

A46 Coventry Junctions (Walsgrave)

Scheme Number: TR010066

6.8 Environmental Scoping Report

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A46 Coventry Junctions (Walsgrave)
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ENVIRONMENTAL SCOPING REPORT

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Environmental Scoping Report

Regulation 10(1) of the Infrastructure Planning (Environmental
Impact Assessment) Regulations 2017

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Table of contents

1.	Introduction	8
1.1.	Overview of the project	8
1.2.	Consenting approach	8
1.3.	Purpose of the report	9
2.	The project	10
2.1.	Need for the project	10
2.2.	Project objectives	10
2.3.	Project location	13
2.4.	Project description	17
2.5.	Construction	19
3.	Assessment of alternatives	23
3.1.	Introduction	23
3.2.	History of the proposed scheme	23
4.	Consultation	31
4.1.	Consultation undertaken to date	31
4.2.	Proposed consultation	32
5.	Environmental assessment methodology	34
5.1.	Introduction	34
5.2.	Surveys and predictive techniques and methods	35
5.3.	General assessment assumptions and limitations	38
5.4.	Significance criteria	39
5.5.	Duplication of assessment	43
5.6.	Environmental Statement	44
6.	Air Quality	47
6.1.	Introduction	47
6.2.	Study area	51
6.3.	Baseline conditions	54
6.4.	Potential impacts	57
6.5.	Design, mitigation and enhancement measures	59
6.6.	Description of the likely significant effects	59
6.7.	Assessment methodology	60
6.8.	Assessment assumptions and limitations	62
7.	Cultural heritage	63
7.1.	Introduction	63
7.2.	Study area	65
7.3.	Baseline conditions	66
7.4.	Potential impacts	70
7.5.	Design, mitigation and enhancement measures	72
7.6.	Description of the likely significant effects	72
7.7.	Assessment methodology	76
7.8.	Assumptions and limitations	79
8.	Landscape and visual	81
8.1.	Introduction	81
8.2.	Study area	83
8.3.	Baseline conditions	84
8.4.	Potential impacts	86

8.5.	Design, mitigation and enhancement measures	89
8.6.	Description of the likely significant effects	91
8.7.	Assessment methodology	92
8.8.	Assessment assumptions and limitations	97
9.	Biodiversity	98
9.1.	Introduction	98
9.2.	Study area	99
9.3.	Baseline conditions	100
9.4.	Potential impacts	111
9.5.	Design, mitigation and enhancement measures	115
9.6.	Description of the likely significant effects	115
9.7.	Assessment methodology	116
9.8.	Assessment assumptions and limitations	121
10.	Geology and soils	122
10.1.	Introduction	122
10.2.	Study area	123
10.3.	Baseline conditions	123
10.4.	Potential impacts	127
10.5.	Design, mitigation and enhancement measures	128
10.6.	Description of the likely significant effects	129
10.7.	Assessment methodology	131
10.8.	Assessment assumptions and limitations	131
11.	Material assets and waste	133
11.1.	Introduction	133
11.2.	Study area	137
11.3.	Baseline conditions	138
11.4.	Potential impacts	142
11.5.	Design, mitigation and enhancement measures	143
11.6.	Description of the likely significant effects	145
11.7.	Assessment methodology	151
11.8.	Assessment assumptions and limitations	151
12.	Noise and vibration	153
12.1.	Introduction	153
12.2.	Study area	154
12.3.	Baseline conditions	155
12.4.	Potential impacts	157
12.5.	Design, mitigation and enhancement measures	159
12.6.	Description of likely significant effects	161
12.7.	Assessment methodology	162
12.8.	Assessment assumptions and limitations	168
12.9.	Conclusion	169
13.	Population and human health	170
13.1.	Introduction	170
13.2.	Study area	174
13.3.	Baseline conditions	175
13.4.	Potential impacts	186
13.5.	Design, mitigation and enhancement measures	187

13.6.	Description of the likely significant effects	187
13.7.	Assessment methodology	188
13.8.	Assessment assumptions and limitations	195
14.	Road drainage and water environment	196
14.1.	Introduction	196
14.2.	Study area	197
14.3.	Baseline conditions	197
14.4.	Potential impacts	208
14.5.	Design, mitigation and enhancement measures	214
14.6.	Description of the likely significant effects	217
14.7.	Assessment methodology	218
14.8.	Assessment assumptions and limitations	224
15.	Climate	226
15.1.	Introduction	226
15.2.	Study area	229
15.3.	Baseline conditions	230
15.4.	Potential impacts	233
15.5.	Design, mitigation and enhancement measures	235
15.6.	Description of the likely significant effects	236
15.7.	Assessment methodology	237
15.8.	Assessment assumptions and limitations	240
16.	Assessment of cumulative effects	241
16.1.	Cumulative assessment methodology	241
16.2.	Assessment of combined effects	246
16.3.	Assessment of cumulative effects	246
17.	Summary	248
18.	Acronyms & glossary	254
18.1.	Acronyms	254
18.2.	Glossary	258
19.	References	260

List of Appendices

Appendix A.	Environmental proposed scheme plans	272
Appendix B.	General arrangement drawings	277
Appendix C.	Air quality figures	282
Appendix D.	Cultural heritage gazetteer tables	285
Appendix E.	Cultural heritage figures	300
Appendix F.	Landscape figures	304
Appendix G.	Ecological constraints plan	307
Appendix H.	Material assets and waste figure	309
Appendix I.	Population and human health figure	311
Appendix J.	Road drainage and water environment figures	313
Appendix K.	Lighting impact assessment	317

Tables

Table 3-1: Descriptions of the six design families considered as part of the assessment of alternatives	24
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Table 5-1: Descriptions of environmental value (sensitivity)	39
Table 5-2: Magnitude of impact and typical descriptors	40
Table 5-3: Significance matrix	40
Table 5-4: Descriptions of the significance of effect categories	41
Table 5-5: Outline structure of the Environmental Statement	44
Table 6-1 : Relevant objectives set out in the Air Quality Strategy and concentration targets as per Environment Act 2021 for the protection of human health	49
Table 6-2 Annual mean NO ₂ concentrations from nearby passive air quality monitoring locations	54
Table 6-3 Annual mean NO ₂ Concentrations from Nearby Automatic Air Quality Monitoring Locations	55
Table 6-4: Projected background concentrations (µg/m ³) of NO _x , NO ₂ , PM ₁₀ and PM _{2.5} relevant to the proposed scheme	57
Table 6-5: Summary of potential air quality impacts for assessment	60
Table 7.7-1. Potential impacts on cultural heritage within the proposed scheme extent	71
Table 7.7-2. Scoping assessment questions	75
Table 7.7-3. Criteria for assessing value	78
Table 7.7-4. Magnitude of change	78
Table 8-1: Proposed representative viewpoints	88
Table 8-2: Criteria for assessing landscape sensitivity (susceptibility and value) and typical descriptions	93
Table 8-3: Criteria for magnitude of change and nature of effect on the landscape and typical descriptions	94
Table 8-4: Criteria for assessing visual sensitivity (susceptibility and value) and typical descriptions	94
Table 8-5: Criteria for magnitude of change on the visual impact and typical descriptions	95
Table 9-1: Survey guidance for targeted surveys to inform the Scoping Report and dates of surveys undertaken at the time of writing this Scoping Report	100
Table 9-2: Nationally important statutory designated sites within 2km of the proposed scheme extent	102
Table 9-3: Non-statutory designated sites within 2km of the proposed scheme	103
Table 9-4: Potential ecology impacts – construction and operation	112
Table 9-5: Guidance for determining the importance of ecological features (DMRB LA108 Table 3.9)	117
Table 9-6: Level of impact and typical descriptions (taken from DMRB LA 108, Table 3.11)	120
Table 9-7: Description of the significance of effect categories	120
Table 10-1: Baseline data	124
Table 10-2: Summary of potential geology and soil effects	130
Table 10-3 : Baseline data	130
Table 11-1: Remaining landfill capacity summary (end 2021)	141
Table 11-2: Potential material assets and waste impacts – construction	146
Table 12-1: Indicative study area for each phase and activity	154
Table 12-2: Example threshold of potential significant effect at dwellings	164
Table 12-3: Construction noise LOAELs and SOAELs	164
Table 12-4: Magnitude of impact, construction noise levels	164
Table 12-5: Magnitude of impact, construction traffic noise levels	165

Table 12-6: Magnitude of impact, construction vibration levels	165
Table 12-7: Operational noise LOAELs and SOAELs	166
Table 12-8: Magnitude of change, short term and long term	167
Table 12-9 Initial assessment of operational noise significance	167
Table 12-10 Summary of potential noise and vibration effects	168
Table 13-1: Public health baseline data	182
Table 13-2: Potential construction impacts	186
Table 13-3: Potential operational impacts	186
Table 13-4: Sensitivity of receptors	189
Table 13-5: Impact magnitude criteria for receptors	192
Table 13-6: Human health outcome categories	194
Table 14-1: Summary of existing road drainage and the water environment baseline	198
Table 14-2: Criteria for estimating the importance of water environment attributes (adapted from DMRB LA 113)	221
Table 14-3: Estimating the magnitude of an impact on an attribute (adapted from DMRB LA 113)	222
Table 14-4: Significance categories and typical descriptions	224
Table 15-1: UK Government carbon budgets	231
Table 15-2 : Historic climate baseline for Midlands (1981-2010)	232
Table 15-3 : Future climate projections for Midlands (2080s; RCP8.5)	232
Table 15-4 : Impact of the proposed scheme on climate	234
Table 15-5 : Likelihood categories	239
Table 15-6 : Description of consequences	239
Table 15-7 : Significance matrix ('S' significant, 'NS' not significant)	240
Table 16-1: Likely degree of certainty assigned to each tier	243
Table 16-2: Combined and cumulative significance criteria	245
Table 17-1: Summary of scoping assessment for environmental factors and requirement for further assessment	249
Table 18-1: Acronym list	254
Table 18-2: Glossary	258

1. Introduction

1.1. Overview of the project

- 1.1.1. The A46 Coventry Junction (Walsgrave) (the 'proposed scheme') comprises of an upgrade to the junction of the A46 Coventry Eastern bypass and the B4082, east of Walsgrave. The proposed scheme is being progressed by National Highways to ease congestion and reduce queuing along the A46 corridor, east of Coventry.
- 1.1.2. The proposed scheme forms part of a wider scheme of improvements to the A46, a non-continuous route which begins east of Bath and ends in Cleethorpes. The A46 connects a number of major employment sites to the wider motorway network and forms a key element of the north-south travel movements in the area.

1.2. Consenting approach

- 1.2.1. The proposed scheme is a Nationally Significant Infrastructure Project (NSIP) within Sections 14(1)(h) and 22 of the Planning Act 2008. Under Section 22, an NSIP must fall within one of the three categories specified, which are expressly stated to be alternatives. The proposed scheme is an 'alteration of a highway' as it falls under Sections 22(1)(b), 22(3) and 22(4)(b).
- 1.2.2. The Scheme satisfies Section 22(3) and 22(4)(b) in that:
- the highway is wholly in England
 - the Applicant as a strategic highways company will be the highway authority for the highway
 - the area of land on which part of the highway to be altered and any adjoining land expected to be used in connection with its alteration is greater than the limit of 12.5 hectares set out in subsection (4)(b), and the speed limit will be 50mph or greater.
- 1.2.3. In accordance with the legislation, a Development Consent Order (DCO) is therefore required to allow the construction and operation of the proposed scheme.
- 1.2.4. The proposed scheme falls under the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (hereafter referred to as the EIA Regulations). It falls under Schedule 2, Section 10f, infrastructure projects, construction of roads (unless included in Schedule 1). The selection criteria in Schedule 3 of the EIA Regulations have been used to screen the proposed scheme and have identified the potential for significant effects. The proposed scheme therefore requires a statutory EIA to support the DCO application.

- 1.2.5. In accordance with Regulation 8(1)(b) of the EIA Regulations, National Highways notifies the Secretary of State for Transport (Secretary of State) that an Environmental Statement will be submitted with the DCO application for this project.

1.3. Purpose of the report

- 1.3.1. This report is the Environmental Scoping Report (ESR) for the proposed scheme. It is prepared in line with guidance on EIA Scoping provided in the Planning Inspectorate's Advice Note Seven: Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping (Planning Inspectorate, 2020).
- 1.3.2. The ESR is a required product for projects likely to seek consent through the Planning Act 2008. The ESR is produced to document the proposed scope of the EIA, including a description of the aspects which will be considered within the Environmental Statement (ES). The ESR sets out the environmental features and constraints that are identified from a desk-based study and preliminary field surveys and provides a description of the potential impacts that could arise from the proposed scheme. The outcomes of the scoping assessment are used to reach a reasoned conclusion on the likely significant effects of constructing and operating the proposed scheme on the environment, and provide justification, supported by evidence, for scoping aspects and matters in or out of further EIA.
- 1.3.3. The environmental scoping assessment has been completed in accordance with section 10 of the EIA Regulations and the Design Manual for Roads and Bridges (DMRB) LA 103 Scoping projects for environmental assessment (Highways England, 2020a). The environmental factors covered include those within DMRB.

The overseeing organisation

- 1.3.4. National Highways is the Applicant and the Strategic Highways Company, as defined in the Infrastructure Act 2015 charged with modernising and maintaining the highways, as well as running the network and keeping traffic moving. National Highways is responsible for the operation and maintenance of the Strategic Road Network (SRN) in England, which includes all motorways and major trunk roads.

2. The project

2.1. Need for the project

- 2.1.1. The A46 corridor forms part of the national SRN connecting the M1, M6 and the M69 with the M5 and provides links to the SRN and the rest of the country. The South Midlands Route Strategy Evidence Report (Highways Agency, 2014) indicated that sections of the A46 to the south and east of Coventry suffer from congestion and poor journey time reliability issues. These are likely to be exacerbated by future housing growth and economic aspirations. Many communities are located adjacent to the A46 and stakeholders have raised concerns regarding the pedestrian crossing points on and near the A46.
- 2.1.2. The A46 has historically experienced safety performance issues in comparison to the rest of the SRN. The A46 south of Coventry was in the top 45% for total casualties and in the top 250 collision locations in England. Improvements at A45/A46 Tollbar End Junction, to the south of Coventry, to grade separate the A46 (N) to A45 (W) movements were completed in 2017. Conversion of a section of the M6 between junctions 2 and 4 into a smart motorway was completed in March 2020.
- 2.1.3. Walsgrave Junction is one of two roundabouts east of Coventry and north of Tollbar End Junction that are at grade, and as such are pinch points for traffic. The second roundabout is located to the east of Binley, approximately 1.7km to the south of Walsgrave Junction. The Tollbar End and M6 Smart Motorway improvements have increased the pressure on Binley and Walsgrave Junctions.
- 2.1.4. There are concerns that without further investment to reduce congestion on the A46, the benefits derived from the improvement works at Tollbar End Junction would be limited. In particular, the current delays at the Binley and Walsgrave Junctions could undermine the existing investment which has been made on A46 improvements.

2.2. Project objectives

- 2.2.1. The Secretary of State (SoS) appointed Highways England Company Limited (the Licence holder) (now operating as National Highways) by way of an Order in accordance with Section 1 of the Infrastructure Act 2015. The licence under which National Highways operates sets out the SoS's statutory directions and guidance to National Highways. Under the licence, National Highways is the highway authority, traffic authority and street authority for the SRN. It makes clear, to both National Highways and the wider community of road users and stakeholders, what National Highways is expected to achieve and how they must

behave in discharging their duties and in delivering plans for the network, set out in the Road Investment Strategy 2 (RIS2).

2.2.2. Under Part 4.2g of The Highways England Licence (Department for Transport, 2015) and in accordance with the Infrastructure Act 2015, the licence holder must “*minimise the environmental impacts of operating, maintaining and improving its network and seek to protect and enhance the quality of the surrounding environment.*” The licence holder should and will as part of implementing this proposed scheme follow the conditions set out in Part 5.23 of the act:

- “*Ensure that protecting and enhancing the environment is embedded into its business decision-making processes and is considered at all levels of operations.*”
- “*Ensure the best practicable environmental outcomes across its activities, while working in the context of sustainable development and delivering value for money.*”
- “*Consider the cumulative environmental impact of its activities across its network and identify holistic approaches to mitigate such impacts and improve environmental performance.*”
- “*Where appropriate, work with others to develop solutions that can provide increased environmental benefits over those that the Licence holder can achieve alone, where this delivers value for money.*”
- “*Calculate and consider the carbon impact of road projects and factor carbon into design decisions and seek to minimise carbon emissions and other greenhouse gases from its operations.*”
- “*Adapt its network to operate in a changing climate, including assessing, managing and mitigating the potential risks posed by climate change to the operation, maintenance and improvement of the network.*”
- “*Develop approaches to the construction, maintenance and operation of the Licence holder's network that are consistent with the government's plans for a low carbon future.*”
- “*Take opportunities to influence road users to reduce the greenhouse gas emissions from their journey choices.*”

Project objectives

2.2.3. In order to resolve the issues identified above the following objectives have been identified:

- an SRN that supports and facilitates economic growth, supporting employment and residential development opportunities
- an SRN that is maintained to safe and serviceable condition

- improve the operation and efficiency of the existing transport network, delivering capacity enhancements to the SRN
- an SRN that minimises its negative impacts on users, local communities and the environment
- an SRN that balances the need of individuals and businesses that use and rely upon it
- reducing / minimising the impact on the wider environment, whilst seeking to bring enhancement
- operational maintenance to be considered holistically during the design stage and at a balance of cost versus disruption

2.2.4. The A46 corridor provides opportunities for economic growth and improved accessibility within Coventry and Warwickshire enabling the unlocking of sites for residential development and improving access to existing commercial areas.

2.2.5. Economic growth aspirations in the surrounding environment as mentioned in the Coventry and Warwickshire updated strategic economic plan (Coventry and Warwickshire Local Enterprise Partnership, 2016) include:

- up to 75,000 new homes and 94,500 jobs in Coventry and Warwickshire by 2030
- Friargate, a 30-hectare mixed use regeneration project in Coventry city centre
- Ansty Park, high profile prestige business park site for Coventry and Warwickshire
- Whitley South, an extension of Jaguar Land Rover's existing site west of the A46 Tollbar Junction

2.2.6. The A46 corridor also fulfils a key strategic role in linking the advanced manufacturing sector within the Warwickshire sub region.

2.2.7. The proposed scheme seeks to support the following performance outcomes as stated in the Highways England Strategic Business Plan: 2020-2025 (Highways England, 2020l):

- improved safety for all
- providing fast and reliable journeys
- a well-maintained and resilient network
- delivering better environmental outcomes
- meeting the needs of all users
- achieving efficient delivery

- 2.2.8. Under Section 5.24 of the Licence, National Highways must deliver these commitments and develop strategies and timescales as specified and published in Highway's England Delivery Plans.
- 2.2.9. The proposed scheme is set out in Highways England's Delivery Plan 2020-2025 (Highways England, 2020k). The Delivery Plan 2020-2025 builds on Highways England's Strategic Business Plan 2020-2025 which was the response to the Government's road improvement scheme. The Strategic Business Case sets out the performance goals in six key areas, one of which is delivering better environmental outcomes. The Delivery Plan states *"We want our roads to work more harmoniously with the communities that live alongside them, and the built, natural and historic environments that surround them. Every aspect of our business has a part to play in improving environmental performance, alongside ensuring we meet our statutory obligations. We will build on the progress made during the first road period and embed environmental considerations into all our activities, ranging from infrastructure design to scheme delivery"*.

2.3. Project location

- 2.3.1. The proposed scheme, shown in figure 2.1 in Appendix A, is located approximately 5km to the east of Coventry city centre and connects the B4082 and the A46. Binley Junction is approximately 1.7km to the south and the M6 and M69 are to the north.
- 2.3.2. The proposed scheme is situated within the Coventry City Council and Rugby Borough Council administrative areas (figure 2.1, Appendix A). In the vicinity of the proposed scheme, the boundary between these two administrative areas is along the western side of the A46.
- 2.3.3. Figure 2.2 in Appendix A shows the local area. To the west of Walsgrave Junction, the area is densely populated with seven schools within 2km of the junction and University Hospital Coventry is located approximately 1.2km to the north. An area of land on the west side of the A46, from north of Walsgrave Junction to where the A46 crosses the River Sowe, has been allocated for development (H2:3) in the Coventry City Council Local Plan 2011 to 2031 (Coventry City Council, 2017). This site is expected to deliver approximately 900 dwellings through future development proposals, which is approximately 3.7% of the homes the Local Plan sets out to provide before 2031. There are areas allocated in the Coventry Local Plan for housing development to the west of the A46.

- 2.3.4. Immediately adjacent to the east side of Walsgrave Junction is Coombe Country Park, part of which includes Coombe¹ Pool Site of Special Scientific Interest (SSSI) and Coombe Abbey Grade II* Park and Garden.

Sensitive environmental receptors

- 2.3.5. Environmental constraints and sensitive receptors are described in detail in the individual topic chapters. Potentially sensitive receptors to the proposed scheme have been identified and are presented on the environmental constraints plan as shown in figure 2.3 in Appendix A and summarised as follows:

Residential, community, noise and air receptors:

- nearby residential communities which are part of Walsgrave on Sowe and Binley are located to the north and south of the B4082, west of A46. A residential property is also located at Hungerley Hall Farm approximately 140m north-west of the junction
- the nearest noise important areas (NIA)² in relation to road noise are over 1km from the existing junction
- Clifford Bridge Academy and Pearl Hyde Primary School are situated approximately 380m and 840m from the existing junction respectively. A further five schools are within 2km of the junction
- Wyken Community Centre is located approximately 770m north-west of the existing junction and Coventry and Warwickshire University Hospital is approximately 1.2km to the north.
- Caludon Castle playing fields are situated 1km to the north-west
- the junction is immediately adjacent to the Coventry City-Wide Air Quality Management Area (AQMA), which has been designated due to exceedances of the annual mean nitrogen dioxide (NO₂) objective
- Coombe Country Park, the Spring Estate Allotments adjacent to Clifford Bridge Road, recreational open space adjacent to Binley residential development, and Caludon Castle playing field may be sensitive to dust soiling during construction

Ecological receptors:

- there are no European protected sites (Special Protection Areas (SPAs), Special Areas of Conservation (SAC) or Wetlands of International Importance (Ramsar sites) within 2km of the existing junction. The nearest European protected site is Ensor's Pool SAC which is located over 11.5km to the north-west

¹ Coombe is also spelt as Combe in some databases. For consistency, hereafter the spelling of Coombe will be used.

² Noise Action Planning Important Areas (IAs) for roads and railways are also shown. These areas provide a framework for the local management of the Important Areas.

- Coombe Pool SSSI is located adjacent to the east of the Walsgrave Junction. The SSSI lies within Coombe Country Park and contains a 36 hectare (ha) pool (fed by Smite Brook), reed beds, and woodland. The site is known for its herons (it is the largest heronry in the county with 20 breeding pairs), wintering waterfowl, few pairs of tufted duck, kingfisher, water rail, and grey wagtail. The woodland within the SSSI supports a diverse breeding bird community (tits, corvids, woodpecker (three species) and warblers)
- three other SSSI are within 5km south of the proposed scheme: Herald Way Marsh (1.6km south), Ryton and Brandon Gravel Pitts (2.3km south), and Brandon Marsh (2.3km south)
- Stoke Floods Local Nature Reserve (LNR) is located approximately 900m south-west of the junction. The reserve has a large lake, reedbeds and scrub next to the River Sowe. The site supports many wetland plants, flag and reed canary grass and bird life is varied from many species of duck, seven species of warbler in the summer and occasional black tern and yellow wagtails. The reserve is one of the most important wetland sites in Coventry and is a wildlife oasis in an area of high intensity housing. Two other LNR are located within 5km of the junction; Willenhall Wood (south-west of the proposed scheme) and Wyken Slough (north-west of the proposed scheme)
- seven local wildlife sites (LWS) are located within 2km of the junction, the closest of which is Gainford Rise LWS which is approximately 80m south of existing Walsgrave roundabout (west of the A46)

Hydrological, flood risk and geological receptors:

- Smite Brook, which is culverted beneath the A46 approximately 50m to the south of Walsgrave Junction. Smite Brook is an Ordinary Watercourse and classified under the Water Framework Directive (WFD)
- River Sowe and Withy Brook. The River Sowe, which passes around the edge of Walsgrave on Sowe and is approximately 280m to the north-west of the junction. Smite Brook flows into the River Sowe approximately 500m downstream of where it emerges from the A46 embankment. The River Sowe is a classified under the WFD
- there are a number of standing water bodies within 2km of the junction, including Coombe Pool SSSI, Herald Way Marsh SSSI/ LNR, Brandon Marsh SSSI, and Ryton and Brandon Gravel Pits SSSI. To the north of the A428 Binley Road, the floodplain north of the channel is included within the Stoke Floods LNR There are also a number of unnamed ponds and field drains
- no SSSIs designated for geological or geomorphological interest have been identified within 2km of the junction

Cultural heritage receptors:

2.3.6. Designated heritage assets located within 500m of Walsgrave Junction include:

- Coombe Abbey, Grade II* listed Park and Garden which is adjacent to Walsgrave Junction and is situated within the Coombe Country Park. The park has been developed on the grounds of the old abbey which was

enclosed in 1150 for sheep pasture. The abbey has now been converted into the privately owned Coombe Abbey hotel

- three Grade II listed buildings at the site of Hungerley Hall Farm, approximately 170m north of the junction. These listed buildings are associated with the late 17th – early 18th century farmhouse

2.3.7. Other designated heritage assets located up to 1km of Walsgrave Junction include:

- two scheduled monuments at the site of Caludon Castle (approximately 880m north-west of the proposed scheme at the nearest point)
- two Grade I listed buildings
- one Grade II* listed building
- 16 Grade II listed buildings

Key traffic and transport receptors:

- no public rights of way (PRoW) cross the A46 near the junction. Nearby PRoW include: R75x and R75b bridleways which are located approximately 1.5km to the north-east and footpaths R75y 2.4km to the north-east) and R145 (approximately 1.7km to the south)
- the Sowe Valley Walk, a locally promoted walk, is situated approximately 280m west of the junction and follows the River Sowe from Longford through to Willenhall
- no footways or pavements are provided along the A46 or the B4082
- footways are provided along Clifford Bridge Road and there is a crossing point on Clifford Bridge Road near Bridgeacre Gardens. The Sowe Valley Walk also passes beneath Clifford Bridge Road north of the junction with B4082
- a number of bus routes are serviced along Clifford Bridge Road, with the following route numbers calling at 'Clifford Bridge Rd Stop': 17, 17A, 85, 85B, 60 (travelling north east) and 8, 85S, 8S, 9, X30, 74, 74A, 74S, X6, 85A (travelling south west)

The Rochdale envelope

- 2.3.8. The Planning Inspectorate's Advice Note 9: 'Rochdale Envelope' (Planning Inspectorate, 2018) provides guidance regarding the degree of flexibility that may be considered appropriate within an application for development consent under the Planning Act 2008. The advice note acknowledges that there may be aspects of the proposed scheme design that are not yet fixed, and therefore, it may be necessary for the EIA to assess likely worst-case variations to ensure that all foreseeable significant environmental effects of the proposed scheme have been assessed. In accordance with the guidance provided in Advice Note 9, the draft DCO site boundary has been drawn at this stage to allow some

design flexibility. The project design process is ongoing, and as such it is not possible to define the exact footprint of the proposed scheme. The draft DCO site boundary as included herein will be subject to review and revision but will be finalised prior to the DCO application.

- 2.3.9. This ESR is based on the emerging preliminary design for the proposed scheme. The proposed scheme is to be developed further through a reference design stage which will form the basis for the DCO application.
- 2.3.10. Within the reference design there will need to be sufficient flexibility to provide scope for finalising the detailed design and construction methodology in due course. Therefore, when presenting the proposed scheme design in the ES and the accompanying assessment, the requirements of Advice Note 9 will be complied with to ensure that the likely significant effects of the proposed scheme are assessed on a reasonable worst-case basis.
- 2.3.11. The proposed scheme boundary used in the ESR has been taken from the option selection stage ESR and has not yet been refined for the preliminary design stage. The proposed scheme boundary for this scoping exercise is a combined indicative land take boundary for construction of all options assessed at the option selection stage (and is subject to change as the project progresses).

2.4. Project description

Structures

- 2.4.1. The full grade separated dumb-bell junction would be approximately 800m north of the existing Walsgrave Junction roundabout and would consist of north and southbound diverge and merge slip roads connecting to an overbridge with roundabouts to the east and west. The Walsgrave overbridge would be provided across the A46 between the two roundabouts and would carry a two-lane single carriageway. The proposed scheme will also include a new electronic message sign gantry.
- 2.4.2. There are also two existing structures: Hungerley Hall Farm accommodation overbridge and Smite Brook culvert which may need works undertaken. This will be confirmed during the preliminary design stage.

Walkers, cyclists and horse riders

- 2.4.3. Operation of the proposed scheme will not result in any impacts on any walking, cycling and horse-riding (WCH) facilities. The proposed scheme will also not lead to any changes to the local WCH network.

- 2.4.4. Opportunities for WCH will be explored further during the preliminary design stage and may include and/or encourage controlled crossings, footpaths and cycleways.

Drainage design

- 2.4.5. The proposed outline drainage strategy for the proposed scheme is for three attenuation ponds to be constructed to attenuate the increase in impermeable area, before discharging to the River Sowe to the west via new outfalls. The pond volumes will take into account relevant climate change allowances, to be agreed with statutory bodies. A new culvert may be required to carry flow under the proposed connector road to maintain an existing drainage ditch.
- 2.4.6. The drainage design will be based on the principles of the standard DMRB CG 501: Design of Highway Drainage Systems (National Highways, 2022a) for the majority of the work. Where the standard cannot be viably applied a departure from Standard will be sought in line with DMRB GG 101: Introduction to the Design Manual for Roads and Bridges (National Highways, 2021). This approach will be discussed with the local lead flood authority (LLFA) before the drainage strategy is finalised.

Lighting

- 2.4.7. The proposed scheme will include new lighting, including:
- lighting of the dumb-bell junction
 - increase in the presence of mainline carriageway lighting columns
 - new slipway lighting columns
 - new connector road lighting columns
- 2.4.8. The lighting design is still to be developed; however, it is assumed that efficient full cut-off lighting technology and light emitting diodes would be used.

Technology

- 2.4.9. Within the proposed scheme limits there are several technology asset installations. These include: two existing Variable Message Signs (VMS), two existing Emergency Roadside Telephones (ERTs), two existing communications network cabinets, one existing power supply cabinet, and two existing traffic flow loops. Due to proposed scheme proposals and the introduction of a new dumb-bell junction some of these existing installations will be impacted.
- 2.4.10. A summary of the impacted existing assets is as follows:
- one of the two existing VMS will require relocation

- both ERTs will likely be removed as they are not required from a road operational perspective
- the existing communications cabinets will require relocation
- the existing power cabinet will require relocation
- the existing traffic flow loops may need to be replaced at the same location

2.4.11. On the northern side of the proposed scheme, there are additional existing technology assets which currently fall outside the proposed scheme extents and are therefore assumed to be unimpacted.

Utilities

2.4.12. A high voltage electricity line runs north-south on the western side of the A46, crossing the B4082 immediately west of Walsgrave Junction. It is not proposed that this line will be impacted by the proposed scheme. The presence of statutory undertakers apparatus (such as electricity, gas and mains water) will be identified during the design process and any impacts or constraints on design identified.

Environmental design

2.4.13. The proposed scheme design is an iterative process which considers the key potential significant effects on environmental receptors. Environmental considerations that have influenced the option development and selection process are set out in Chapter 3: Assessment of alternatives. The ongoing design development will continue to be influenced by the EIA process.

2.4.14. Environmental mitigation can be incorporated within the highways design, where appropriate, to mitigate environmental effects from the proposed scheme. Examples of this include noise barriers and bunds to mitigate noise level changes from road traffic, drainage features, and landscape planting to screen visual effects. More detail on aspect specific mitigation is provided in Chapters 6-15 of this ESR. Mitigation measures will continue to be developed throughout the design development, informed by the EIA.

2.5. Construction

Construction programme and phasing

2.5.1. The Start of Works (SoW) is anticipated to be September 2026, with the proposed scheme being open for traffic (OFT) in May 2028.

2.5.2. It is anticipated that construction works of the proposed scheme would take place over an approximate 18 month period. Construction works are anticipated to be from September 2026 to Spring 2028.

Compounds and haul roads

- 2.5.3. A construction compound of approximately 17,000m² is assumed to be required and is expected to include temporary offices, compounds and storage areas. This is proposed to be located to the north of Hungerley Hall Farm, with access off the existing B4082.

Traffic management

- 2.5.4. There are currently two options for traffic management during the construction phasing of the proposed scheme which are being considered.
- 2.5.5. Option 1 is based on keeping all lanes running on the A46 northbound and southbound carriageway at peak times throughout the works.
- 2.5.6. Option 2 is based on reducing the capacity of the northbound and southbound carriageways of the A46 to single carriageway whilst constructing sections of the works to the south of the existing Walsgrave Junction.
- 2.5.7. Construction programmes for each option are currently being drafted. These programmes will then be used to calculate costs and forecast delay to journey times. This information will be used to inform the decision on the preferred traffic management option.
- 2.5.8. Both options 1 and 2 require the following traffic management arrangements:
- narrow lane running and a reduced speed limit on the A46 northbound and southbound carriageways
 - night closures of the A46 northbound and southbound carriageways
 - narrow lane running and a reduced speed limit on the B4082
 - night closures of the B4082
 - realignment of the existing Walsgrave roundabout
 - use of temporary crossovers between carriageways
- 2.5.9. Option 1 requires the following additional traffic management:
- construction of temporary lanes in the southbound verge south of the existing roundabout
- 2.5.10. Option 2 requires the following additional traffic management:
- reduction of the northbound carriageway to single lane traffic for sections of the programme
 - reduction of the southbound carriageway to single lane traffic for sections of the programme

- running traffic in single lane contraflow
- removal of right hand turns to and from the B4082 for sections of the programme

2.5.11. Where practicable all lanes will be kept open during construction of the proposed scheme to minimise disruption to the road user. The following works will be completed offline:

- construction of the new link road (other than tie-ins to A46)
- construction of the new slip roads and roundabouts
- construction of the new bridge
- removal of the existing roundabout

2.5.12. To increase the working area and safety zones during offline working, narrow lanes, temporary safety barriers and reduced speed limits will be implemented.

2.5.13. Works requiring carriageway closures are as follows:

- installation of new traffic management layouts
- final surfacing / road marking visits
- completion of tie in works for new slip roads and link road
- demolition of the existing access bridge (if required)

2.5.14. Where carriageway closures are noted above, these will be undertaken during nights or over weekends to minimise disruption. Closures will be communicated to stakeholders and suitable diversion routes will be in place.

Plant and equipment

2.5.15. Construction activities would involve the use of heavy plant items, for example excavators, dumper trucks, dozers, piling rigs, and demolition and compaction equipment.

Earthworks

2.5.16. Large amounts of fill material would be required, estimated at 193,000m³. This may be reduced by recycling material generated at site, with cut material estimated to be 126,500m³. Various options will be explored to obtain additional fill material from local sources, including other nearby construction projects which have a surplus of suitable fill, as well as local quarries.

Dewatering

- 2.5.17. Ground investigation (GI) will be undertaken to determine the ground and groundwater conditions within the proposed scheme extent. The information obtained will be used to inform the risk assessment of any identified contaminated land impacting on the groundwater and will be used to determine the requirements for protective measures if deemed necessary. An assessment of the requirement for dewatering activities as part of the construction works will also be undertaken following the ground investigation.
- 2.5.18. If required, dewatering and disposal using standard techniques such as sumps and pumps may be used to manage the potential for groundwater seepages into excavations/ earthworks.

Carbon management

- 2.5.19. In order to deliver National Highways' aspirations with respect to the minimisation of carbon emissions and the efficient use of resources, the carbon intensity of the proposed scheme will be established and monitored throughout the design and construction phases.

Sustainable procurement

- 2.5.20. In addition to ensuring a carbon efficient design, a sustainable procurement strategy will be implemented to ensure that low carbon materials are, where practicable, specified and that the carbon intensity of materials and sub-contract packages is measured and monitored throughout.

Materials and waste management

- 2.5.21. The recycling and re-use of site (including demolition) materials arising from the proposed scheme will be implemented and, where practicable, construction materials will be sourced from local sources of supply.

3. Assessment of alternatives

3.1. Introduction

3.1.1. This chapter outlines the alternative design options that have been considered during the development of the proposed scheme. All National Highways projects go through the following initial project stages:

- strategy stage – at this project stage initial analysis and appraisal are conducted to assess the viability of transport scheme solutions to the problem, including road network and non-road network solutions.
- options identification stage: at this stage traffic modelling and economic and environmental assessment is undertaken on a number of options.
- option selection stage: at this stage the public are consulted on the recommended options from the options identification stage. Refinements are then made to the option designs, traffic modelling and economic and environmental assessments following feedback from the consultation. At the end of the option selection stage a Preferred Route Announcement (PRA) is made to announce the decision on which option to progress.
- preliminary design stage: this is the stage the proposed scheme is currently in and involves developing a single preferred option to the required level for undertaking an EIA and applying for a DCO.

3.2. History of the proposed scheme

Alternative options considered

3.2.1. In July 2014, Highways England published the Route Strategic Options Report – A46 Coventry to M6 J2 Study (Highways England, 2014), which identified four potential options associated with the Binley and Walsgrave Junctions that could address congestion and poor journey time reliability issues at Binley and Walsgrave Junctions along the A46. These included:

- Option 1: Improvements to the Binley Junction by grade separation
- Option 2: Improvements to Walsgrave Junction through relocation of the junction and grade separation
- Option 3: Improvements to or upgrade of M6 Junction 2 and M6/M69, and consideration of whether the links can be improved, and if there is sufficient capacity to cope with the planned growth
- Option 4: Improvements to both Binley and Walsgrave Junctions as stated in Options 1 and 2 above

3.2.2. Option 4 was progressed, and design development was undertaken between mid-March to October 2016 in several phases. First, several designs for each of the two junctions were developed and evaluated against a number of metrics

(safety, traffic throughput, impact on local network, environment, geotechnical issues, economic growth, cost and stakeholder impact). The designs were then considered in a series of scenarios which comprised:

- Grade separation of Binley Junction only (at either 50mph or 70mph)
- Two grade separation junctions at Binley and Walsgrave (at either 50mph or 70mph)

3.2.3. In October 2016, it was determined that development of Binley Junction should continue with Walsgrave Junction placed on hold until the local authorities were in a position to unlock the surrounding development land.

Walsgrave option development

3.2.4. In April 2018, design work for Walsgrave re-commenced and a review of the work completed as part of the early option assessment was undertaken. To ensure that identification of specific options was not biased by earlier work or limited to a narrow interpretation of the layout, options were developed within six design families, as outlined in Table 3-1.

Table 3-1: Descriptions of the six design families considered as part of the assessment of alternatives

Design family	Description	Degree of change
1	Do nothing / Do minimum	None
2	Southbound dedicated bypass lane	Minor
3	Signalised junction	Minor to moderate
4	Remodel for left-in and left-out to B4082	Moderate
5	Compact grade separated junction	Substantial
6	Full grade separation	Substantial

3.2.5. Thirty options were subsequently developed across the six family types to give a range of possible solutions. The options appraisal took into account:

- safety
- benefits to traffic
- impact on the local network
- environmental and geotechnical considerations
- economic benefits
- cost
- effects on future stakeholders

3.2.6. With respect to the consideration of potential environmental impacts, those options which would require the loss of large areas of Coombe Pool SSSI/

Coombe Abbey Grade II* listed Park and Garden were discounted and not progressed further, as were options which would require complex construction works within Coombe Pool itself.

- 3.2.7. At the end of the options selection stage four do something options were progressed to the options selection stage. These four options are described further below along with the do minimum option which is a standard option against which change is measured.

Options selection stage

Do minimum

- 3.2.8. This is the current baseline (i.e., what would happen in future without the scheme) and includes the completed improvements to Binley Junction. With this option there would be no capacity improvements to Walsgrave Junction and National Highways would be required to put in place a long-term repair and maintenance strategy to maintain the serviceability of the existing structures.

Do something

- 3.2.9. Four options were considered at the options selection stage and have been assessed for the upgrade to the existing Walsgrave Junction. The options were:
- Do something – option 6
 - Do something – option 7
 - Do something – option 8
 - Do something – option 11
- 3.2.10. The proposed scheme is anticipated to have an opening year of 2028 and a design year (15 years after opening) of 2043. Air quality, noise and climate have used traffic modelling data from the base year (2018) in their assessments.

Do something – Option 6 – Full grade separated junction

- 3.2.11. Option 6 is a grade separated junction approximately 1km to the north of the existing roundabout location. The geometry of this option allows a 70mph speed limit on the mainline dual carriageway.
- 3.2.12. The A46 mainline would be realigned through the existing Walsgrave roundabout for approximately 1.8km in length, approximately 225m west of the existing route, and approximately 1m above the existing ground level before re-joining the existing A46 approximately 1.1km north of the existing roundabout.
- 3.2.13. The full grade separated dumbbell junction would be approximately 830m north-west of the existing Walsgrave Junction and would consist of north and

southbound diverge and merge slip roads connecting to an overbridge with roundabouts at each end. The overbridge would be provided across the realigned A46 between the two roundabouts and would carry a two-lane single carriageway. The proposed height above the A46 mainline road level would be up to approximately 7m. A new link road, approximately 1km in length, would be provided between the western roundabout of the dumbbell junction and the existing roundabout on Clifford Bridge Road. This would be a two-lane single carriageway.

- 3.2.14. The existing sections of the B4082 and A46 that are no longer required would be grubbed up and landscaped; however, it may be advantageous to re-use one carriageway from the eastern dumbbell to the south for accommodation works to re-provide access to Hungerley Hall Farm.
- 3.2.15. The proposed outline drainage strategy for Option 6 is for three attenuation ponds to be constructed to attenuate the increase in impermeable area, before discharging to the River Sowe to the west via new outfalls. A new culvert may be required for this option to carry flow under the proposed mainline and connector road. An extension to the culvert carrying Smite Brook under the B4082 would be required on both sides to support the proposed verge. This would involve an in-situ reinforced concrete extension of approximately 7m on the north side and approximately 3m on the south side of the culvert. The existing wingwalls and headwalls would also need to be removed and replaced with in-situ reinforced concrete wingwalls and headwalls.
- 3.2.16. The scheme footprint for Option 6 is 333,138m². The permanent land take required for this option outside of the highway boundary would be 192,825m². The temporary land take required for this option would be 86,358m².

Do something – Option 7 – Left-in/ left-out junction

- 3.2.17. Option 7 is a left-in/ left-out arrangement, allowing merging or diverging from the proposed A46 northbound carriageway. Access/ egress to the local road network from the southbound carriageway is removed.
- 3.2.18. In Option 7 the existing roundabout would be removed and the A46 mainline dual carriageway would be realigned to provide a continuous link for two lanes of traffic in both the north and southbound directions. The realignment would occur at approximately the same level as the existing A46 and would be approximately 1km in length and approximately 40m to the east of the existing roundabout. The proposed alignment would have a posted speed limit of 50mph.
- 3.2.19. Access to the northbound carriageway of the A46 would be maintained through the provision of a new northbound merge slip road from the B4082 to the A46 mainline. Similarly, egress would be maintained via a new northbound diverge

slip road from the A46 mainline to the B4082. The northbound diverge and merge slip roads would be single lane and would require widening of the existing highway corridor north and south of the B4082 where it meets the existing Walsgrave roundabout. Access to and egress from the A46 southbound carriageway at this junction would no longer be possible.

- 3.2.20. The diverge lane from the A46 would begin approximately 200m south of the existing junction and would join the B4082 approximately 230m to the west of the existing junction. The northbound diverge would be introduced at approximately the same level as the existing A46.
- 3.2.21. The merge lane would join the B4082 approximately 230m west of the existing junction and join the A46 approximately 260m to the north. The northbound merge would be introduced at approximately the same level as the existing A46.
- 3.2.22. The existing Walsgrave roundabout and any other redundant land between the proposed slip roads would be grubbed up and landscaped.
- 3.2.23. As part of the drainage strategy, a culvert extension on the west side of the A46 for the Smite Brook under the mainline A46 would be required. This would involve the introduction of a new precast concrete retaining wall approximately 1.2m high and 6.2m long, to be installed in front of the existing headwall to retain fill. No extension is required for the existing link road culvert.
- 3.2.24. The scheme footprint for Option 7 is 111,453m². The permanent land take required for this option outside of the highway boundary would be 7,177m². The temporary land take required for this option would be 28,006m².

Do something – Option 8 – Left-in/ left-out junction

- 3.2.25. Option 8 is also a left-in/ left-out arrangement, allowing merging or diverging from the proposed A46 northbound carriageway. Access/ egress to the local road network from the southbound carriageway is removed. The mainline in this option has a larger radius compared to option 7 to allow for a posted speed limit of 70mph on the proposed A46 through the junction.
- 3.2.26. The existing roundabout would be removed and the A46 mainline dual carriageway would be realigned to provide a continuous link for two lanes of traffic in both the north and southbound directions. The realignment would occur at the approximately the same level as at the existing A46 and would be approximately 1.4km in length and approximately 30m to the east of the existing roundabout.
- 3.2.27. Access to the northbound carriageway of the A46 would be maintained through the provision of a new northbound merge slip road from the B4082 to the A46

mainline. Similarly, egress would be maintained via a northbound diverge slip road from the A46 mainline to the B4082. The northbound diverge and merge slip roads would be single lane and would require widening of the existing highway corridor north and south of the B4082 where it meets the existing Walsgrave roundabout. Access to and egress from the A46 southbound carriageway would no longer be possible.

- 3.2.28. The diverge lane from the A46 would begin approximately 260m south of the existing junction and would join the B4082 approximately 230m to the west of the existing junction. The northbound diverge would be at approximately the same level as the existing A46. The merge lane would diverge from the B4082 approximately 230m west of the existing junction and join the A46 approximately 570m to the north. The northbound merge would be at approximately the same level as the existing A46.
- 3.2.29. The existing Walsgrave roundabout and any other redundant land between the proposed slip roads would be landscaped. The road realignment would impact the listed buildings at Hungerley Hall Farm and require the demolition of the farmhouse.
- 3.2.30. As part of the drainage strategy, an attenuation pond would be introduced just north-west of the existing junction to provide attenuation for the surface water runoff. This attenuation pond would be constructed to attenuate the increase in impermeable area and discharge to the River Sowe to the north-west of the pond via a new outfall. A culvert extension to the east and west of the A46 would be required for the Smite Brook. This would involve an in-situ reinforced concrete extension of approximately 3m on the west side and approximately 4.5m on the east side of the culvert. The existing wingwalls and headwalls would also need to be removed and replaced with in-situ reinforced concrete wingwalls and headwalls. No extension is required for the existing link road culvert.
- 3.2.31. The scheme footprint for Option 8 is 223,636m². The permanent land take required for this option outside of the highway boundary would be 52,890m². The temporary land take required for this option would be 38,253m². Option 8 includes both temporary and permanent land take within the Coombe Pool SSSI, with approximately 1,850m² permanent land take and approximately 2,850m² temporary land take.

Do something – Option 11 – Full grade separated junction

- 3.2.32. Option 11 is a grade separated junction approximately 800m to the north of the existing roundabout location. The geometry of this option allows a 50mph speed limit on the mainline dual carriageway.

- 3.2.33. The A46 mainline would be realigned through the existing Walsgrave roundabout for approximately 800m, before tying back into the current alignment at the existing Hungerley Hall Farm accommodation bridge. The mainline then continues on the current alignment for approximately 850m to allow for junction slip road tie ins.
- 3.2.34. The full grade separated dumbbell junction would be approximately 800m north of the existing Walsgrave Junction roundabout and would consist of north and southbound diverge and merge slip roads connecting to an overbridge with roundabouts to the east and west. The overbridge would be provided across the A46 between the two roundabouts and would carry a two-lane single carriageway. The proposed height above the A46 mainline road level would be up to approximately 8m. A new B4082 link road, approximately 1km in length, would be provided between the western roundabout of the dumbbell junction and an existing section of the B4082 that leads to the existing roundabout on Clifford Bridge Road. This would be a two-lane single carriageway. The new link road would pass close to the A46 mainline carriageway between the A46 and Hungerley Hall Farm before being aligned further west away from the A46 to connect to the western dumbbell.
- 3.2.35. The existing sections of the B4082 and A46 roundabout that are no longer required would be grubbed up and landscaped. The existing overpass (farm access) over the A46 close to Hungerley Hall Farm will be demolished, with access re-provided via the B4082 and dumbbell junction overbridge, subject to consultation with the current landowner.
- 3.2.36. The proposed outline drainage strategy for Option 11 is for three attenuation ponds to be constructed to attenuate the increase in impermeable area, before discharging to the River Sowe to the west via new outfalls. A new culvert may be required to carry flow under the proposed connector road to maintain an existing drainage ditch.
- 3.2.37. The scheme footprint for Option 11 is 306,752m². The permanent land take required for this option outside of the highway boundary would be 94,553m². In addition, an allowance has been made for an environmental compensation area to the north of Coombe Pool SSSI of 37,020m². The temporary land take required for this option would be 23,678m².

Selection of the preferred option

- 3.2.38. When selecting the preferred route, National Highways considered several criteria, including the scheme objectives, safety, benefits, costs, environmental effects, construction and feedback from the public consultation.

- 3.2.39. Following public consultation on the four options in January- February 2022 Option 11 was chosen as the preferred option which was supported by the consultation responses received. The PRA for Option 11 was made in June 2022 and Option 11 has been progressed to the preliminary design stage. Consultation is described further in Chapter 4.

Further scheme development

- 3.2.40. Following the PRA, during the preliminary design stage the design process will consider alternative ways of delivering the proposed scheme. This will include consideration of:
- the design (including size and scale) of the proposed scheme and associated structures (e.g., bridges and culverts)
 - optimising the cut-fill balance to reduce material requirements and waste
 - the alignment of new offline elements
 - the type, location and extent of environmental mitigation
 - the construction methodology and programme (including the phasing of construction works and number and location of compounds and haul roads)
- 3.2.41. Reasons for the selection of the chosen options for the design will be defined in the ES. The assessment will fully consider the environmental impact of delivering the proposed scheme, including incorporating any mitigation embedded into the design to avoid or reduce environmental effects. This will be documented in the ES.

4. Consultation

4.1. Consultation undertaken to date

- 4.1.1. Consultation is an important part of the environmental assessment process and should be undertaken throughout the options selection and design stages of a scheme.
- 4.1.2. National Highways held a non-statutory consultation in January – February 2022 as part of the option selection stage for the proposed upgrade to Walsgrave junction. Consultation was undertaken with applicable statutory stakeholders including Historic England, Natural England, Environment Agency, Coventry City Council, Warwickshire County Council and Rugby Borough Council.
- 4.1.3. Statutory consultation will be required to support the DCO application. Consultation and engagement will be carried out with statutory bodies and consultees (as defined by the Planning Act 2008), stakeholders, members of the public and organisations as necessary during subsequent stages of the process.

Preferred route announcement (PRA)

- 4.1.4. During the options selection stage a non-statutory consultation was held between 11 January and 14 February 2022 on option 11. Due to Covid-19 restrictions that were in place at the time, this was carried out remotely which included three online public information events. Members of the community could also request a call back from a specialist within the project team as well as request hard copies of consultation documents to be posted to them free of charge. Detail was shared during the public consultation on the discounted options and why these options were not viable. The purpose of the consultation was to provide the local community and stakeholders with the opportunity to have their say on the proposals and share ideas, concerns, and local knowledge.
- 4.1.5. The feedback received during the consultation showed support for improvements at Walsgrave junction and support for Option 11. Option 11 would provide a fully grade separated junction approximately 800m north of the existing A46 Walsgrave junction. Exit and entry slip roads would be provided on both the north and southbound carriageway allowing full connection to the local road network. 80% of respondents agreed that improvements to the Walsgrave junction are needed, and 66% supported Option 11.
- 4.1.6. National Highways received 121 responses to the consultation. This feedback was important to understand how the local community currently uses the road and what people thought about the proposals for upgrading the A46 Walsgrave junction. Respondents were asked to share thoughts on the need for

improvements at Walsgrave junction and on Option 11, as presented in the consultation.

4.1.7. A number of comments were raised in response to the consultation, which will be looked at further during the preliminary design stage. These include:

- access to the hospital
- walking and cycling provision
- proposed 50mph speed limit
- impact on the local road network

4.1.8. The PRA for the A46 Walsgrave junction upgrade was made in June 2022.

4.2. Proposed consultation

Statutory consultation

4.2.1. National Highways will consult with prescribed consultees as per the requirements of Section 42 of the Planning Act 2008. The consultees will include statutory consultees (Natural England, the Environment Agency, Historic England, relevant planning authorities, UK Health Security Agency and the Office for Health Improvement and Disparities (OHID)), statutory undertakers and anyone who has an interest in the proposed scheme (for example landowners and tenants).

4.2.2. Early engagement with statutory environmental bodies has been undertaken after the PRA and prior to the start of the preliminary design stage to discuss the proposed scheme with:

- Natural England (September 2022)
- Environment Agency (September 2022)

4.2.3. Historic England were contacted for early consultation in October 2022 however, no response was received.

4.2.4. The local community and wider public will be consulted on the proposed scheme via a statutory consultation programme in line with Section 47 of the Planning Act 2008.

4.2.5. Consultation will be ongoing throughout the preliminary design stage, with the first consultation exercise being related to the scoping report in summer 2023. A Statement of Community Consultation (SoCC) will be produced and published prior to the formal statutory consultation period. The SoCC will outline how National Highways will formally consult with the local community about the proposed scheme.

- 4.2.6. The purpose of the statutory consultation will be to seek comments from the local community and statutory consultees on the proposed scheme. A Preliminary Environmental Information Report (PEIR) will be produced to support the consultation. The PEIR will include environmental information to enable consultees (both specialist and non-specialist) to understand the likely significant environmental effects of the proposed scheme, and measures proposed to mitigate such effects, to help inform their consultation responses. The PEIR will also be accompanied by a non-technical summary (NTS).
- 4.2.7. The approach to statutory consultation has not yet been finalised but is likely to include (without being limited to):
- meetings and workshops with local community groups and other local stakeholders
 - publication of brochures, reports and other information made available in local community facilities and online
 - public exhibitions where members of the community can meet with the project team
- 4.2.8. In addition, consultation materials will be available online during the consultation period, as well as an online response form enabling people to share their views.
- 4.2.9. A consultation report will be produced and submitted as part of the DCO application. This will summarise the feedback received during the consultation as well as how the project team have considered this feedback in the proposed scheme design and EIA. The consultation report will demonstrate how National Highways has complied with the consultation requirements of the Planning Act 2008.

Technical engagement

- 4.2.10. Technical engagement will be ongoing throughout the preliminary design stage to discuss the scope, potential effects, and proposed mitigation with relevant stakeholders. This engagement will take the form of email exchanges, telephone calls, virtual meetings, and face to face meetings where required.
- 4.2.11. This ESR will be used by the Planning Inspectorate to consult relevant bodies on the proposed scope of the EIA. Stakeholders will be invited to provide feedback to the Planning Inspectorate, and such feedback will be used by the Planning Inspectorate in formulating the scoping opinion for the proposed scheme.

5. Environmental assessment methodology

5.1. Introduction

- 5.1.1. This chapter outlines the purpose and main stages of the EIA process and explains the methodology that will be followed for the EIA. The focus of the EIA methodology is ensuring a robust and proportionate approach.
- 5.1.2. The aim of EIA is to protect the environment by ensuring that the decision maker, when deciding whether to grant permission for a project, which is likely to have significant effects on the environment, does so in the full knowledge of the likely significant effects, and takes this into account in the decision-making process.
- 5.1.3. The preparation of an ES is one of the key stages in the EIA process. The Planning Inspectorate, which is responsible for examining an application for development consent, will use this information in making a recommendation to the Secretary of State, about whether or not the proposed scheme should be consented.
- 5.1.4. The Secretary of State will also rely upon the ES in coming to a decision on the Application.

The National Policy Statement for National Networks (NPSNN)

- 5.1.5. Sections 104 (2) and (9) of the Planning Act 2008 require applications to be decided in accordance with the relevant National Policy Statement. Strategic roads have their own policy framework, the National Policy Statement for National Networks (NPSNN) (DfT, 2014). This contains the relevant policy objectives and the principles by which applications for road and rail schemes should be assessed.
- 5.1.6. The NPSNN is framed in the context of wider Government policies on environment, safety, technology, sustainable transport and accessibility. It provides planning guidance for promoters of NSIPs on the road network, and the basis for the examination by the Examining Authority and decisions by the Secretary of State. The Secretary of State will use the NPSNN as the primary basis for making decisions on development consent applications for national networks NSIPs in England. Given the importance of the NPSNN, the EIA approach adopted for the proposed scheme takes account of this key policy document. The EIA will have regard to the methodological advice within Chapter 5 of the NPSNN.

5.2. Surveys and predictive techniques and methods

Design Manual for Roads and Bridges (DMRB)

- 5.2.1. The environmental assessment will be undertaken in accordance with the DMRB standards including:
- LA 101 Introduction to environmental assessment (Highways England, 2019a) hereafter referred to as DMRB LA 101
 - LA 102 Screening projects for environmental impact assessment (Highways England, 2019b) hereafter referred to as DMRB LA 102
 - LA103 Scoping projects for environmental assessment (Highways England, 2020a) hereafter referred to as DMRB LA 103
 - LA 104 Environmental assessment and monitoring (Highways England, 2020b) hereafter referred to as DMRB LA 104
- 5.2.2. As defined in DMRB LA 101 “*environmental assessment is the process by which information about environmental effects is collected, assessed, reported and used to inform decision-making. Environmental assessment includes screening, scoping, EIA, non-statutory environmental assessment and monitoring.*”
- 5.2.3. Each technical discipline has their own DMRB standard (as contained within DMRB LA 105 to 115 and 120) which takes precedence over the standards listed above. The relevant DMRB standard is referred to in each of the technical chapters. Where relevant, the environmental assessment will draw on relevant technical discipline guidance and best practice.
- 5.2.4. DMRB is the established standard for assessing the environmental impacts of highway schemes and has been developed by Highways England (now National Highways) in collaboration with relevant stakeholders.

Scoping

- 5.2.5. To enable a reasoned conclusion on the likely effects of a project on the environment to be made, any environmental assessment should be proportionate to the scale and stage of a project. The scoping stage of a project ensures that environmental assessment is proportionate, by identifying those environmental factors:
- 1) which are likely to result in significant environmental effects
 - 2) where sufficient uncertainty for significant environmental effects remains
- 5.2.6. The scoping assessment presented in this report has been undertaken in accordance with DMRB LA 103 which states that the purpose of scoping is to:

- 1) provide justification, supported by evidence, for scoping in/out environmental factors (or any elements) from further environmental assessment
- 2) define what level of environmental assessment (simple or detailed) is to be undertaken for those environmental factors (or any elements) scoped in
- 3) specify the environmental assessment methodology and further data collection and survey requirements
- 4) identify the study area for those environmental factors (or any elements) scoped in
- 5) identify initial mitigation measures and environmental enhancements.

5.2.7. Scoping identifies which environmental factors are to be examined in an environmental assessment in accordance with DMRB LA 104 the environmental factors include:

- air quality
- cultural heritage
- landscape
- biodiversity
- geology and soils
- material assets and waste
- noise and vibration
- population and human health
- road drainage and the water environment
- climate
- combined and cumulative effects

5.2.8. The output from the scoping exercise will inform the environmental assessment to be reported in the ES.

5.2.9. Schedule 4, Part 1 of the EIA Regulations introduced a requirement to consider the likely significant effects of the proposed scheme on heat and radiation. Due to the nature of the proposed scheme as a road improvement scheme, it is considered unlikely that heat and radiation effects associated with the proposals are likely to arise. The assessment of heat and radiation is therefore not considered relevant to the proposed scheme and has been scoped out of further assessment.

- 5.2.10. Schedule 4, Part 5 of the EIA Regulations require that risks due to accidents and disasters are considered within the EIA. As per DMRB LA 104, the scope of the assessment would cover:
- vulnerability of the project to risks of major accidents or disasters
 - any consequential changes in the predicted effects of that project on environmental topics as a result of major accidents and/or disasters
- 5.2.11. To address the requirements of DMRB LA 104 the topic of major accidents and disasters will be assessed within each individual environmental factor chapter. In considering the elements of vulnerability, professional judgement would be applied in consultation with National Highways, to develop project specific definitions of major events. Major events, both man-made and naturally occurring, will be identified and any potential effects and likely mitigation measures, will be included as part of the assessment. Where major events are identified, the potential for any changes in the assessed significance of the project on relevant environmental topics will be described, with relevant mitigation clearly identified.

Study areas

- 5.2.12. Study areas define the geographical area over which environmental receptors will be identified. Study areas have been identified for each of the environmental topics following DMRB standards and environmental factor-specific guidance. Specific study areas are outlined in the individual environmental factor chapters.

Surveys

- 5.2.13. Information gathered through desk top studies has been collated to inform this scoping report. A summary of the main environmental constraints identified within this report are presented in figure 2.3 in Appendix A.
- 5.2.14. In addition to the surveys undertaken at options selection stage several surveys have been undertaken during summer 2022 to inform the environmental assessment, including:
- badger
 - great crested newts (GCN)
 - bats
- 5.2.15. Additional surveys will be undertaken during 2023 (the wintering bird survey will be undertaken in autumn-spring 2023/2024) to inform the EIA. Details about factor specific surveys have been outlined in each of the individual environmental factor chapters (Chapters 6 to 15).

- 5.2.16. In addition to surveys, other predictive techniques will be used to inform the EIA, such as air quality, noise, and flood risk modelling. Further information on the proposed surveys and assessments to be undertaken is provided in the individual environmental factor chapters.

Future baseline

- 5.2.17. The baseline conditions used for assessment purposes are the predicted future conditions that would exist in the absence of the proposed scheme either (a) at the time that construction is expected to start, for impacts arising from construction, (b) at the time that the proposed scheme is expected to be open to traffic, for impacts arising from its operation, or (c) the design year, which is taken to be 15 years after opening. The future baseline is considered in each of the environmental factor chapters.

5.3. General assessment assumptions and limitations

- 5.3.1. Assumptions and limitations associated with the proposed scheme design, baseline information, and scoping exercise that has taken place have been outlined throughout this report. General assumptions relating to all factors and this scoping assessment include the following:
- this ESR is based on the options selection stage option 11 design as presented in the PRA and the general arrangement plans (HE604820-OIL-HGN-00-DR-CH-31001, HE604820-OIL-HGN-00-DR-CH-31002, HE604820-OIL-HGN-00-DR-CH-31003 and HE604820-OIL-HGN-00-DR-CH-31004, in Appendix B)
 - the proposed scheme is at an early stage in design development and the construction methodology is not fully defined at this stage. There could therefore be changes to the provisional Order Limits to accommodate changes in temporary working areas, or changes in permanent footprint associated with the design and/or environmental mitigation areas. The provisional Order Limits presented in Figures 2.1 to 2.4 are based upon the proposed scheme extent areas from options selection stage
 - the assessment of all environmental factors is based on existing baseline information and publicly available information. It is assumed this information is accurate at the time of which it was supplied
 - a traffic model was built at options selection stage which was used to understand the likely impacts on the road network (including on air quality and noise) and to inform the options appraisal. A new traffic model is being built for the preliminary design stage, the output of which will feed into the EIA. Updated traffic modelling outputs from the new model were not available at the time of writing this ESR

5.4. Significance criteria

- 5.4.1. The output of the environmental assessment is to report the likely significance of effects using established significance criteria, as presented within DMRB LA 104. DMRB states that the approach to assigning significance of effect relies on reasoned argument, professional judgement and taking on board the advice and views of appropriate organisations.
- 5.4.2. Environmental assessment requires the identification of receptors. A receptor or resource's environmental value (or sensitivity) is then determined. The magnitude of a project's impacts (i.e., its change upon the receptor) is then established. The significance of an environmental effect is typically a function of the 'value' or 'sensitivity' of the receptor and the 'magnitude' of the impact.
- 5.4.3. For some factors, predicted effects may be compared with quantitative thresholds and scales in determining significance. Each environmental assessment chapter within the ESR will describe the specific thresholds / criteria used to determine value and magnitude and will align within the general methodology described within this chapter.
- 5.4.4. The value of receptors is determined based upon Table 3.2N in DMRB LA 104 which is reproduced below in Table 5-1.
- 5.4.5. Assigning values to the relevant receptors for each discipline enables different environmental receptors to be placed upon the same scale and can assist with the process of assigning significance.

Table 5-1: Descriptions of environmental value (sensitivity)

Value (sensitivity) of receptor / resource	Typical description
Very High	Very high importance and rarity, international scale and very limited potential for substitution.
High	High importance and rarity, national scale, and limited potential for substitution.
Medium	Medium or high importance and rarity, regional scale, limited potential for substitution.
Low	Low or medium importance and rarity, local scale
Negligible	Very low importance and rarity, local scale.

- 5.4.6. For the majority of environmental factors scoped into further assessment, the value of identified receptors will be determined, along with the magnitude of impact and this will be reported in the ESR.

- 5.4.7. The criteria for identifying the magnitude of an impact is based upon Table 3.4N in DMRB LA 104 which has been reproduced below as Table 5-2. Potential impacts are identified that might occur due to the construction and operation of the proposed scheme. Impacts may be adverse or beneficial, direct, indirect, secondary or cumulative, temporary or permanent, short, medium or long term.

Table 5-2: Magnitude of impact and typical descriptors

Magnitude of impact (change)		Typical description
Major	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality.
Moderate	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.
	Beneficial	Benefit to, or addition of, key characteristics, features or elements. improvement of attribute quality.
Minor	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	Adverse	Very minor loss or detrimental alteration to one or more characteristics, features or elements.
	Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements.
No change		No loss or alteration of characteristics, features or elements; no observable impact in either direction.

- 5.4.8. The greater the magnitude of impact, the more significant the effect. For example, the consequences of a highly valued environmental resource experiencing a major adverse impact would be a significant adverse effect.

Table 5-3: Significance matrix

Environmental Value (Sensitivity)	Magnitude of Impact (Degree of Change)					
		No change	Negligible	Minor	Moderate	Major
	Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
	High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large

	Magnitude of Impact (Degree of Change)					
	Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
	Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
	Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

- 5.4.9. For noise, air quality and flood risk, a matrix-based approach is not used as calculations are used to assess the effects in numerical terms.
- 5.4.10. The significance of an effect is reported after an assessment of the effectiveness of the design and mitigation measures (the residual effect). Where the significance matrix (Table 5-3) includes two significance categories, evidence should be provided to support the reporting of a single significance category. Any avoidance or mitigation measures proposed, how they may be secured and the anticipated residual effects are to be included as per Planning Advice Note Seven: Environmental Impact Assessment (Planning Inspectorate, 2020).
- 5.4.11. Assigning each effect to one of the five significance categories enables different environmental issues to be placed upon the same scale, to assist the decision-making process at whatever stage the project is at within that process. Typical descriptors for the five significance categories are set out in Table 5-4.
- 5.4.12. As stated in DMRB LA 104 and Table 5-4 effects with a very large or a large significance are considered as being 'material' and 'likely to be material' in the decision-making process respectively. Therefore, large and very large effects are considered 'significant' for the purposes of the EIA Regulations. Moderate effects are described as potentially being material in the decision-making process. Moderate residual effects are therefore also typically considered as 'significant'.

Table 5-4: Descriptions of the significance of effect categories

Significance category	Typical descriptors of effects
Very Large	Effects at this level are material in the decision-making process
Large	These beneficial or adverse effects are very important considerations and are likely to be material in the decision-making process.
Moderate	Effects at this level can be considered to be material decision-making factors.
Slight	Effects at this level are not material in the decision-making process.
Neutral	No effects or those that are beneath levels of perception, within normal bounds or variation or within the margin of forecasting error.

Mitigation and enhancement measures

5.4.13. The mitigation hierarchy from DMRB LA 104 will be considered for all environmental features throughout the proposed scheme's lifecycle. The mitigation hierarchy is based on a series of sequential steps undertaken to limit any adverse impacts on the environment and has the following steps in order of priority:

1. avoidance and prevention: design and mitigation measures to prevent the effect (e.g., alternative design options or avoidance of environmentally sensitive sites)
2. reduction: where avoidance is not possible, then mitigation is used to lessen the magnitude or significance of effects
3. remediation: where it is not possible to avoid or reduce a significant adverse effect, these are measures to offset the effect

5.4.14. The mitigation hierarchy will be used in the design of mitigation. Factor specific mitigation has been outlined in each of the individual environmental factor chapters.

5.4.15. The environmental assessment will report on the following categories of mitigation as per DMRB LA 104:

1. embedded mitigation: project design principles adopted to avoid or prevent adverse environmental effects
2. essential mitigation: measures required to reduce and if possible offset likely significant adverse environmental effects, in support of the reported significance of effects in the environmental assessment

5.4.16. It is important to note that proposed mitigation measures can only be taken into account when determining significance if the success of the measures delivering the desired outcome is supported by evidence and the project has an identified legal mechanism for implementing the measures.

5.4.17. An assumption regarding the incorporation of best practice measures and standard mitigation was used to inform the assessment for individual topics. One typical standard mitigation measure for ensuring effects are avoided and reduced is through an Environmental Management Plan (EMP). The first iteration of an EMP will be produced during preliminary design stage in line with DMRB LA 120: environmental management plans (Highways England, 2020i). The first iteration of the EMP will contain measures, including the Register of

Environmental Actions and Commitments (REAC), to manage environmental effects in construction and operation. This first iteration of the EMP will provide the framework for the future production of the more detailed second iteration of the EMP. The second iteration of the EMP will be produced during the detailed design stage in preparation for the construction stage. The EMP is seen as a “live” document which will evolve as the project progresses.

- 5.4.18. During construction, the responsibility for further environmental mitigation and the adherence to environmentally responsible working practices will fall to the Principal Contractor. The first and second iterations of the EMP will detail the measures that the Principal Contractor is to apply on-site that will demonstrate commitments to environmental management. It will include both generic and specifically targeted measures to enable construction to be undertaken whilst minimising the impact on the environment and will also enable monitoring requirements to be set up.
- 5.4.19. If effects cannot be mitigated, compensatory measures would be considered, for example, to provide replacement habitat. Mitigation and enhancement measures will be developed further in preliminary design stage and in consultation with statutory consultees, where appropriate.

Monitoring

- 5.4.20. Where significant adverse environmental effects are reported, monitoring of those effects shall be undertaken in accordance with DMRB LA 104, as well as the topic specific DMRB standards (as contained within DMRB LA 105 to 115) and the EIA Regulations. The purpose of monitoring is to:

- 1) ensure measures envisaged to avoid, prevent or reduce and, if possible, offset significant adverse effects on the environment are delivered
- 2) build data on the effectiveness of design and mitigation measures thereby driving improvement in environmental performance for future projects
- 3) satisfy licence / permit requirements (where applicable)
- 4) identify remedial action as a consequence of under-performance or failure of mitigation

5.5. Duplication of assessment

- 5.5.1. The ES will be prepared taking into account other relevant environmental assessments with a view to avoiding duplication of assessment. The other assessments are described below.

Habitats Regulation Assessment

- 5.5.2. A Habitats Regulations Assessment (HRA) screening exercise was undertaken at the options selection stage (AECOM, 2020) for the proposed scheme. The HRA concluded that no likely significant effects on any European sites are anticipated, when considered alone or in combination with other plans and projects.
- 5.5.3. Natural England will be consulted on the conclusions of the screening exercise to confirm that an Appropriate Assessment is not required.

Water Environment Regulations

- 5.5.4. The impact of the proposed scheme on the Water Framework Directive (WFD) is now being assessed under the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (WER). The impacts to the Water Environment Regulation objectives are being assessed in line with the Planning Inspectorate's Advice Note Eighteen: The Water Framework Directive (2017). A standalone WFD compliance assessment will be prepared as an appendix to the ES with the conclusions summarised in the road drainage and the water environment chapter.

Flood Risk Assessment

- 5.5.5. A Flood Risk Assessment (FRA) will be undertaken and reported within a standalone report which will form an appendix to the ES. To avoid duplication, the road drainage and the water environment chapter will cross refer to this report and summarise where appropriate.

Health Impact Assessment

- 5.5.6. The impact of the proposed scheme on health will be assessed in the population and human health chapter of the ES in line with Institute of Environmental Management and Assessment (IEMA) guidance (IEMA 2022). This in turn will be supported by technical appendices as required. A standalone Health Impact Assessment (separate from the EIA) will not be undertaken.

5.6. Environmental Statement

- 5.6.1. The results of the EIA will be reported within an ES. An outline structure of the ES is provided in Table 5-5.

Table 5-5: Outline structure of the Environmental Statement

Chapter title	Description
Non-technical summary (NTS)	A summary of the EIA using non-technical language. The NTS will summarise the proposed scheme description, alternatives considered, the likely significant effects, and the proposed mitigation, monitoring and enhancement requirements.
Chapter 1. Introduction	A brief introduction to the proposed scheme, legislative and policy framework, competent expertise used to undertake the EIA, and the purpose and structure of the Environmental Statement.
Chapter 2. The project	Description of the proposed scheme location, the need for the proposed scheme, proposed scheme objectives, and baseline scenario. A proposed scheme description will be provided comprising information on the site, design, and physical characteristics of the development. The proposed scheme description will describe both the construction and operation of the proposed scheme, as well as long term management and a statement of whether the EIA is to consider decommissioning.
Chapter 3. Assessment of alternatives	Description of the main alternatives considered during the design and development of the proposed scheme, and the justification for the choice of the preferred option, including a comparison of environmental effects.
Chapter 4. Consultation	This chapter will set out the consultation which has been undertaken as part of the EIA, including responses and a summary of how the scope has been influenced by statutory consultation.
Chapter 5. Environmental assessment methodology	This chapter will set out the scope of the EIA. The general assessment approach will be detailed including the guidance and methodologies to be used, general assessment criteria and terminology to be used, assumptions and limitations and the approach to mitigation, enhancement, and monitoring.
Chapter 6. Air quality	<p>Chapters 6-15 will assess the potential significant effects from the proposed scheme. Each of the specialist chapters will include the following:</p> <ul style="list-style-type: none"> • competent expert evidence • legislative and policy framework • assessment methodology • assessment assumptions and limitations • study area • baseline conditions • potential impacts • design, mitigation and enhancement measures • assessment of likely significant effects • monitoring
Chapter 7. Cultural heritage	
Chapter 8. Landscape	
Chapter 9. Biodiversity	
Chapter 10. Geology and soils	
Chapter 11. Material assets and waste	
Chapter 12. Noise and vibration	
Chapter 13. Population and human health	
Chapter 14. Road drainage and the water environment	
Chapter 15. Climate	
Chapter 16. Assessment of cumulative effects	This chapter will assess the combined effects of the proposed scheme and the cumulative effects of other major developments which could overlap with the proposed scheme.
Chapter 17. Summary	Summary of the residual effects (highlighting where significant residual effects are predicted), and a summary of mitigation measures and

Chapter title	Description
	monitoring requirements. This will form the basis of a commitments schedule to be included within the EMP.
Technical appendices and figures (including location, design, and constraints plans). References and Glossary	

6. Air Quality

6.1. Introduction

- 6.1.1. This chapter outlines the proposed scope of work relating to the assessment of potential local air quality impacts associated with the construction and operational phases of the proposed scheme. The proposed scope of work reported herein will be progressed as part of the preliminary design stage EIA.
- 6.1.2. This scoping assessment has been completed in accordance with the approach detailed within DMRB LA 105 Air quality, revision 0 (Highways England, 2019c; hereafter referred to as 'DMRB LA 105').
- 6.1.3. The assessment of air quality considers impacts to human health and designated ecological sites. This includes assessing the risk of dust arising from construction activities that have the potential to result in statutory nuisance.
- 6.1.4. Specifically, this chapter provides:
- details of the construction and operational phase study areas, including a preliminary review of potentially sensitive receptors (human and ecological) that would be considered within the air quality assessment
 - a review of existing air quality baseline information and the need for further desk-based study and/or surveys
 - an outline of the potential local air quality impacts associated with the construction and operational phases of the proposed scheme
 - a description of appropriate mitigation measures, where applicable
 - a description of the likely significant effects on local air quality
 - details of the proposed assessment methodology, which will be adopted at the preliminary design stage to quantify the potential impacts on local air quality and determine the significance of effects
 - details of the applicable legislation, policy, and guidance governing the assessment
- 6.1.5. Air quality in urban areas and adjacent to major roads is dominated by emissions from road vehicles. The main pollutants of health concern from road traffic exhaust releases are nitrogen dioxide (NO₂) and fine particulate matter of mean aerodynamic diameter less than 10 and 2.5 micrometres (PM₁₀ and PM_{2.5}, respectively). As such, NO₂, PM₁₀ and PM_{2.5} emissions associated with the proposed scheme form the focus of this assessment.

Legislation, policy and guidance

Legislative framework

- 6.1.6. The European Directive on Ambient Air Quality (2008/50/EC) sets legally binding limits for ambient concentrations of air pollutants that impact public health such as PM₁₀, PM_{2.5}, and NO₂. The Directive and associated pollutant limit values were transposed into the UK law under the Air Quality Standards Regulations 2010 and, following the UK's exit from the EU, the Environment (Legislative Functions from Directives) (EU Exit) Regulations 2019.
- 6.1.7. The UK's Air Quality Strategy (Defra, 2021) established the framework for air quality improvements across the UK. The Strategy sets out standards for key air pollutants that reflect levels of pollutants thought to avoid or minimise risks to health or ecosystems. The associated air quality objectives are policy targets, expressed as maximum permissible outdoor concentrations of pollutants that take account of economic efficiency, practicability, technical feasibility and timescales.
- 6.1.8. The national air quality objectives for the aforementioned key pollutants considered in this assessment are enacted by the Air Quality (England) Regulations 2000 and are given in Table 6-1. The national objectives are numerically identical to the European limit values, enacted through the Air Quality Standards Regulations 2010, with the exception of PM_{2.5}. With respect to PM_{2.5}, the limit value was amended (tightened) in 2020 by The Environment (Miscellaneous Amendments and Revocations) (EU Exit) Regulations 2020.
- 6.1.9. Following the departure of the UK from the EU, the Environment Act 2021 makes provision about targets, plans, and policies for improving the natural environment, including air quality. The Act gives the Secretary of State the power to set long-term, legally binding air quality targets of at least 15 years in duration. Long-term targets have been set within the first Environmental Improvement Plan 2023 (EIP) (Defra, 2023) pursuant to Section 10(6) of the Act. These legal targets specifically relate to PM_{2.5} and have been transposed into law via The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023:
- Annual Mean Concentration Target - a maximum concentration of 10µg/m³ to be met across England by 2040
 - Population Exposure Reduction Target - a 35% reduction in population exposure by 2040 (compared to a base year of 2018)
- 6.1.10. The EIP (Defra, 2023) also sets an interim annual mean concentration target of 12µg/m³, to be achieved by January 2028, but is not legally binding. The potential implications of the Environmental Targets Regulations within the

context of the proposed scheme air quality assessment and DMRB LA 105 methodology are outlined in paragraphs 6.4.7 and 6.4.8.

- 6.1.11. Under the Environment Act 2021, the environment secretary will be required to review the UK Air Quality Strategy (Defra, 2021) at least every five years, and to publish an annual progress report to parliament.
- 6.1.12. Under Part IV of the Environment Act 1995, local authorities must review and document local air quality within their area by way of staged appraisals and respond accordingly, with the aim of meeting the air quality objectives defined in the Air Quality Regulations. This is referred to as the Local Air Quality Management (LAQM) regime.
- 6.1.13. The LAQM regime requires that local authorities that identify exceedances of any air quality objective(s) within their geographical area must designate an AQMA and produce an Air Quality Action Plan (AQAP) setting out measures they intend to take to work towards the objectives.

Table 6-1 : Relevant objectives set out in the Air Quality Strategy and concentration targets as per Environment Act 2021 for the protection of human health

Pollutant	Averaging Period	Concentration ($\mu\text{g}/\text{m}^3$)	To be achieved by
For the protection of human health			
Nitrogen dioxide (NO_2)	Annual mean	40	31 st December 2005
	1-hour mean	200 (not to be exceeded more than 19 times per year)	31 st December 2005
Particulate matter (PM_{10})	Annual mean	40	31 st December 2004
	24-hour mean	50 (not to be exceeded more than 35 times a year)	31 st December 2004
Particulate matter ($\text{PM}_{2.5}$)	Annual Average	20	1 st January 2020
	Annual Mean (Legal Target)	10	1 st January 2040
	Annual Mean (Interim Target)*	12	1 st January 2028
For the protection of vegetation and eco systems			
Nitrogen Oxide (NO_x)	Annual Mean	30	31 st December 2000
* The Interim Target for $\text{PM}_{2.5}$ is not legally binding.			

National policy

- 6.1.14. The National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2021) provides a basis upon which local authorities can develop local plans to facilitate developments and is a material consideration in planning decisions for such developments under the Town and Country Planning Act 1990. The NPPF advises that planning policies and decisions should sustain and contribute towards compliance with relevant air quality limit values and national objectives, taking into account the presence of AQMAs and Clean Air Zones (CAZs), and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified and planning decisions should ensure that any new development in AQMAs and/or CAZs is consistent with relevant local air quality action plans.
- 6.1.15. The NPPF is not intended to contain specific policies for NSIPs, such as the proposed scheme. This function is assumed by the National Policy Statement for National Networks (NPSNN).
- 6.1.16. The NPSNN sets out the Government's policies to deliver the development of NSIPs on the national road and rail networks in England. The SoS uses the NPSNN as the primary basis for making decisions on DCO applications. The air quality aspects of the NPSNN are presented in Paragraphs 5.3 to Paragraph 5.15 within the NPS document.
- 6.1.17. The NPSNN states that the ES should describe:
- existing air quality levels.
 - forecasts of air quality at the time of opening, assuming that the scheme is not built (the future baseline) and taking account of the impact of the scheme
 - any significant air quality effects, their mitigation and any residual effects, distinguishing between the construction and operation stages and taking account of the impact of road traffic generated by the project
- 6.1.18. Paragraph 5.11 of the NPSNN states that air quality considerations are likely to be relevant where schemes are proposed:
- within or adjacent to an AQMA, roads identified as being above limit values or nature conservation sites (including Natura 2000 sites and SSSIs, including those outside England)
 - where changes are sufficient to bring about the need for a new AQMA or change the size of an existing AQMA; or bring about changes to exceedances of the limit values, or where they may have the potential to impact on nature conservation sites

6.1.19. The NPSNN directs that the SoS "...must give air quality considerations substantial weight where, after taking into account mitigation, a project would lead to significant air quality impacts in relation to EIA and/or where they lead to a deterioration in air quality in a zone/agglomeration³...". Consent for the project should be refused by the SoS "...where, after taking into account mitigation, the air quality impacts of the scheme will:

- *result in a zone/agglomeration which is currently reported as being compliant with the [Air Quality Standards Regulations 2010] becoming non-compliant; or*
- *affect the ability of a non-compliant area to achieve compliance..."*

Local policy

6.1.20. Both Rugby Borough Council and Coventry City Council have adopted Local Plans for the period 2011 – 2031 (Rugby Borough Council, 2019; Coventry City Council, 2017) and provide statutory documents used by each respective local authority to determine planning applications. Both Local Plans include policies specifically aimed at mitigating and managing traffic growth associated with new developments with the potential to negatively impact local air quality. The relevant policies require the applicant to complete appropriate air quality assessment and that all major development schemes should be suitable planned to design out any adverse impact on air quality.

Relevant guidance

- 6.1.21. The impacts of the proposed scheme on air quality will be assessed in accordance with DMRB LA 105, which will ensure that the assessment complies with the requirements of the NPSNN. This will allow the determination of whether the proposed scheme impacts on air quality are considered significant, and/or whether there is a risk of the proposed scheme impacting on the ability of areas to achieve compliance with relevant air quality limit values.
- 6.1.22. Where relevant, the air quality assessment will also be completed with reference to LAQM Technical Guidance (LAQM.TG22) (Defra, 2022b) and the National Planning Practice Guidance (PPG) for Air Quality (Ministry of Housing, Communities and Local Government, 2019).

6.2. Study area

Construction

6.2.1. The study area for the construction phase dust assessment will encompass human receptors and designated ecological habitats within 200m of construction

³ The United Kingdom is split into 43 zones and agglomerations for the purpose of reporting air quality within those zones

activities, in line with DMRB LA 105. To provide a conservative assessment, the construction phase study area will assume that construction activities could occur up to the proposed scheme extent.

- 6.2.2. With respect to the impact of construction activities on vehicle emissions and local air quality, DMRB LA 105 states that "...If the construction activities are less than 2 years it is unlikely that the construction activities would constitute a significant air quality effect or impinge on the UK's reported ability to comply with the Air Quality Directive given the short term duration of the construction activities as opposed to the long term operation of the project."
- 6.2.3. The proposed scheme construction period is expected to be less than two years. Therefore, the impact of construction activities on vehicle emissions and local air quality can be scoped out of the assessment (see section 6.4).

Operational phase

- 6.2.4. The operational phase air quality study area will be determined with reference to DMRB LA 105, which defines the 'Affected Road Network' (ARN) for the air quality assessment as all roads that trigger the traffic scoping criteria below, and all adjoining roads within 200m of a road that triggers the criteria.
- 6.2.5. The scoping is completed based on an analysis of the difference between the without ('Do Minimum) and with ('Do Something') proposed scheme scenario traffic data for the proposed scheme opening year. A road link is included within the ARN if it meets any of the following criteria:
- annual average daily traffic (AADT) will change by $\geq 1,000$; or
 - heavy duty vehicle (HDV) AADT will change by ≥ 200 ; or
 - a change in speed band; or
 - a change in carriageway alignment by $\geq 5\text{m}$.
- 6.2.6. Human and ecological receptors included within the study area will be those located within 200m of a triggered road link only. The inclusion of adjoining road links within 200m of a triggered link is to ensure vehicle emissions contributions are adequately captured within the air quality assessment study area.
- 6.2.7. Forecasted traffic flows on the ARN will be used to determine the change in vehicle emissions associated with the operation of the proposed scheme and the resulting changes to pollutant concentrations at identified receptor locations within the study area.

- 6.2.8. At this scoping stage, detailed traffic data are not available, thus the ARN and study area cannot be determined. On receipt of the data, a detailed traffic scoping exercise will be completed to establish the ARN.
- 6.2.9. Notwithstanding, the proposed scheme will introduce two new slip roads to serve the A46, which will be adjoined by roundabout junctions, thus will result in triggered links due to changes in the carriageway alignment of over 5m. Therefore, an ARN will be established, meaning that further air quality assessment will be scoped in.

Sensitive receptors

- 6.2.10. Receptors that are potentially sensitive to changes in air quality include, as stated in DMRB LA 105, residential properties, schools, hospitals and designated species / habitats (ecological receptors) located within 200m of the defined ARN (see paragraph 6.2.5) for the operational phase and, for construction phase dust impacts, within 200m of the proposed scheme extent.
- 6.2.11. DMRB LA 105 specifies the distance of 200m as a maximum extent because, at distances greater than 200m, pollutant concentrations tend towards background levels.
- 6.2.12. Once the ARN and study area are determined, representative sensitive receptors shall be chosen to ensure that those receptors exposed to the highest pollutant concentrations (closest to the road, junctions etc.) or those anticipated to experience the highest level of change (next to roads within the ARN with the largest change in the traffic screening criteria) are included in the air quality assessment.
- 6.2.13. With respect to ecological receptors, all international, national, and locally designated sites within 200m of the ARN will be included in the air quality assessment. The following site designations will be considered, where there are habitats and/or species that are sensitive to changes in concentrations of oxides of nitrogen (NO_x) and/or changes in nutrient nitrogen deposition:
- Ramsar sites
 - SPA
 - SAC
 - SSSI
 - LNR
 - LWS
 - Nature Improvement Areas

- Ancient Woodland
- Veteran Trees

6.3. Baseline conditions

Local air quality management

- 6.3.1. All land within Coventry's administrative boundary is within the Coventry AQMA. The administrative boundary between Rugby Borough Council and Coventry City Council lies to the immediate west of the existing A46. Therefore, the elements of the proposed scheme that lies within Coventry's administrative areas also lie within the Coventry AQMA. This AQMA was declared due to historic exceedances to the annual mean NO₂ health-based objective⁴ in the centre of Coventry. The proposed link road serving the new junction is also located within this AQMA, as depicted on Figure 6.1 in Appendix C.
- 6.3.2. Rugby Borough Council have declared a single AQMA in the borough, covering the urban area of Rugby, located 8km to the east of the proposed scheme.
- 6.3.3. Both Rugby Borough Council and Coventry City Council have air quality monitoring networks established that use passive diffusion tubes to monitor NO₂ concentrations. The passive monitoring results for annual mean NO₂ concentration from relevant local authority sites are presented in Table 6-2, these have been taken from the local authority Annual Status Reports (Coventry City Council, 2020; Rugby Borough Council, 2020). The locations of these monitoring sites are shown on Figure 6.2 in Appendix C.

Table 6-2 Annual mean NO₂ concentrations from nearby passive air quality monitoring locations

Site ID	Site Location	Site Type	Local Authority	Distance from Walsgrave Junction (km)	NO ₂ Annual Mean Concentration (µg/m ³)				
					2016	2017	2018	2019	2020*
STL 1	Stonehouse Lane	Roadside	Coventry	3.5	-	35.2	31.3	33.6	21.6
LON 8	703 London Road	Roadside	Coventry	3.4	-	29.9	25.3	25.3	18.0
S16	Citrus Hotel, London Road	Roadside	Rugby	3.4	22.8	18.2	19.6	18.8	13.5
S14	Binley Woods, Village Hall,	Urban Background	Rugby	1.9	18.2	14.7	15.1	16.8	10.9

⁴ The relevant national air quality objectives for pollutants of concern in this assessment are detailed in section 6.7 and Table 6-5.

Site ID	Site Location	Site Type	Local Authority	Distance from Walsgrave Junction (km)	NO ₂ Annual Mean Concentration (µg/m ³)				
					2016	2017	2018	2019	2020*
	Rugby Road								
S4	Wolston School	Urban Background	Rugby	4.2	14.0	12.3	12.1	10.4	8.2
S5	High Street Ryton	Kerbside	Rugby	4.9	28.5	25.0	24.0	23.5	16.4
NO ₂ Air Quality Objective					40				
* Concentrations monitored in 2020 (and 2021) were notably lower than previous years due to travel restrictions associated with the COVID-19 pandemic.									

6.3.4. The results presented in Table 6-2 demonstrate that NO₂ concentrations have remained consistently below the national annual mean objective (40µg/m³) over period presented. Monitoring sites STL1 and LON8 are both located in proximity to the A46 Tollbar End junction, the monitoring concentrations from which are likely to be representative of conditions near to the A46 Walsgrave junction. Monitoring site STL1 recorded a concentration of 33.6µg/m³ in 2019, which is well below the annual mean objective.

6.3.5. In addition, there is an automatic monitoring site within Coventry City Council, which forms part of Defra's Automatic Urban and Rural National (AURN) monitoring network, located east of Coventry urban centre on Binley Road (Site ID: COBR). The site is located approximately 3.5km to the west of the proposed scheme extent (see Figure 6.2 in Appendix C), which monitors both NO₂ and PM₁₀. The monitored annual mean concentrations for both pollutants are presented in Table 6-3.

Table 6-3 Annual mean NO₂ Concentrations from Nearby Automatic Air Quality Monitoring Locations

Site ID	Site Location	Site Type	Pollutant	Annual Mean Concentration (ug/m ³) (Number of exceedances to the 1-hour mean objective of 200 ug/m ³ for NO ₂)				
				2016	2017	2018	2019	2020
COBR	Coventry Binley Road	Urban Traffic	NO ₂	-	31.4 (0)	29.4 (0)	30.9 (0)	23.0 (0)
			PM ₁₀	-	15.3	19.4	19.5	16.7

- 6.3.6. The data from the AURN monitoring site demonstrates that NO₂ annual mean concentrations have remained well below the air quality objective since 2017. Similarly, PM₁₀ concentrations monitored at this site have been well below the relevant annual mean objective (40µg/m³).
- 6.3.7. There are no relevant monitoring sites that monitor PM_{2.5} in proximity to A46 Walsgrave Junction.

Defra pollution climate mapping

- 6.3.8. Defra uses the Pollution Climate Mapping (PCM) model to report compliance with the EU Air Quality Directive (Directive 2008/50/EC) air quality limit values, as transposed into UK Law under the Air Quality Standards (England) Regulations 2010 and, following the UK's exit from the EU, The Environment (Legislative Functions from Directives) (EU Exit) Regulations 2019.
- 6.3.9. Approximately 9,000 roadside PCM projection values are provided across the UK for NO₂, PM₁₀, and PM_{2.5}, covering all years from 2018 to 2030 from a reference base year of 2018. The most recent PCM model data were published in 2020. The focus of the DMRB LA 105 compliance risk assessment is on annual mean NO₂ roadside concentrations and the respective limit value (40µg/m³).
- 6.3.10. The proposed scheme extent is not included within the PCM model. However, once the ARN and associated study area is established, there is potential for a number of PCM links to be captured for inclusion in the compliance risk assessment as per DMRB LA 105 (see section 6.7 Assessment Methodology, paragraph 6.7.4).

Defra background pollutant concentrations

- 6.3.11. Defra provides mapped future year projections of background pollution concentrations for NO_x, NO₂, PM₁₀ and PM_{2.5} for each one-kilometre grid square across the UK for all years between 2018 to 2030 (Defra, 2022a). The maps include a breakdown of background concentrations by emission source, including road and industrial sources, which have been calibrated against UK monitoring data from 2018.
- 6.3.12. The maximum reported background concentrations based on a review of the 1km grid squares containing the proposed scheme are presented in Table 6-4 for the baseline year of 2018 (baseline traffic data year), the current year of 2023, and future year of 2028.
- 6.3.13. The maximum background concentrations within and near to the proposed scheme extents are all within the relevant objectives for NO₂, PM₁₀ and PM_{2.5}.

Background concentrations are predicted to decline annually based on the available mapped background concentrations up to 2030 and will remain below the current air quality objectives.

- 6.3.14. The background annual mean PM_{2.5} concentrations are forecasted to be marginally below the recently legislated 2040 long-term concentration target (10µg/m³) in the proposed scheme opening year (2028) and also below the 2028 interim target (12µg/m³) (seen section 6.7 for details of the new PM_{2.5} targets).

Table 6-4: Projected background concentrations (µg/m³) of NO_x, NO₂, PM₁₀ and PM_{2.5} relevant to the proposed scheme

National grid reference	Year	Annual man background concentration (µg/m ³)			
		NO ₂	NO _x	PM ₁₀	PM _{2.5}
438500, 278500	2018 (baseline)	16.6	23.0	15.8	10.3
	2023 (present year)	13.3	17.9	14.7	9.5
	2028 (opening year)	11.1	14.8	14.4	9.2

Source: Defra 2023. <https://uk-air.defra.gov.uk/data/laqm-background-maps>

* The reported grid reference represents the maximum pollutant concentrations predicted for all grid squares within which the proposed scheme extents are located.

6.4. Potential impacts

Construction

- 6.4.1. The main risks to off-site sensitive receptors during the construction phase include the generation of fugitive dust emissions from onsite construction activities and use of construction plant/vehicle movements. Dust can be transported by wind and/or re-suspended by vehicle movements (e.g., heavy vehicles on unpaved roads). It can also arise from wind erosion from material stockpiles and earth moving.
- 6.4.2. The risk of potential dust impacts will be assessed within 200m of construction activities, as stated in DMRB LA 105, with impacts beyond 200m expected to be negligible due to deposition and dispersion of fugitive dust emissions. Construction dust emissions will be controlled through appropriate mitigation measures to be included within the EMP.
- 6.4.3. The construction phase of the proposed scheme also has the potential to impact local air quality due to changes in emissions associated with changes in traffic flows on the local road network. However, the proposed scheme construction period is expected to less than two years. Therefore, with reference to DMRB LA 105 (see paragraph 6.2.2), the impact of construction activities on vehicle emissions and local air quality can be scoped out of the assessment.

Operational phase

- 6.4.4. The operational phase of the proposed scheme has the potential to impact air quality at sensitive human and ecological receptors due to:
- changes in vehicle emissions associated with changes in traffic flows (including composition of fleet, total flows and speeds) on the local road network (i.e., the ARN); and/or
 - changes in road layout which may bring road traffic emission sources closer to, or further away from, identified sensitive receptors.
- 6.4.5. The above potential impacts will be assessed, alongside compliance risk within the context of the EU Air Quality Directive pollutant limit values, as transposed into UK law, using outputs from scheme-specific air quality assessment modelling to determine whether the proposed scheme will cause a significant air quality effect.
- 6.4.6. The key pollutants for consideration within the assessment of the operational phase air quality impacts are:
- oxides of nitrogen (NO_x), including NO₂
 - particulate matter, PM₁₀ and PM_{2.5}
 - ammonia (NH₃) - if assessment of impacts at designated site features is required, which are sensitive to changes in NH₃ concentrations and/or nitrogen deposition⁵
- 6.4.7. As outlined in DMRB LA 105, PM₁₀ and PM_{2.5} will be considered within the base year assessment. The guidance states that where there are no predicted exceedances of the PM₁₀ annual mean objective in the baseline scenario, PM₁₀ and PM_{2.5} can be scoped out of modelling in the future year(s) 'Do Minimum' and 'Do Something' scenarios. However, with the introduction of a new long-term legally binding annual mean PM_{2.5} target into English law, which is to be achieved by 2040 and is more stringent than the current objective (see section 6.7), there is potential for levels of PM_{2.5} to be close to and/or exceed the target throughout the study area.
- 6.4.8. As such, the basis on which to scope out modelling of PM_{2.5} may not be appropriate. Therefore, a suitable assessment approach will be adopted to account for PM_{2.5}, which will align with the latest version of DMRB LA 105 at the time of undertaking the assessment⁵.

⁵ A revised version of DMRB LA 105 is currently being developed to account for the assessment of both NH₃ and PM_{2.5} emissions, which will be adhered to at the assessment stage. Furthermore, further guidance from Defra is required to understand how the PM_{2.5} targets should be applied within a planning context.

- 6.4.9. There has been no consideration of emissions of any pollutants other than those identified above, as no significant emission sources of these pollutants are introduced or affected by the proposed scheme, or because concentrations are expected to be well below the relevant air quality objectives within the study area.

6.5. Design, mitigation and enhancement measures

Construction

- 6.5.1. Appropriate mitigation measures to control dust generation will be included within a dust management plan which will form part of the EMP for the proposed scheme. Mitigation measures would include, but not be limited to, minimising the use of dust-generating activities, the use of water as a dust suppressant where appropriate, and managing stockpiles effectively (e.g., in-situ for the shortest time possible).

Operation

- 6.5.2. The need and extent of air quality mitigation measures would be dependent on the predicted change in local air quality at sensitive receptor locations, which will be associated with the change in vehicle emissions resulting from the proposed scheme operation.

6.6. Description of the likely significant effects

- 6.6.1. Air quality impacts during construction are likely to be transitory in nature. With the appropriate implementation of the EMP, significant direct air quality effects during construction are unlikely. An assessment will be undertaken in line with DMRB LA 105 to determine the appropriate level of mitigation required, therefore construction dust impacts are scoped into the air quality assessment.
- 6.6.2. The likely significance of operational air quality effects will depend on forecasted traffic changes associated with the proposed scheme and the impacts on the identified ARN. Detailed traffic data is not available at the time of writing and thus the likely significant effects will not be known until the assessment is undertaken. Potential operational air quality impacts from traffic are scoped in and will be assessed in line with DMRB LA 105.
- 6.6.3. A summary of the potential construction and operational air quality impacts scoped in and out of the assessment for the proposed scheme are presented in Table 6-5.

Table 6-5: Summary of potential air quality impacts for assessment

	Potential Construction Impacts	Potential Operation Impacts
Scoped In	Dust impacts are unlikely to be significant with mitigation measures in place; assessment will be undertaken in line with DMRB LA 105 to determine the appropriate level of mitigation required.	<p>Potential operational impacts from traffic to be assessed in line with DMRB LA 105 as the traffic scoping criteria for assessment are considered likely to be triggered.</p> <p>Potential for adverse impacts on local air quality (NO₂, PM₁₀, PM_{2.5} concentrations) at human receptors located adjacent to the proposed scheme extents and the wider ARN (to be confirmed).</p> <p>Potential for adverse impacts on local air quality (NO_x, NH₃, nutrient nitrogen deposition) at ecological receptors (designated sites) located adjacent to the proposed scheme extents and the wider ARN (to be confirmed).</p>
Scoped Out	Changes in vehicle emissions associated with traffic flow impacts during the construction phase are scoped out, given that construction is expected to last for under two years. This is in line with DMRB LA 105, which states “...if the construction activities are less than 2 years it is unlikely that the construction activities would constitute a significant air quality effect...”	N/A

6.7. Assessment methodology

- 6.7.1. This section provides the proposed approach to assessing potential air quality impacts associated with the construction and operation phases of the proposed scheme.

Construction

- 6.7.2. The scope of the construction phase assessment will consider dust arising from construction activities within the proposed scheme extent, as well as the impacts from trackout by construction vehicles. A qualitative assessment of the construction dust risk and associated air quality effects will be undertaken.
- 6.7.3. Key stages of the construction phase and the locations and types of sensitive receptors will be identified in accordance with DMRB LA 105. Appropriate mitigation measures will be identified, which will be incorporated into the EMP, to reduce significant residual effects.

Operation

6.7.4. The assessment for the operational phase will be undertaken in accordance with DMRB LA 105 and will include:

- identifying the level of assessment required and provide full justification in the preliminary design stage environmental assessment. This will be based on the risk level of the proposed scheme as well as the receiving environment (i.e., identified sensitive receptors within the study area).⁶
- establishing the ARN and associated study area, capturing sensitive human and ecological receptors within 200m of the ARN, based on the traffic scoping criteria presented in paragraph 6.2.5.
- where a detailed assessment is required, detailed atmospheric dispersion modelling of vehicle emissions associated with the ARN, specifically for the 'Base Year' and the opening year 'Do Minimum' and 'Do Something' scenarios to predict air pollutant concentrations (NO_x , NO_2 , PM_{10} , $\text{PM}_{2.5}$, NH_3 (if required) and associated nutrient nitrogen deposition) at identified human and ecological receptors within the study area.
- where a simple assessment is required, the National Highways DMRB air quality spreadsheet will be used and applied to the same scenarios as outlined above for a detailed assessment.
- the air quality model will be verified against local monitoring data, obtained from Coventry City Council and Rugby Borough Council.
- a 'gap analysis' as per DMRB LA 105 to address the uncertainty in predicted future roadside NO_2 concentrations, ensuring that the modelled roadside NO_2 concentrations are not too optimistic in the future opening year (i.e., not underestimated).
- calculating air quality impacts at the identified receptors based on the difference in pollutant concentrations (and nitrogen deposition, where applicable) between the opening year Do Minimum and Do Something scenarios.
- completing a compliance risk assessment based on the outputs of the proposed scheme air quality modelling assessment and the latest Defra PCM model data for the relevant road links. This analysis will determine whether the proposed scheme will affect the UK's reported ability to comply with the Air Quality Directive, as transposed into UK law, in the shortest timescales possible and inform whether the project triggers a significant air quality effect.

6.7.5. As stated in paragraphs 6.4.7 and 6.4.8, a suitable assessment approach will be adopted to account for $\text{PM}_{2.5}$, primarily due to the introduction of the new legally-binding long term concentration target for $\text{PM}_{2.5}$, which will align with the latest version of DMRB LA 105 at the time of progressing the assessment⁵.

⁶ Once traffic data for the proposed scheme are provided, the ARN, study area, and associated sensitivity of the receiving environment will be defined to identify the level of assessment required (simple or detailed).

6.8. Assessment assumptions and limitations

- 6.8.1. The air quality assessment will be based on the most reasonable, robust and representative methodologies and data available at the time of assessment. There is an inherent level of uncertainty associated with air quality modelling due to uncertainties associated with:
- model parameters such as surface roughness length (defined by land use) and minimum Monin-Obukhov length (used to calculate stability in the atmosphere)
 - future traffic forecasts and fleet emission predictions
 - background air quality data
 - recorded meteorological data
 - air quality monitoring data
 - simplifications made in the model algorithms or post processing of the data that represent atmospheric dispersion or chemical reactions
- 6.8.2. To best manage these uncertainties, the air quality model will be evaluated using the results from local authority air quality monitoring to verify model outputs. The model verification will be undertaken with reference to LAQM.TG22 guidance (Defra, 2022). The model will be adjusted and verified by comparing modelled and monitored pollutant concentrations and, if necessary, adjusting the model output to account for systematic bias.
- 6.8.3. Monitoring data for 2020 and 2021 will not be used within the assessment, as it is unlikely to be representative of normal conditions due to the changes in traffic flows associated with the travel restrictions imposed during the Covid-19 pandemic.
- 6.8.4. Scheme specific baseline air quality monitoring is not proposed for the assessment of the proposed scheme because:
- there are existing local authority air quality monitoring sites within relevant proximity (see Figure 6.2 in Appendix C) that can be used for both the baseline assessment and for dispersion model verification, if required.
 - any monitoring undertaken in 2023 would need to be processed and back-projected to be representative of 2018 concentrations (the baseline year for this assessment) to be used for model verification. This would likely introduce considerable uncertainty and reduced reliability into the modelling assessment, principally due to the change in vehicle fleet mix and driver behaviour during and after the Covid-19 pandemic (i.e., 2020 onwards).

7. Cultural heritage

7.1. Introduction

- 7.1.1. This chapter has been prepared in accordance with DMRB LA 106 Cultural heritage assessment revision 1 (Highways England 2020c), hereafter referred to as DMRB LA 106.
- 7.1.2. This chapter provides an overview of the baseline heritage assets in the vicinity of the proposed scheme and describes the proposed approach for the initial review of cultural heritage within the study area. For this preliminary design stage scoping assessment, “cultural heritage” includes scheduled monuments, listed buildings, conservation areas, registered battlefields, registered parks and gardens and non-designated heritage assets. These categories represent the record of past human activity and environments. They may include above-ground and below-ground archaeological remains, historic buildings, historic open spaces, historic landscape features and the wider historic landscape. Such ‘heritage assets’ can make an important contribution to the local distinctiveness of an area and its sense of place.
- 7.1.3. In reference to scoping, DMRB LA 106 (paragraphs 3.1 and 3.2) states that ‘the assessment shall document the initial baseline studies undertaken and make a recommendation on the scope of further assessment’. The following questions are used during the scoping assessment to gain an understanding of the need to undertake further cultural heritage assessment:
- ‘is any designated or other cultural heritage resource in the footprint of the scheme or outside that footprint but still potentially physically affected by it?
 - is the setting of any designated or other cultural heritage resource in the footprint of the scheme, within the zone of visual influence or potentially affected by noise?
 - is there new land take associated with the project?
 - could potential archaeological remains be concealed?

Legislation, policy and guidance

- 7.1.4. The overarching legislation in relation to the historic environment is provided by the Ancient Monuments and Archaeological Areas Act 1979 and the Planning (Listed Buildings and Conservation Areas) Act 1990. Section 1(5) of the latter provides tests for that which can be assumed to be included in a listing, namely that:

(5) In this Act “listed building” means a building which is for the time being included in a list compiled or approved by the Secretary of State under this section; and for the purposes of this Act—

- (a) any object or structure fixed to the building;*
- (b) any object or structure within the curtilage of the building which, although not fixed to the building, forms part of the land and has done so since before 1st July 1948, shall [subject to subsection (5A)(a),] be treated as part of the building.*
- (5A) In a list compiled or approved under this section, an entry for a building situated in England may provide—*
- (a) that an object or structure mentioned in subsection (5)(a) or (b) is not to be treated as part of the building for the purposes of this Act;*
- (b) that any part or feature of the building is not of special architectural or historic interest.*

- 7.1.5. The overall national planning context in relation to the historic environment is provided by the National Planning Policy Framework (2021) and the DMRB.
- 7.1.6. The National Policy Statement for National Networks (NPS NN, 2014) sets out guidance concerning infrastructure projects. Of relevance to this assessment is Section 5: The historic environment, which addresses impacts to heritage assets and the conservation and enhancement of the historic environment. The statement sets out requirements for the applicant's assessment and the SoS responsibilities when dealing with planning proposals which have the potential to impact on cultural heritage assets. The statement emphasises the importance of balancing the need for the conservation of heritage assets with the desirability of new development.
- 7.1.7. Paragraph 5.131 states *"Given that heritage assets are irreplaceable, harm or loss affecting any designated heritage asset should require clear and convincing justification. Substantial harm to or loss of a grade II Listed Building or a grade II Registered Park or Garden should be exceptional. Substantial harm to or loss of designated assets of the highest significance, including World Heritage Sites, Scheduled Monuments, grade I and II* Listed Buildings, Registered Battlefields, and grade I and II* Registered Parks and Gardens should be wholly exceptional"*.
- 7.1.8. The local planning policies for the historic environment are contained in the Coventry Local Plan (2011-2031) and the Rugby Local Plan (2011-2031).
- 7.1.9. The method for determining and appraising baseline conditions will involve both desk study and baseline survey. The assessment will be undertaken in accordance with the published standards and guidance set out below:
- Chartered Institute for Archaeologists (CIfA), Standards and Guidance (updated 2020).
 - Department for Transport, Transport Analysis Guidance (TAG) Environmental Impact Appraisal (TAG Unit A3).

- Highways England, DMRB, LA 104 'Environmental assessment and monitoring' and LA 106 'Cultural heritage assessment'.
- Historic England, Conservation Principles (2008).
- Historic England, Good Practice Advice in Planning Note 2: Managing Significance in the Decision-Making Process (2015).
- Historic England, Good Practice Advice in Planning Note 3: The Setting of Heritage Assets (2017).

7.2. Study area

- 7.2.1. The zone of visual influence (ZVI) is derived from the zone of theoretical visibility (ZTV), modified with site observations and professional judgement. A ZTV was not available for this stage of works and so a study area has been determined based on scheme proposals and professional judgement. A 1km study area is appropriate to inform the potential impacts of the proposed scheme at this stage. However, since details of design are expected to evolve over the project, the precautionary principal has been applied and data from a wider area was examined to determine if there may be a risk of effects on the settings of particularly sensitive assets. This wider area was based on professional judgement considering the current proposals, surrounding topography and the types of assets in the region.
- 7.2.2. The following study areas have been used for this assessment to gather information on the heritage receptors (assets) which have the potential to be affected by the proposed scheme:
- Designated heritage assets, such as scheduled monuments, listed buildings, conservation areas, registered battlefields and registered parks and gardens will be assessed within the proposed scheme extent, plus a 1km radius buffer around the proposed scheme.
 - Non-designated heritage assets such as archaeological remains and locally listed buildings will be assessed within the proposed scheme extents, plus a 300m radius buffer around the proposed scheme.
- 7.2.3. This study area allows for consideration of known heritage assets which may indicate the potential for further unrecorded archaeological remains within the proposed scheme extent. Records of designated and non-designated assets were examined from a wider area beyond the study area to sufficient detail to confirm that the study area is appropriate at this stage. Data was also used to inform the archaeological and historical development and character of the wider area, placing the study area in context.

7.3. Baseline conditions

7.3.1. The baseline conditions have been established from previous project stages of the proposed scheme. This includes:

- Highways England (2020), A46 Coventry Junctions Upgrade (Walsgrave Junction): PCF Stage 2 Environmental Scoping Report
- Highways England (2022), A46 Coventry Junctions Upgrade (Walsgrave Junction): PCF Stage 2 Environmental Assessment Report

7.3.2. As part of the current assessment, the existing baseline data has been enhanced through further desktop study, using the following sources:

- Warwickshire Historic Environment Record (HER), data obtained 27/04/2023
- Coventry Historic Environment Record (HER), data obtained 14/04/2023
- National Heritage List for England (NHLE), data obtained 10/05/2023
- Defra MagicMap (accessed May 2023)
- Other readily available online information sources such as aerial photographs, historic mapping etc.

Known historic environment resource

7.3.3. Asset values given below are an interim assessment based on designations and the guidance set out in DMRB LA 104. These may be subject to review in future stages of work.

7.3.4. There are 30 designated heritage assets recorded within the 1km study area. These comprise:

- two scheduled monuments
- one grade II* registered park and garden
- 27 listed buildings
 - two grade I, three grade II* and 19 grade II

7.3.5. There are 31 known non-designated heritage assets recorded within the 300m study area. These include two findspots and 26 archaeological sites and three historic buildings. Some of these records are the same asset duplicated between the two HERs where they are located across or near the LPA border, or the same asset recorded in several different places from different primary sources. A process of consolidation will be undertaken in the ES.

7.3.6. Individual assets are detailed within the heritage gazetteer contained within Appendix D and the locations of these assets are shown in Figures 7.1, 7.2 and 7.3 in Appendix E.

Designated heritage assets

- 7.3.7. There are four designated heritage assets within or adjacent to the proposed scheme extent. These include the grade II* registered park and garden of Coombe Abbey (NHLE1000408), the boundary of which sits just within the south-eastern edge of the proposed scheme extent. There is also a group of grade II listed buildings centred on Hungerley Hall Farmhouse (NHLE1265694) including its associated granary, cowshed, stable range (NHLE1265638) and barn (NHLE1226789), these sit to the north-west of the existing A46 Walsgrave roundabout.
- 7.3.8. There is potential that the structures immediately surrounding Hungerley Hall Farmhouse are included in the listing of the main house or its related listings. In parallel with the tests set out in paragraph 7.1.4, there are three key factors to be taken into account in assessing whether a structure or object is considered within a given listing (Historic England, 2018). These factors include the physical layout of the listed building and the additional structure, their ownership both historically and at the date of listing, and the use or function of the relevant buildings historically and at the date of listing. The buildings surrounding Hungerley Hall Farmhouse are clearly related to the listed main house and ancillary barn in their layout and apparent use. Those structures in closest proximity to the existing A46 are; the yard boundary wall c.6m west of the cutting, the garden wall of the farmhouse circa (c).38m west of the cutting, and a barn which sits c.39m west of the cutting. Further work is needed to assess whether, and to what extent, these structures are part of the listings.
- 7.3.9. The designated heritage assets within the proposed scheme extent all date to the post-medieval period and demonstrate the presence of both a rural agricultural landscape, as well as an ornamental one. Coombe Abbey registered park and garden has origins in the late 16th century but was landscaped by Lancelot Brown in the 18th century at the peak of its prominence. It is likely that the park boundary that sits within the proposed scheme extent is part of the 18th century landscaping and therefore of potentially high cultural heritage value. The physical makeup and condition of the boundary is unknown at present, as there is significant planting obscuring the precise boundary line. The park is approached from the south and has extensive internal views within its grounds and there are significant views across surrounding agricultural land to the north and north-east.
- 7.3.10. The group of grade II listed agricultural buildings to the north-west of the A46 Walsgrave roundabout also date to the 18th century, although the farmhouse could have earlier origins. Historic mapping shows the area as agricultural land up to the registered park boundary. The buildings form a group and an impact on one may impact on the others by association.

- 7.3.11. There are two scheduled monuments recorded within the 1km study area. The closest is Caludon Castle, a moated site and part of an associated water management system dating to the 12th century, c 960m west of the proposed scheme extent (NHLE1014044). The other is a moated site 190m south of and relating to Caludon Castle, likely dating to the 12th century c.945m west of the proposed scheme extent (NHLE1014045). These scheduled monuments are of high value and both demonstrate that the area surrounding the proposed scheme was part of an elite defensive landscape during the medieval period.
- 7.3.12. The NHLE also records 24 listed buildings within the 1km study area. The listed buildings comprise:
- Two grade I listed buildings; the Church of St Bartholomew (NHLE1076629) c.840m south-west of the proposed scheme and the remains of Caludon Castle (NHLE1076645) c.881m north-west of the proposed scheme.
 - Three grade II* listed buildings; the Church of St Mary the Virgin (NHLE1115404) c.1.1km west of the proposed scheme, West Lodge (NHLE1233532) c.1.1km east of the proposed scheme, and The Woodlands (NHLE1233533) c.390m east of the proposed scheme.
 - The remaining 19 listed buildings are all grade II listed and include one asset of medieval date and 20 assets of post-medieval date.
- 7.3.13. The listed buildings within the 1km study area are of high value. Further information can be found in Appendix D. There are numerous listed buildings outside the 1km study area that are of a similar nature to those within the study area. Of these, the grade I listed Coombe Abbey (NHLE1233485) c.1.6km to the east of the proposed scheme has been selected for further assessment. The building sits within the grade II* registered park and garden discussed above and draws significance from this setting. While there are other grade II* and II listed buildings within the park, these are considered as adjunct to the Abbey and assessment of any impacts on this asset will be sufficient to describe the effects of the proposed scheme on the group at this stage.
- 7.3.14. Other designated assets outside of the 1km study area are considered to either not share intervisibility within the proposed scheme or do not draw significance from the proposed scheme area in their long distance views.

Non-designated heritage assets

- 7.3.15. There are four non-designated heritage assets recorded by the Warwickshire and Coventry HERs within the proposed scheme extent. There are a further two areas of ridge and furrow recorded within the proposed scheme extent by the Warwickshire HER, these ridge and furrow assets are not attributed a number but are shown in light green on Figure 7.2 in Appendix E.

- 7.3.16. The four heritage assets recorded within the proposed scheme extent include two records of a post-medieval turnpike road, running east to west from Market Harborough to Coventry following the same trajectory as the B4428 in the southern part of the proposed scheme extent (MCT15261; MWA4788). The remaining two non-designated heritage assets within the proposed scheme extent are two areas of ridge and furrow which have been partially excavated. One (MCT891) dates to the post-medieval period (1500-1900 Common Era) with post-1800 CE coins and a belt buckle found in the same area, along the B4082 to the west of the A46 Walsgrave roundabout. The other sits just within the northern area of the proposed scheme extent (MCT16481) and is of potential early medieval date (410-1066 CE), field boundaries of unknown date were also recorded during the excavation. The two unnumbered records of ridge and furrow recorded by Warwickshire HER also sit in the northern area of the proposed scheme extent.
- 7.3.17. The Warwickshire and Coventry HERs record a further 28 non-designated heritage assets within the 300m study area. Warwickshire also record areas of ridge and furrow across the proposed scheme extent and the study area, these are not attributed numbers but are shown in light green on Figure 7.2 in Appendix E.
- 7.3.18. The earliest evidence of activity recorded within the study area is ridge and furrow of early medieval date (MCT16482), made up of multiple areas, all of which sit within the northern part of the 300m study area. This cropmarks and archaeological evidence suggests that there may have been early medieval agricultural activity throughout the study area.
- 7.3.19. There are four non-designated heritage assets recorded within the 300m study area of medieval date, all of which are areas of ridge and furrow (MCT65; MCT304; MCT581; MWA8277). While the evidence for medieval activity within the 1km study area is limited, Coombe Abbey (outside the 1km study area) was established during the 12th century and enclosed the surrounding area (NHLE1000408). Villages in the area surrounding the proposed scheme extent and the study area are also recorded within the Domesday Book (Powell-Smith, A. 2023). The proposed scheme would certainly have been part of the rural hinterland between Coombe Abbey and other surrounding settlements, but the extent of agricultural development is unknown.
- 7.3.20. There are 18 non-designated heritage assets recorded within the 300m study area of post-medieval date. The heritage assets of this date within the 300m study area consist of numerous quarries, gravel pits and a brickworks, as well as a number of assets identified off 1st edition OS mapping. There is also potential that the ridge and furrow recorded by Warwickshire HER also dates to or

continued in use through this period. This ridge and furrow could mask earlier features.

- 7.3.21. Results of a geophysical survey, EDP209 Walsgrave Coventry Geophysical Survey Report 2006/77 (GSB Prospection. 2006), previously undertaken in parts of the proposed scheme extent, has shown potential evidence for sporadic activity of unknown date suggestive of some use, although relatively small scale. Another previous archaeological investigation, carried out in 2020/21 for National Highways (Network Archaeology, 2021), immediately to the south-west of the proposed scheme extent has shown evidence for a post-medieval ditch running north-east to south-west which aligns with a field boundary identified off historic mapping, as well as unstratified post-medieval remains. In addition to the HER records within the proposed scheme extent, these surveys demonstrates the low potential for previously unknown archaeological remains to survive within the area. The HER records suggests that these remains would most likely be medieval to post-medieval in date and agricultural in nature. If any such remains were to survive, they would derive their significance from their archaeological interest as well as their potential relationship with the Coombe Abbey estate.

Historic landscapes

- 7.3.22. The Coventry Historic Landscape Characterisation (HLC) (<https://www.coventry.gov.uk/downloads/file/14966/character-area-descriptions-1-to-17>) shows the southern area of the proposed scheme extent as part of the East Binley Character Area which predominantly consists of residential settlement located on the eastern fringe of Coventry. The earliest evidence for landscape history here shows the area as almost entirely enclosed fields which remained largely unchanged until the early 20th century when housing was built here.
- 7.3.23. The Coventry HLC also records the northern area of the proposed scheme extent as part of the South Stowe Character Area which has always been largely open in character. The open fields were enclosed in the mid-18th century, there were little changes following this aside from the construction of the A46 in the late 20th century.

7.4. Potential impacts

Construction

- 7.4.1. Potential adverse impacts to cultural heritage assets during the construction phase are outlined in Table 7.7-1 below. These impacts may arise as a result of:
- temporary impacts due to the presence and use of construction plant and machinery

- temporary impacts due to increased noise, vibration and dust during construction
- the temporary presence of works compounds, diversion or alteration of existing services and installation of new services
- permanent impacts due to excavation, ground disturbance and compaction
- permanent changes to setting due to the construction of new and modification of existing infrastructure, landscaping and planting
- permanent changes due to altered ground-water levels which may impair preservation of archaeological or palaeoenvironmental remains

7.4.2. Potential beneficial impacts to the heritage value of cultural heritage assets during the construction phase would result from landscaping and planting that would enhance the setting of assets.

Operation

7.4.3. Potential adverse impacts to the heritage value of cultural heritage assets during the operational phase would be due to changes in their setting as a result of changes to lighting, noise, vibration, air quality or ecological conditions (particularly in the case of the registered park and garden).

7.4.4. A potential reduction in noise, vibration or traffic would have a positive impact on the heritage value of an asset due to an improvement in its setting.

Summary

7.4.5. Table 7.7-1 below, provides a summary of potential cultural heritage impacts for assets within the study area.

Table 7.7-1. Potential impacts on cultural heritage within the proposed scheme extent

Potential construction impacts	Potential operation impacts
<p>Temporary impact on the setting of designated and non-designated heritage assets, resulting from noise, vibration and visual presence of construction plant and works.</p> <p>Permanent impact through the disturbance or removal of designated and non-designated assets, within land required for the construction of the proposed scheme.</p> <p>Permanent impact through vehicle movements within the land required for the construction of the proposed scheme, which may cause damage to sub-surface archaeological deposits through compaction.</p> <p>Permanent impact through changes to groundwater levels or ground movement adjacent to the land required for construction.</p>	<p>Permanent impact on the historic setting / character of designated and non-designated heritage assets, through increased visual intrusion from new infrastructure, lighting and landscaping. Or from changes in noise, air quality or ecological conditions</p> <p>Permanent impact on the integrity of designated and non-designated heritage assets through increase or decrease in noise, vibration or air quality associated with changes in traffic movements. Or from seasonal or episodic changes in ground-water levels.</p>

7.5. Design, mitigation and enhancement measures

- 7.5.1. Potential mitigation measures to reduce the impacts from the construction and operational phases of the proposed scheme upon heritage assets could include:
- design of development proposals and/or construction methods to avoid or reduce impacts on heritage assets
 - use of minimal or sympathetic design to reduce changes within the settings of heritage assets
 - management of noise and vibration in the vicinity of heritage assets
 - installation of physical protection measures, or temporary removal of heritage assets and for reinstatement following the completion of construction works
 - the use of noise fencing or maintenance of access routes to a heritage asset to maintain its viability
 - landscaping and planting to reduce the visual impact of the proposed scheme, including sympathetic selection of species with reference to historic landscapes

7.6. Description of the likely significant effects

- 7.6.1. The proposed scheme has potential to cause temporary and permanent adverse effects during construction and operation. Some have the potential to be significant without adequate mitigation. However, none of the impacts are likely to be of a level and character that cannot be reduced, avoided or mitigated using standard mitigation measures. The proposed scheme will include good practice measures in its EMP to guard against accidental damage and react to unexpected archaeological discoveries. Any agreed mitigation measures will also be set out and managed via the EMP.
- 7.6.2. The proposed option for the A46 Walsgrave Junction would require significant groundworks associated with the construction of a full grade-separated dumbbell junction, overbridge, and new B4082 link road, which would pass between the existing A46 and Hungerley Hall Farmhouse. Also involved in this option is the realignment of the A46 mainline through the existing roundabout, which will be removed as part of the proposed scheme.
- 7.6.3. It is likely that construction of the existing highway will have disturbed or truncated archaeological remains within its footprint. However, the land either side of the current A46 road and cutting has no record of previous development and is currently open agricultural land. It is most likely that these areas have been agricultural land since at least the post-medieval period and, while ploughing may have damaged any below ground archaeological remains, some deeper remnants may survive.

- 7.6.4. The full extent of disturbance from construction of the existing A46 carriageway across the proposed scheme is unknown. There is, therefore, potential for further archaeological remains relating to the known heritage assets within the proposed scheme or other, previously unknown, assets to be disturbed or truncated during groundworks within the proposed scheme extent. As such, the proposed scheme could have an adverse effect upon the recorded archaeological sites and/or previously unknown archaeological remains. There is a medium to low likelihood of archaeological remains overall and it is considered that any remains would most likely be of low value. However, there is a small chance for remains of up to medium value to survive here. Total removal of any such remains would be a major magnitude of impact and therefore up to a moderate adverse (significant) effect without adequate mitigation. Potential mitigation measures such as minimal intrusion into areas outside the existing A46 footprint and archaeological monitoring in areas of higher potential would reduce impacts on archaeological remains to result in a neutral (not significant) effect.
- 7.6.5. As the proposed scheme is largely within the existing road corridor, it is not considered likely that there will be impacts to the settings of archaeological remains. This is due to the retention of enough of the existing landscape context to inform interpretation and experience of buried remains to an informed observer.
- 7.6.6. The proposed scheme could physically impact the group of three grade II listed buildings of Hungerley Hall Farm (NHLE1265694; NHLE1226789; NHLE1265638). The proposed B4082 link road and associated landscaping may involve the alteration or demolition of the yard wall and potentially the alteration or demolition of the garden wall to the farmhouse and a barn. These features have potential to be included within the curtilage of the listings. Determination of this will be subject to further research and consultation with the LPA and Historic England. As assets of potentially high value, alteration or demolition could be up to major magnitude of impact and therefore up to a large adverse (significant) effect, prior to mitigation.
- 7.6.7. The proposed option could also physically impact the designated historic landscape of Coombe Abbey registered park and garden (NHLE1000408). As an asset of high value, alteration could be up to a moderate magnitude of impact and therefore up to a large adverse (significant) effect, prior to mitigation. Furthermore, if after site visits and consultation there is a built structure delineating the boundary of the registered park within the proposed scheme extent, this may be curtilage of the grade I Coombe Abbey itself (NHLE1233485) and therefore an asset of high value. Potential alteration or demolition of part of the boundary could be up to a moderate magnitude of impact and therefore up to a large adverse (significant) effect, prior to mitigation.

- 7.6.8. The proposed scheme will not physically impact any other designated or non-designated historic buildings, as all assets of this type, other than those discussed above, sit outside the proposed scheme extent.
- 7.6.9. The proposed option has the potential to impact the setting of numerous designated historic buildings as well as the designated historic landscape of Coombe Abbey (NHLE1000408). The grade II listed buildings centred on Hungerley Hall Farmhouse (NHLE1265694; NHLE1226789; NHLE1265638) would be subject to setting impacts during both construction and operation phases.
- 7.6.10. While the majority of the significance of these buildings lies within their fabric, they draw significance from their rural setting. While this has already been altered during the construction of the existing A46 the construction of the new B4082 link road would further erode the rural agricultural setting in which these listed buildings can be understood. As assets of high value any alteration to their setting would be a minor to moderate magnitude of impact and therefore have a slight to moderate adverse effect, prior to mitigation.
- 7.6.11. During construction it is considered that there may be some temporary alteration to the setting of the grade II* registered park and garden (NHLE1000408) and the listed buildings recorded within this area (NHLE1233663; NHLE1276493; NHLE1233533; NHLE1233703; NHLE1276492; NHLE1233532), as well to the grade II listed building of Walsgrave Hill Farmhouse (NHLE1233531) c.300m east of the proposed scheme extent. Since these effects are temporary and 100% reversible at the end of construction, the changes cannot be said to result in losses and therefore cannot lead to significant effects. Standard construction measures, such as the management of noise and vibration during construction would be sufficient to safeguard against accidental effects. It is not proposed to scope out temporary effects on setting from the ES as, the details of traffic diversion, construction lighting, programme etc are not known at this stage. Scoping this into the ES provides assurance that heritage assets which may be sensitive to accidental damage, dust accumulation or disruption to heritage-relevant functions (such as church services, festivals or heritage events) will be considered and managed through the EMP.
- 7.6.12. The proposed scheme does not have the potential for significant physical or setting effects on non-designated historic landscapes. The landscape types within the study area are typical for the region and proposed changes to the existing overall historic landscape layouts and land use are minimal relative to the resource.

Recommendations

7.6.13. Table 7.7-2 below gives answers to the questions outlined within the cultural heritage section of DMRB LA 106 used to determine the need for further assessment at preliminary design stage.

Table 7.7-2. Scoping assessment questions

Scoping Assessment Questions	Result
Is any designated or other cultural heritage resource in the footprint of the scheme or outside that footprint but still potentially physically affected by it?	Yes
Is the setting of any designated or other cultural heritage resource in the footprint of the scheme, within the zone of visual influence or potentially affected by noise?	Yes
Is there new land take associated with the project?	Yes
Could potential archaeological remains be concealed?	Yes

7.6.14. Due to the nature of the archaeological baseline and the impacts of proposed works upon the significance of the identified heritage assets, it is recommended that Cultural Heritage will be considered further in the ES.

7.6.15. In accordance with Section 5 of the NPSNN and paragraph 194 of the NPPF, local planning authorities (LPA) should advise the SoS to require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum, the relevant HER should be consulted and the heritage assets assessed using appropriate expertise where necessary.

7.6.16. Where the development is subject to EIA the applicant should undertake an assessment of any likely significant heritage impacts of the proposed project as part of the EIA and describe these in the ES. Where a site on which development is proposed includes or has the potential to include heritage assets with archaeological interest, the applicant should include an appropriate desk-based assessment and, where necessary, a field evaluation.

7.6.17. In accordance with NPPF, the Coventry and Warwickshire HER databases will need to be consulted as part of the ES, and further detailed assessment and consideration of mitigation measures will be required during the preliminary design stage.

7.7. Assessment methodology

- 7.7.1. A detailed assessment is recommended for the preliminary design stage. DMRB LA104 defines a detailed assessment as “detailed field surveys and/or quantified modelling techniques”. In this case, a desk-based assessment is proposed to be supplemented with site visits, and where appropriate non-intrusive geophysical survey (magnetometry) and archaeological trenching. The scope and scale of the geophysical survey and trial trenching will be outline within a Written Scheme of Investigation. The proposed methodology is set out below.
- 7.7.2. The ES will consider all heritage assets within the historic environment resource within the Cultural Heritage chapter, supported by appropriate specialist appendices. The historic environment resource encompasses three types of heritage asset or receptors as defined by DMRB:
- archaeological remains, which include Scheduled Monuments, and non-designated archaeological assets
 - historic buildings, which include listed, locally listed, and non-designated buildings
 - historic landscapes, which include Conservation Areas, Registered Battlefields and Registered Parks and Gardens
- 7.7.3. The study area for potential impacts will be defined in accordance with DMRB LA 106 Section 3.6-3.7 to include:
- the footprint of the proposed scheme plus any land outside that footprint which includes any heritage assets which could be physically affected
 - assets or their settings within the ZVI or potentially affected by changes in noise
 - the ZVI will be defined by the procedurally generated ZTV as modified using site observations to account for vegetation or other factors. The ZVI will not have a mappable output, as it will be based partly on professional judgement and will change with season, weather and available light
 - assets potentially affected by noise will be defined as those within the +/-3 dB noise contour and with a setting that could be sensitive to changes in character and volume of noise
 - further assets that may lie outside the study area may be included based on consultation with the LPA heritage advisors and Historic England and application of the precautionary principal. Considerations may include factors such as; strong group value with assets within the study area that may be affected, curtilage relationships with assets within the study area or, assets which may be temporarily more sensitive during the programme for construction of the proposed scheme. This list is not exhaustive and any such assets would be, by definition, exceptional

- 7.7.4. The assessment will describe the baseline historic environment resource within the study area, including evidence from detailed assessment. It will consider the potential for previously unrecorded heritage assets. It will describe how the proposed scheme will impact on this resource and assess the significance and severity of the effects arising from the construction of the proposed scheme.
- 7.7.5. The assessment will consider both temporary and permanent construction and operational impacts on heritage assets. Temporary impacts will be classed as impacts on setting through construction-related activities and are 100% reversible; whereas permanent impacts can be either physical impacts on the integrity of a heritage asset or impacts on setting. For the sake of clarity, permanent impacts can arise from temporary activities and impacts that can be reasonably expected to last throughout the projected operational lifetime of the proposed scheme will be assessed as “permanent”.
- 7.7.6. Mitigation measures will be included where appropriate. The assessment will conclude with the significance of effects, taking into account any agreed mitigation. Indirect, cumulative and secondary effects will also be assessed, and the assessment will draw on the conclusions from other disciplines, notably landscape, visual amenity, biodiversity, groundwater and noise and vibration. For clarity, mitigation achieved through avoidance or sensitive design will be noted separately from proposals for mitigation through active intervention, as the latter will require specific assurances through the EMP.
- 7.7.7. The temporal scope of the assessment assumes a baseline with current conditions at the time of the proposed site visit and impact years defined as the year of opening and the expected maturity of any landscape screening planting (usually 15 years after opening, subject to detailed proposals).

Significance Criteria

- 7.7.8. The proposed assessment methodology is based on the methodology and significance criteria outlined in the DRMB LA 104 and DMRB LA 106. According to DMRB, significance of effect upon the historic environment is assessed according to the value of the heritage asset and the magnitude of change. The effects may be either adverse or beneficial. The proposed assessment criteria are set out below in Table 7.7-3 and Table 7.7-4, the wording of which is based on DMRB.

Value of the receptor

- 7.7.9. The value and sensitivity of historic environment assets will be based on Table 7.3 below. The assessment of importance is based on a combination of designated status and professional judgement. It takes into account the SoS

non-statutory criteria for the scheduling of ancient monuments and principles of selection criteria for listed buildings.

- 7.7.10. It is also recognised that occasionally, sites can have a lower or higher than normal sensitivity within a local setting. The assessment of sensitivity therefore needs to take into account the part of the site that is being affected and the ability of the site to absorb change without compromising the understanding or appreciation of the historic environment.

Table 7.7-3. Criteria for assessing value

Value	Typical criteria
Very High	World Heritage sites, assets of acknowledged international importance, assets that can contribute significantly to acknowledged international research objectives.
High	Scheduled monuments, grade I, II* and II listed buildings, grade I and II* registered parks and gardens, registered battlefields, non-designated assets of schedulable or listable quality, non-designated monuments, sites or landscapes that can be shown to have specific nationally important qualities and assets that can contribute significantly to national research objectives.
Medium	Conservation Areas, grade II registered parks and gardens, locally listed buildings, non-designated assets that can be shown to have specific regionally important qualities that can contribute significantly to regional research objectives
Low	Non-designated assets – buildings, structures, monuments, landscapes or archaeological sites with a local importance for education or cultural appreciation. Assets which add to local archaeological and historic research or make limited contribution to wider research objectives. Very badly damaged assets that are of such poor quality that they cannot be classed as high or medium.
Negligible	Heritage resources identified as being of little historic, evidential, aesthetic, or communal interest, resources whose importance is compromised by poor preservation or survival or by contextual associations to justify inclusion into a higher grade.
None	Any heritage asset that has been destroyed or removed. For example, a find spot or an asset that has been completely archaeologically excavated. This criteria can include non-historic assets such as natural or very modern features or records of archaeological investigations with negative results that are often included in the local HER data for research purposes.

Magnitude of impact

- 7.7.11. The magnitude of impact on the historic environment, will be assessed in accordance with the criteria outlined in Table 7.7-4 below.

Table 7.7-4. Magnitude of change

Magnitude	Criteria
Major adverse	Total loss or fundamental alteration to a heritage asset's value or setting. Addition of new features that substantially and detrimentally alter the setting of a heritage asset.
Moderate adverse	Partial loss or alteration to a heritage asset's significance or its setting. Addition of new features that partially alter setting of a heritage asset to the extent where the significance is impacted.

Magnitude	Criteria
Minor adverse	Minor loss of an element of a heritage asset or its setting. Addition of new features that form largely inconspicuous elements in the setting of a heritage asset to the extent that its significance is slightly impacted.
Negligible adverse	Very minor loss of elements of a heritage asset or its setting. Addition of new features that do not alter the setting of a heritage asset or do so in such a way that the relevant aspect of the setting is still clear and readily appreciable.
No change	No change to the heritage asset.
Negligible beneficial	Very minor enhancements to the heritage asset or its setting that help slightly better reveal to the asset's heritage value.
Minor beneficial	Changes that have a limited benefit to the heritage value of the asset. Changes to the setting of the asset which have a slight beneficial impact on heritage value and enhance the ability to understand the asset its historic context and setting.
Moderate beneficial	Changes that are beneficial to the heritage value of the asset. Changes that result in the setting of the asset being noticeably enhanced and improving the ability to understand the asset and its historic context and setting.
Major beneficial	Changes that are extremely beneficial to the heritage value of the asset. Comprehensive changes to the setting of the asset which greatly reveal and enhance its heritage value.

Significance of effects

- 7.7.12. Effects will be evaluated by combining the assessment of magnitude and value outlined in Table 7.7-3 and Table 7.7-4, to predict the significance of effect. These effects can be beneficial or adverse and temporary or permanent. The significance of effects matrix is show in Table 5.3 in Chapter 5.

7.8. Assumptions and limitations

- 7.8.1. The baseline information presented here is based on the information contained in documents from previous stages of the proposed scheme design and assessment: this includes updated NHLE and HER data obtained in April 2023. The data was gathered for a larger study area than the 300m study area defined here, to inform context and is sufficient to cover potential changes to the proposed scheme extent. Both national and regional data sets will be kept up to date as appropriate throughout the duration of the project.
- 7.8.2. HER data sets are, by their nature, incomplete and are constantly being updated at source. Information from archaeological fieldwork used to update the HER data is predominantly from development-related works rather than pure research works. As a result, they are limited in their ability to predict previously unknown archaeology within the proposed scheme extent. Information from the Coventry and Warwickshire HERs will be a starting point for further research during the ES rather than acting as a definitive list of assets. Where there is an absence of data, professional judgement will be used to reach informed decision regarding the historic environment.

- 7.8.3. The current understanding of the extent and survival of archaeological remains within the study area is based on data relevant to the assessment which has been selected based on professional judgement. However, the specific nature, extent, date, degree of preservation and significance of known and unknown archaeological remains is difficult to predict without undertaking archaeological field surveys. The uncertainty in predicting impacts and effects upon such resources is inherent in all such studies and should be stressed.
- 7.8.4. Conclusions may be revised during the course of the ES process on the basis of updated information following further research, survey, and investigation. However, intrusive archaeological investigations are inherently destructive and must be minimised to limit potential damage to only that which is necessary to inform the application.
- 7.8.5. A programme of archaeological monitoring on ground investigations within and around the proposed scheme is ongoing and has not been reported at the time of writing. Results from this work will be incorporated into the later stages of assessment.

8. Landscape and visual

8.1. Introduction

- 8.1.1. This scoping chapter considers the potential landscape and visual effects associated with the proposed scheme that may occur during construction and operation phases. It outlines how potential effects will be assessed in the Landscape and Visual Effects chapter of the ES. This information includes baseline conditions as well as the methodology that will be used to assess the effects of the proposed scheme.
- 8.1.2. Landscape and visual impact assessment (LVIA) identifies and assesses the significance of and the effects of change due to the project on the landscape as a resource, and people's views and visual amenity as part of the iterative steps in assessment and design development.
- 8.1.3. This scoping chapter has been prepared based on DMRB LA 107 Landscape and visual effects, Revision 2, (Highways England, 2020d) hereafter referred to as DMRB LA 107 and the Guidelines for Landscape and Visual Impact Assessment 3rd Edition (GLVIA3), (Landscape Institute and Institute of Environmental Management and Assessment, 2013). As recommended in the GLVIA3, the LVIA will address landscape effects and visual effects separately.
- 8.1.4. Potential effects on landscapes of historical, cultural, or archaeological significance are considered in Chapter 7 Cultural Heritage and potential effects on nature conservation and biodiversity are considered in Chapter 9 Biodiversity.
- 8.1.5. As stated in DMRB LA 107, paragraph 3.8, the landscape scoping assessment should identify and report on:
- “1) the likely nature, extent and scale of the project to determine effects of change and development
 - 2) the likely nature and scale of landscape effects (positive, neutral or negative) during the construction and operation of the project
 - 3) the likelihood of the project to affect the aesthetic and perceptual aspects of the landscape, its distinctive character and its elements
 - 4) issues likely to require further assessment together with the methods to be applied”
- 8.1.6. As stated in DMRB LA 107, paragraph 3.28, the visual impact scoping assessment should identify and report on:
- “1) the likely nature, extent and scale of the project to determine effects of change and development

- 2) the likely nature and scale of effects (positive, neutral or negative) on views and visual receptors during the construction and operation of the project
- 3) the likelihood of the project to result in significant visual effects
- 4) issues likely to require further assessment together with the methods to be applied”

Legislation, policy and guidance

- 8.1.7. The proposed scheme sits on the boundary between Coventry City Council and Rugby Borough Council, the latter regionally part of Warwickshire County Council. Landscape and visual matters are important considerations within regional and local planning policy.

Coventry City Council

- 8.1.8. The Coventry Local Plan (2011-2031), (Coventry City Council, December 2017) includes environmental policies relating to the ‘Green Belt and Green Environment’ elements and policies relevant to the proposed scheme include:
- Policy GB1: Green Belt and Local Green Space — “Part 3c: ‘Land south at Walsgrave Hill Farm (residential)’” to be removed from the Green Belt to accommodate future development needs.
 - Policy GE4: Tree Protection – Part 1 and 2:
 - “1. Development proposals will be positively considered provided:
 - a. there is no unacceptable loss of, or damage to, existing trees or woodlands during or as a result of development, any loss should be supported by a tree survey
 - b. trees not to be retained as a result of the development are replaced with new trees as part of a well designed landscape scheme; and
 - c. existing trees worthy of retention are sympathetically incorporated into the overall design of the scheme including all necessary measures taken to ensure their continued protection and survival during construction.
 - 2. Development proposals that seek to remove trees that are subject to ‘Protection’, without justification, will not be permitted.”
- 8.1.9. Policy DE1 ‘Ensuring High Quality Design’ relates to Councils requirements to “raise the standard of design in the built and green environments”; and should be considered within the development of design proposals for the scheme.
- 8.1.10. Coventry City’s *The New Coventry Local Development Plan (2011-2031)*, (Coventry City Council, September 2014) pages 37-38, reinforce Policy DE1 by providing key design criteria and considerations for use within new

developments but also the need for high quality transport links, which benefit the local community and economy (pages 39-41).

Rugby Borough Council

- 8.1.11. Rugby Borough Council's Local Plan 2011-2031 Draft publication (Rugby Borough Council, 2016), Policy NE4: Landscape Protection and Enhancement, discusses how new developments should protect, enhance and contribute to landscape character positively, in order, *"to ensure that significant landscape features are protected from harm and that landscape design is a key component in the design of new development"*.
- 8.1.12. Policy SDC2: Landscaping, discusses how all landscape aspects are an integral part of the overall design with a high standard of appropriate hard and soft landscaping required on all new developments.

8.2. Study area

- 8.2.1. The preliminary ZTV (computer-generated), in figure 8.2 in Appendix F, has been generated using a 5m Digital Terrain Model which does not take account of the screening effects of vegetation, buildings or other structures. Woodland from National Forest Inventory has been incorporated into the DTM with an assumed height of 10m. ZTV is based upon a series of points spaced 25m apart (using the Paved Edge of Carriageway and Central Reservation Edge) at a height of 4.5m (HGV Trucks) above the proposed scheme elevation, and 10m at notional lighting column locations in the centre of each roundabout with an observer eye height of 1.6m. The ZTV does not include embankments and cuttings and there are some areas where the proposed scheme alignment is lower than the existing ground level.
- 8.2.2. In accordance with DMRB LA 107 a study area for landscape and visual effects has been established, following the review of the ZTV produced at the options selection stage, desk-based studies and an initial scoping site visit that was undertaken in March 2023. The site visit was conducted to inform the landscape and visual baseline of the study area and surrounding context. On production of the Landscape and Visual Effects ES chapter, a ZTV will be run based upon the preliminary design stage information.
- 8.2.3. A 1km radius study area around the site is proposed. The extent of the study area from the application site boundary has been selected as being appropriate to ensure that all potentially significant visual effects are identified. 1km is considered adequate for the study area as the extent of visibility could be established during a site visit in March 2023 based on visibility of the existing road corridor. Beyond this extent, it is considered that the proposed scheme will unlikely give rise to any significant effects on landscape and visual receptors due

to the distance and presence of intervening topography, vegetation and built form.

- 8.2.4. The study area is split between the urban edge of Coventry to the west and rural countryside of Rugby to the east. The north-eastern area of the study area contains arable farmland around Walsgrave Hill, and south-eastern section is dominated by Coombe Country Park and farmland north of Binley Woods. In contrast to the north-western section of the study area consists of urban areas of Walsgrave around University Hospital Coventry and Warwickshire and south-western section consists of Binley residential area.

8.3. Baseline conditions

- 8.3.1. Landscape and visual baseline conditions that may be significantly affected by the proposed scheme have been established through desktop study and an initial scoping site visit.

Landscape

Landscape character

- 8.3.2. Natural England's National Character Areas (NCA) describe the general character of the English countryside. The site is situated on the boundary of two NCAs; NCA 96: Dunsmore and Feldon (Natural England, 2013) and NCA 97: Arden (Natural England, 2012), both of which will be reviewed as part of the LVIA (as shown on figure 8.1 in Appendix F).
- 8.3.3. Dunsmore and Feldon covers the north section and southern tip of the site. The character is predominantly a rural, agricultural landscape, crossed by numerous small rivers and tributaries and varying between a more open character in the Feldon area and a wooded character in Dunsmore. The land to the north comprises the wedge-shaped area of low ridges and valleys lying between Leamington Spa, Coventry and Rugby, and is known as Dunsmore. This still retains a character of historic heathland and woodlands, which can create a sense of confinement in the generally open landscape. The fringes of the plateaux are all similar in character but have open views framed by low hills and settlements. Coventry, which sits on the border of Dunsmore and Feldon and Arden, exerts a huge influence, especially in the north of the area.
- 8.3.4. Arden covers the central section of the site around the current roundabout. Arden character area comprises farmland and former wood-pasture lying to the south and east of Birmingham between the River Tame and the River Avon in Warwickshire and extends into north Worcestershire to the Severn and Avon Vales. The eastern part of the NCA borders and surrounds Coventry. The landscape of the lower-lying central area is gently rolling with small fragmented,

semi-natural and ancient woodlands consisting of Mature oaks set in hedgerows and distinctive field boundaries. Historic parklands and narrow river corridors are common features in the vicinity of the urbanised areas within the NCA.

- 8.3.5. As discussed, the proposed scheme sits on the boundary between two Local Authorities Coventry City Council and Rugby Borough Council, the latter regionally part of Warwickshire County Council. There are no published Landscape Character Assessments relating to the study area undertaken by Coventry City Council or Rugby Borough Council specifically.
- 8.3.6. However, in conjunction with Warwickshire County Council and Rugby Borough Council, the Living Landscapes Project, report was published in April 2006: *Landscape Assessment of the Borough of Rugby Sensitivity and Condition Study* (Warwickshire County Council and Rugby Borough Council, 2006). The aim of the study was to examine the landscape around Rugby in terms of sensitivity, and condition undertaking a broad-based landscape character assessment of Rugby.
- 8.3.7. Warwickshire County Council has also produced a suite of landscape character assessments reports for the whole of Warwickshire: *Warwickshire Landscapes Guidelines* (November 1993). The area of the site located under Rugby Borough Council jurisdiction, falls under Dunsmore Parklands Landscape Character Type (LCT): *'An enclosed, gently rolling estate landscape with a strongly wooded character defined by woodland edges, parkland and belts of trees'*.
- 8.3.8. This character gives a strong sense of scale, enclosure, and the feeling of a linked landscape; through large woodland blocks, wooded streams, mature hedgerows and hedgerow trees (oak). This emphasised by gently rolling landform and large-scale field pattern, poorly defined in some places, allowing for middle distant views to wooded skylines. The landscape around Coombe fields is open allowing for wide views northwards but fragmented by intrusive landscape features of busy roads and industrial built form.
- 8.3.9. Landscape Assessment of the 'Borough of Rugby Sensitivity and Condition Study', April 2006, page 14; defines Dunsmore Parklands LCT of moderate sensitivity, due to fragility, visibility, and condition.
- 8.3.10. The site is further classified as 'Enhancement zone', as part of the Strategies and guidelines, page 30-32, which identifies that landscaping along new roads can greatly improve highway environment and to be considered as a whole; in terms of landform, connection to surrounding landscape pattern and potential use of heathland in diversification of roadside character.

Landscape designations

- 8.3.11. There are no protective national or local landscape designations within the study area.
- 8.3.12. Coombe Abbey Grade II* Registered Park and Garden is located within the Coombe Abbey Country Park, which borders the proposed scheme, along its western boundary. There is very limited potential intervisibility due to screening by a thick woodland belt along Coombe Abbey Country Park Boundary.

National trails/Public Rights of Way/Long distance walking routes

- 8.3.13. There is a limited network of public paths within and beyond the 1km study area (as shown on figure 8.2 in Appendix F)
- Centenary Way Long Distance Path
 - PRoW no.R75X at Walsgrave Hill
 - local footpaths within: Smite Brook, Sowe Valley Footpath, Dorchester Way Open Space and Gainford Rise Open Space

Visual context

- 8.3.14. The A46 (Coventry Eastern Bypass) is located within a landform cutting, resulting in limited visibility due to landform and virtually continuous woodland belt along both sides of the road with occasional gaps allowing for glimpsed views. A high voltage overhead power line crosses the study area in a north-south alignment, the main detracting visual feature of the study area.
- 8.3.15. Except for Walsgrave Hill, which is slightly elevated (92m, Above Ordnance Datum (AOD)), north-east of the A46 Walsgrave Junction; the landform is largely flat with views comprising of arable fields with limited boundaries allowing for longer views. In comparison, views north-west of the site, towards the residential edge of Walsgrave are blocked or partially screened due to woodland belt along River Sowe. The University Hospital is four/five storeys tall with views potentially available from the upper storeys of the hospital towards the existing A46 corridor as part of the wider landscape.
- 8.3.16. Due to continuous woodland belt on both sides of the road and topography, views south of A46 Walsgrave Junction are restricted or limited in the direction of surrounding residential area of Binley, south-west of the site or Coombe Abbey Country Park south-east.

8.4. Potential impacts

- 8.4.1. The LVIA will describe the potential alterations in landscape character and visual amenity in comparison to the baseline conditions.

Landscape receptors

- 8.4.2. The landscape receptors are the landscape character areas which may potentially be affected by the proposed scheme. Both the character and quality of the site and wider study area will be considered. As described above the LVIA will identify landscape areas as part of the detailed baseline appraisal and assessment process.

Visual receptors

- 8.4.3. The visual receptors are people who would be affected by changes in views or visual amenity at different places, and they are usually grouped by what they are doing at that place (residents, motorists and recreational users). Effects on visual receptors will be supported by assessment viewpoints.
- 8.4.4. Key visual receptors which will be considered in the LVIA are:
- residential receptors of Walsgrave and Binley including Hungerley Hall Farm
 - recreational receptors at Coombe Abbey Country Park including Coombe Pool
 - recreational receptors on the footpaths along:
 - Smite Brook
 - Sowe Valley
 - Dorchester Way Open Space
 - PRow no.R75X at Walsgrave Hill
 - Gainford Rise Open Space
 - Centenary Way Long Distance Path, close to Coombe Abbey Country Park
- 8.4.5. Notwithstanding the building height of University Hospital at four/five storeys and the proximity to the proposed scheme. Views are potentially available from the upper storeys of the existing A46 and subsequent proposed scheme. As reviewed during the scoping site visit, any potential views will be seen as part of the wider landscape. As presented in **Error! Reference source not found.** hospital users have a low value/sensitivity as an indoor place of work and temporary or short-term nature of patient stays (day/ night) i.e., not residential use. As such no significant effects on hospital receptors have been identified and as such are excluded from any further assessment.

Representative viewpoints

- 8.4.6. The visual assessment will be informed by a set of viewpoints which are representative of views of the site. Ten viewpoints have been identified as

presented in Table 8-1 below, which have been informed by the preliminary ZTV, desk-based studies and initial scoping site visit undertaken in March 2023.

Table 8-1: Proposed representative viewpoints

Viewpoint number	Name	Location (approximate)	Reason for selection and comments
1	Recreational users of public path to Coombe Abbey Country Park/ PRow R75x and residential receptors at Farber Road/ Barrow Close, Walsgrave.	SP 438593 280754	Representative of residential and recreational receptors. Even though views are screened by intervening tree belts and differences in landform; due to the proximity to the proposed scheme, receptor sensitivity and potential for design alterations, these receptors will be included in the LVIA.
2	Recreational receptors along the PRow R75x at Walsgrave Hill.	SP 439204 280707	Representative of recreational users. Even though views are screened by intervening tree belts and differences in landform; due to the proximity to the proposed scheme and the potential for design alterations, this receptor will be included in the LVIA.
3	Recreational receptors along the section of Centenary Way close to Coombe Abbey.	SP 439649 280467	Representative of recreational users. This receptor will be included in the LVIA, however is anticipated that the receptor is unlikely to be significantly affected, due an absence of visibility through screening by intervening vegetation and differences in landform.
4	Recreational users of Sowe Valley and Dorchester Way Open Space.	SP 438467 280189	Representative of recreational users. Views are partially screened by vegetation along the River Sowe but due to the proximity to the proposed scheme will be included in the LVIA.
5	Recreational users of Sowe Valley and residential receptors off northern end of Dorchester Way, Walsgrave - Abbotsbury Close/ Bridport Close.	SP 438317 280039	Representative of residential and recreational receptors. Even though views are partially screened by intermediate tree belts along the footpath by the properties and long the River Sowe; due to the proximity to the proposed scheme, differences in landform and potential for design alterations, these receptors will be included in the LVIA.
6	Recreational users of Sowe Valley and residential receptors off southern end of Dorchester Way, Walsgrave - Sturminster Close and Fontmell Close.	SP 438196 279668	Representative of residential and recreational receptors. Even though views are partially screened by intermediate tree belts along the footpath by the properties and long the River Sowe; due to the proximity to the proposed scheme, differences in landform and potential for design alterations, these receptors will be included in the LVIA.

Viewpoint number	Name	Location (approximate)	Reason for selection and comments
7	Recreational users of Gainford Rise Open Space by Smite Brook and residential receptors off northern end of Royston Close, Faygate Close and Gainford Rise.	SP 438052 279268	Representative of residential and recreational receptors. Even though views are screened by intervening tree belts and differences in landform due to the proximity to the proposed scheme, receptor sensitivity and potential for design alterations, this receptor will be included in the LVIA.
8	Recreational users of Gainford Rise Open Space by Smite Brook off Royston Close and Gainford Rise.	SP 438216 279173	Representative of recreational users. Views are partially screened by vegetation along the Smite Brook but due to the proximity to the proposed scheme, this receptor will be included in the LVIA.
9	Recreational users of Gainford Rise Open Space and residential receptors off Valencia Road, Binley.	SP 438382 278951	Representative of recreational users. This receptor will be included in the LVIA, however is anticipated that the receptors are unlikely to be significantly affected, due an absence of visibility through screening by intervening vegetation and differences in landform.
10	Recreational receptors at Coombe Abbey Park	SP 440131 279327	Representative of recreational users. This receptor will be included in the LVIA due to its sensitivity. It is anticipated that the is receptor unlikely to be significantly affected, due an absence of visibility through screening by intervening vegetation and distance from the proposed scheme.

8.4.7. A selection of the final viewpoints will be supported in the LVIA with photomontages (also referred to as photo-realistic visualisations). The exact number and location of the photomontages will be agreed with Coventry City Council and Rugby Borough Council once initial assessment findings have been produced to ensure that the viewpoints selected represent the key effects of the proposed scheme.

8.4.8. Baseline summer and winter photography will be undertaken for the 10 viewpoints as listed above. In line with the preliminary ZTV, all proposed scheme photography will be taken from a typical eye level height of 1.6m above ground level.

8.5. Design, mitigation and enhancement measures

8.5.1. Environmental mitigation design measures integrated into the proposed scheme could mitigate or reduce landscape and visual effects identified within the LVIA. Mitigation design proposals will utilise Highways England (2020) *DMRB LD 117*

Landscape Design guidance. Any effects which cannot be mitigated or reduced are referred to as residual effects.

8.5.2. At this stage of proposed design, potential mitigation measures have not been determined and therefore it is not possible to fully identify all impacts upon landscape character, views and visual amenity. Potential mitigation measures could include:

- Landscape:
 - protection of existing retained vegetation during construction
 - restoration of existing landscape pattern including hedgerows along field boundaries, use of trees and shrub planting to create screening to the proposed scheme in line with local landscape character
 - seeking to integrate the proposed scheme design within the surrounding context wherever possible, including use of muted colours in the design of structures
 - design review to reduce vegetation losses where practicable
 - planting proposals will be developed to integrate the proposed development into the existing landscape setting
- Visual:
 - where bunds are proposed as part of permanent works, where practicable these are to be constructed early in the programme provide mitigation screening to the construction activities and vegetation establishment
 - reinstatement/ mitigation planting, using local native species to aid landscape integration and provide biodiversity benefits, as well as visual screening where required
 - reinstatement/ mitigation planting will feature hedgerows, woodland (roadside belts), individual trees and grassland areas, features present within vicinity to aid visual integration and screening
- Construction:
 - keeping a well-managed and tidy site and compounds - ensuring materials are delivered on an 'as needed' basis to avoid unnecessary stockpiles
 - land used for compounds or haul roads will be returned to the former state once the construction has been completed
 - visual impacts associated with construction compounds, security and task lighting, tall plant such as cranes or piling and haul routes. The locations of such elements are yet to be determined
 - minimising night-time working and the use of permanent lighting. Any lighting that is required should be directional and turned off when possible

- making use of previously developed land for site compounds and storage areas and temporary site buildings and welfare facilities to be of a suitable scale and recessive colour to blend with the local area
- limiting the extent of new haul routes away from existing hard surfaces as far as possible
- limiting temporary and permanent vertical elements within the landscape

8.6. Description of the likely significant effects

- 8.6.1. A summary of construction and operation impacts are listed below, identifying which likely impacts will be assessed in the LVIA. As required by DMRB LA 107, the assessment of operational effects will be undertaken at year one and year 15 in the LVIA.
- 8.6.2. Introduction of features associated with the realignment and expansion of the A46 including new gantries, signage, and lighting at construction and operation phases will have general landscape and visual effects.

Construction

Landscape:

- permanent loss of some landscape elements including removal of the hedgerows, trees/ woodland belts and alteration of the existing field pattern along the A46
- potential changes in landscape setting and listed buildings located at Hungerley Hall Farm and Coombe Abbey Registered Park and Garden
- temporary landscape character effects, including loss of landscape features, and visual effects through the introduction of construction machinery (crane, hoardings, and plant), formation of earthworks (landform) and presence of compounds

Visual:

- potential temporary alterations in visual amenity/ views during the construction phase associated with the realignment of the A46 and introduction of new junction arrangements. This includes sensitive receptor groups such as residents and recreational users likely to experience significant short term adverse visual effects

Operation

Landscape:

- landscape character effects and visual effects through the introduction of features associated with the realignment and expansion of the A46 including new gantries, signage, and lighting
- potential changes in landscape setting and listed buildings located at Hungerley Hall Farm and Coombe Abbey Registered Park and Garden

Visual:

- key visual change would be in relation to the A46 realignment/ expansion, alterations in earthworks (landform), a fundamental element of the proposed scheme and landscape pattern with new planting introduced as part of environmental mitigation design measures
- as in the construction phase, sensitive receptor groups such as residents and recreational users are likely to be significantly affected during the operational stage

8.7. Assessment methodology

- 8.7.1. The LVIA will be carried out in accordance with the principles contained in the DMRB LA 107 and GLVIA3 and visualisations will be produced in accordance with the Landscape Institute's *Technical Guidance Note 06/19 - Visual Representation of Development Proposals* (September 2019).
- 8.7.2. The following comprises a brief overview of the proposed methodology for the LVIA. The methodology will involve desk study, field work and well-established assessment techniques to determine levels of effect and significance. A more detailed explanation will be provided within the LVIA.
- 8.7.3. A detailed analysis of the baseline landscape, views and visual amenity will be undertaken using OS maps, field survey and relevant published documents including previously mentioned landscape character assessments, and national and local planning policy documents.
- 8.7.4. The aim of the landscape assessment is to report on the potential effects of the proposed scheme on the distinctive character of the landscape and the characteristics that contribute to this, including physical features and aesthetic / perceptual aspects. The aim of the visual assessment is to report on the potential effects of the proposed scheme on views and how this affects the visual amenity of viewers.
- 8.7.5. The sensitivity of the receptors will be derived from the detailed assessment of their susceptibility and value. The magnitude of change will consider the size/scale of change, the geographical extent over which the change will be likely to be experienced, and the duration of the effect.
- 8.7.6. The overall assessment of the significance of effect will be the result of professional judgement drawing on guidance provided in DMRB LA 107 and GLVIA3. A numerical or formal weighing system will not be applied. Instead, consideration of the relative importance of each aspect will be made to feed into the overall decision.

- 8.7.7. As set out in DMRB LA 107 levels of significance will be identified as negligible, low, medium, high or very high. While Magnitude (change) of effect will be identified as, no change, negligible, minor, moderate to major. Moderate and/ or major effects will be considered to be a 'significant' effect in EIA terms.
- 8.7.8. The nature of effect (beneficial, adverse, or neutral) will be determined in relation to the degree to which the proposed scheme fits with the landscape character and the contribution to the landscape that the proposed scheme makes as well as how well the proposed scheme fits with the view and the contribution to visual amenity that the proposed scheme makes.
- 8.7.9. The LVIA process will also identify measures for avoiding and mitigating potential adverse effects and feed these into the project design and assess the residual effects and their significance. Inputs to the design will aim to reduce adverse effects and increase beneficial effects on the landscape and on people's views.
- 8.7.10. The significance of effect on landscape character will be determined by combining the sensitivity of the affected landscape with the magnitude of change attributable to the proposed scheme. This is in accordance with the matrix in the methodology section of DMRB LA 104.
- 8.7.11. The criteria for assessing landscape sensitivity is presented in Table 8-2 and the criteria for assessment of the magnitude of change is presented in Table 8-3. Both tables are taken from DMRB LA 107.

Table 8-2: Criteria for assessing landscape sensitivity (susceptibility and value) and typical descriptions

Landscape sensitivity (susceptibility and value) of receptor	Typical descriptors and examples
Very High	Landscapes of very high international / national importance and rarity or value with no or very limited ability to accommodate change without substantial loss / gain (i.e., national parks, internationally acclaimed landscapes - UNESCO World Heritage sites).
High	Landscapes of high national importance containing distinctive features / elements with limited ability to accommodate change without incurring substantial loss / gain (i.e., designated areas, areas of strong sense of place - registered parks and gardens, country parks).
Medium	Landscapes of local or regional recognition of importance, able to accommodate some change (i.e., features worthy of conservation, some sense of place or value through use / perception).
Low	Local landscape areas or receptors of low to medium importance with ability to accommodate change (i.e., non-designated or designated areas of local recognition or areas of little sense of place).
Negligible	Landscapes of very low importance and rarity able to accommodate change.

Table 8-3: Criteria for magnitude of change and nature of effect on the landscape and typical descriptions

Magnitude of effect (change)		Typical descriptors and examples
Major	Adverse	Total loss or large-scale damage to existing landscape character or distinctive features or elements; and / or addition of new uncharacteristic, conspicuous features or elements (i.e., road infrastructure).
	Beneficial	Large scale improvement of landscape character to features and elements; and / or addition of new distinctive features or elements, or removal of conspicuous road infrastructure elements.
Moderate	Adverse	Partial loss or noticeable damage to existing landscape character or distinctive features or elements; and addition of new uncharacteristic, noticeable features or elements (i.e., road infrastructure).
	Beneficial	Partial or noticeable improvement of landscape character by restoration of existing features or elements; or addition of new characteristic features or elements or removal of noticeable features or elements.
Minor	Adverse	Slight loss or damage to existing landscape character of one (maybe more) key features and elements; and addition of new uncharacteristic features and elements.
	Beneficial	Slight improvement of landscape character by the restoration of one (maybe more) key existing features and elements; and the addition of new characteristic features.
Negligible	Adverse	Very minor loss, damage or alteration to existing landscape character of one or more features and elements.
	Beneficial	Very minor noticeable improvement of character by the restoration of one or more existing features and elements.
No Change		No noticeable alteration or improvement, temporary or permanent, of landscape character of existing features and elements.

8.7.12. Significance of visual effect will be determined by combining the sensitivity of the visual receptor with the magnitude of change attributable to the proposed scheme. This is in accordance with the matrix in the methodology section of DMRB LA 104.

8.7.13. The criteria for assessing visual sensitivity is presented in Table 8-4 and the criteria for assessment of the magnitude of change is presented in Table 8-5. Both tables are taken from DMRB LA 107.

Table 8-4: Criteria for assessing visual sensitivity (susceptibility and value) and typical descriptions

Visual sensitivity (susceptibility and value) of receptor	Typical descriptors and examples
Very High	Static views from and of major tourist attractions. Views from and of very important national / international landscapes, cultural / historical sites (e.g., National Parks, UNESCO World Heritage sites). Receptors engaged in specific activities for enjoyment of dark skies.

Visual sensitivity (susceptibility and value) of receptor	Typical descriptors and examples
High	<p>Views by users of nationally important PRoW / recreational trails (e.g., national trails, long-distance footpaths).</p> <p>Views by users of public open spaces for enjoyment of the countryside (e.g., country parks).</p> <p>Static views from dense residential areas, longer transient views from designated public open space, recreational areas.</p> <p>Views from and of rare, designated landscapes of national importance.</p>
Moderate	<p>Static views from less populated residential areas, schools and their outdoor areas.</p> <p>Views by outdoor workers.</p> <p>Transient views from local / regional areas such as public or waterways, users of local / regional designated tourist routes of moderate importance.</p> <p>Views from and of landscapes of regional importance.</p>
Low	<p>Views by users of main roads or passengers in public transport on main arterial routes.</p> <p>Views by indoor workers.</p> <p>Views by users of recreational / formal sports facilities where the landscape is secondary to enjoyment of the sport.</p> <p>Views by users of local public open spaces of limited importance with limited variety or distinctiveness.</p>
Negligible	<p>Quick transient views such as from fast moving vehicles.</p> <p>Views from industrial area, land awaiting re-development.</p> <p>Views from landscapes of no importance with no variety or distinctiveness.</p>

Table 8-5: Criteria for magnitude of change on the visual impact and typical descriptions

Magnitude (change) of visual effect	Typical descriptors and examples
Major	The project, or a part of it, would become the dominant feature or focal point of the view.
Moderate	The project, or a part of it, would form a noticeable feature or element of the view which is readily apparent to the receptor.
Minor	The project, or a part of it, would be perceptible but not alter the overall balance of features and elements that comprise the existing view.
Negligible	Only a very small part of the project work or activity would be discernible or being at such a distance it would form a barely noticeable feature or element of the view.
No Change	No part of the project work or activity would be discernible.

- 8.7.14. The assessment of landscape and visual effects will include consideration of the following:
- seasonal differences with or without the proposed scheme including summer with foliage and winter without foliage
 - the effect of change or loss of existing landscape features (e.g., loss of existing trees)
 - the effect of temporary construction activity (e.g., presence of plant, temporary buildings, materials storage, and construction traffic parking and movements)
 - the effect of the introduction of new associated infrastructure (e.g., roads, signage and lighting)
 - The assessment of visual effects at the agreed representative viewpoints will consider how visibility of the scheme might differ between day and night-time conditions (particularly where visual receptors are more likely to be present during hours of darkness such as residential locations). However, given the urban-edge location of the proposed scheme; the limited number of sensitive visual receptor locations with open views; and the presence of existing night-time traffic movements on the existing A46, significant visual change is unlikely to occur due to night-time visibility and a night-time site visit and viewpoint assessment is not considered necessary as part of the LVIA for this scheme.
- 8.7.15. The assessment will consider the effects of the proposed scheme at the following specific points in time:
- construction; short term (temporary) effects
 - opening year (or Year 1); short term effects. The visual assessment will consider both winter and summer effects and the description of each effect includes reference to key differences in seasonal effects where applicable. However, the judgement with regards the level and significance of effect on each visual receptor will refer to winter. Visual effects experienced during winter months are considered to be the 'worst-case' in assessment terms as trees are without leaf and visibility tends to be more open.
 - fifteen years following opening year (or Year 15); long term (residual) effects. This is also referred to as the 'design year' as mitigation proposed would have gained a relative stage of maturity such that it would effectively mitigate effects. Similar to the Year 1 assessment, reference will be made to visual effects at Year 15 during both summer and winter and the focus of this assessment is the extent to which proposed mitigation planting would have established and the subsequent change in effects during both seasons, albeit with the level and significance of effect on each visual assessed as a worst-case during winter.
- 8.7.16. Any required landscape and visual mitigation will be designed to mitigate effects during both summer and winter, albeit it is acknowledged that this tends to be

more effective during summer when trees are in leaf. The depth of planting proposed in key locations where visual effects are identified will be designed to be sufficient to mitigate visual effects during both seasons.

- 8.7.17. The landscape assessment will not take into account seasonality; however, reference may be made to the seasons where seasonal changes over a calendar year form a distinct part of the landscape character.
- 8.7.18. It is anticipated that construction of the proposed scheme will be phased over a period of up to 2 years; the exact programme of phasing is subject to further consideration by the scheme designers. The LVIA will assess the landscape and visual effects of the proposed scheme as a single development. However, clear reference will be made to the components of the proposed scheme which give rise to key effects and, following the assessment of residual effects at Year 15, a section will be included which presents a narrative discussion on the link between the landscape and visual effects and the phasing of development.

8.8. Assessment assumptions and limitations

- 8.8.1. This scoping chapter is based on a desk-based studies (online), a preliminary ZTV (based upon the option selection stage), a scoping site visit undertaken in March 2023, and information gained from previous stages of A46 Walsgrave Junction design development and assessment. The prevailing site conditions for the LVIA assessment are dated March 2023 and any vegetation cleared prior to this date falls outside of the scope.
- 8.8.2. The identified potential significant effects are based on the road scheme design available at this time and may need adjustment if amendments are made. The preliminary design, including mitigation design, extent of required vegetation clearance and construction strategy will be used to inform the environmental assessment.
- 8.8.3. The locations of key visual receptors and representative viewpoints may be updated following comments obtained at scoping stage. Future assessment work will be undertaken from publicly accessible areas only, with representative viewpoints identified where access to individual receptors is not possible.

Conclusion

- 8.8.4. Given that there is the potential for significant effects upon both landscape character and visual amenity during both construction and operation, a full assessment of all aspects will be undertaken. The assessment will be presented in the form of a LVIA in the ES.

9. Biodiversity

9.1. Introduction

- 9.1.1. This chapter identifies potential impacts regarding biodiversity that may occur during the construction and operation of the proposed scheme and outlines whether these will be addressed further in the ES. It has been prepared in accordance with DMRB LA 108 Biodiversity Revision 1 (Highways England 2020e) (hereafter referred to as DMRB LA 108), to a scoping level, and where necessary, the requirement for assessment to either simple or detailed level will be identified.

Legislation, policy and guidance

- 9.1.2. In preparation of this chapter, the following key legislation has been used:

- The Conservation of Habitats and Species Regulations 2017 (as amended)
- The Wildlife and Countryside Act 1981 (as amended)
- The Protection of Badgers Act 1992
- The Natural Environment and Rural Communities Act 2006
- The Environment Act 2021

- 9.1.3. The following key policy has been used to inform this chapter:

- *National Policy Statement for National Networks* (2014)
- *National Planning Policy Framework* 2019
 - Office of the Deputy Prime Minister ODPM Circular 06/2005 – *Biodiversity and Geological Conservation – Statutory Obligations and their Impact Within the Planning System*
- *Coventry City Council Local Plan 2011 – 2031*
 - Policy GB1: Green Belt and Local Green Space
 - Policy GE1: Green Infrastructure
 - Policy GE3: Biodiversity, Geological, Landscape and Archaeological Conservation
 - Policy GE4: Tree Protection
- *Warwickshire, Coventry and Solihull Green Infrastructure Strategy* 2013
- *Warwickshire, Coventry and Solihull Local Biodiversity Action Plan* 2005
- *National Highways (Highways England) Biodiversity Plan* 2015

9.2. Study area

- 9.2.1. DMRB LA 108 details how the study area will vary in response to the proposed scheme extent, the construction footprint and the proposed scheme's zone of influence (ZOI) on the ecological features. The proposed scheme and relevant survey buffers for the ecological features will be referred to as the 'study area' throughout the remainder of this chapter. This combined with best practice guidelines and professional judgement means that the study area will include suitable buffers for all ecological features that have the potential to be impacted by the proposed scheme.
- 9.2.2. As part of a desk study a search for European sites (e.g., SACs and SPAs) up to 30km from the proposed scheme was carried out to identify those sites where bats are a primary reason for designation, or where potential impact pathways are present with regard to birds. SACs, SPAs, Ramsar sites were identified up to 10km from the proposed scheme and national and local statutory and non-statutory nature conservation designations (where information was available) were identified up to 2km from the proposed scheme. Ancient woodland and priority habitats within 500m of the proposed scheme have been searched for using MAGIC mapping (Defra, 2023).
- 9.2.3. At the options selection stage data was purchased from the Warwickshire Biological Records Centre for non-statutory designated sites, protected and notable species and invasive species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) within 2km of the proposed scheme as reported in the option selection stage ESR.
- 9.2.4. The following study areas for protected and notable species, with regards to their extension beyond the proposed scheme extent, have been adopted to inform the ecological assessment at the preliminary design stage:
- Badger *Meles meles* – 50m
 - Barn owl *Tyto alba* – 1.5km
 - Bats – 50m
 - Breeding birds – 50m
 - GCN *Triturus cristatus* – 500m
 - Reptile – the proposed scheme extents only
 - Otter *Lutra lutra* – 200m
 - Water vole *Arvicola amphibius* – 200m

- 9.2.5. Other notable species on Section 41 of the Natural Environment and Rural Communities Act 2006 (hedgehog *Erinaceus europaeus* and brown hare *Lepus europaeus*) have been assessed within the proposed scheme extent only.
- 9.2.6. A study area of within the proposed scheme extents where suitable habitat exists that would be directly impacted by the proposed scheme was considered appropriate for commuting and foraging bats.

9.3. Baseline conditions

- 9.3.1. This section outlines the ecological features (designations, habitats and species) that have the potential to be affected by the proposed scheme.
- 9.3.2. Information regarding internationally important designated sites within 10km of the proposed scheme, nationally and locally important designated sites within 2km of the proposed scheme, and ancient woodland and priority habitats within 500m of the proposed scheme, has been informed via a desk study and a review of MAGIC (Defra, 2023).
- 9.3.3. The habitat baseline has been established following UK Habitat classification (UKHabs) surveys undertaken between June and August 2022.
- 9.3.4. The baseline with regards to protected species has been established following protected species surveys undertaken in 2022 for the following species and species groups:
- Badger
 - Barn owl
 - Breeding birds
 - GCN
 - Bats
 - Otter
 - Water vole
- 9.3.5. Table 9-1 details the survey guidance used to inform the targeted surveys undertaken to establish the ecological baseline detailed within this chapter.

Table 9-1: Survey guidance for targeted surveys to inform the Scoping Report and dates of surveys undertaken at the time of writing this Scoping Report

Ecological feature	Guidance	Dates of survey
Badger	Delahay <i>et al.</i> , 2001 – <i>The use of marked bait in studies of the territorial organisation of the European badger (Meles meles)</i>	Initial walkover survey – September 2022 Bait marking survey – October 2022

Ecological feature	Guidance	Dates of survey
	Harris <i>et al.</i> , 1989 – <i>Surveying Badgers</i>	Camera monitoring – September to December 2022
Bats (roosting, commuting and foraging)	Berthinussen and Altringham 2015 - <i>WC1060 Development of a Cost Effective Method for Monitoring the Effectiveness of Mitigation for Bats Crossing Linear Transport Infrastructure. Final Report 2015</i> Collins, 2016 – <i>Bat Conservation Trust Bat Surveys for Professional Ecologists Good Practice Guidelines</i> Elmeros <i>et al.</i> , 2016 - <i>Fumbling in the dark – effectiveness of bat mitigation measures on roads, Bat mitigation measures on roads – a guideline</i>	Ground level preliminary roost assessments – March 2022 Tree climbing inspections – June 2022 Emergence / re-entry surveys – May to September 2022 Crossing point surveys – May to October 2022 Activity transect and static monitoring surveys – April to October 2022
Barn owl	Shawyer, 2012 – <i>The Barn Owl and its Habitat</i>	June to August 2022
Breeding birds	Bird Survey Guidelines, 2023 – <i>Breeding bird survey methodology</i> British Trust for Ornithology, 2018 – <i>Breeding Bird Survey Instructions</i>	March to July 2022
Great crested newts	ARG UK, 2010 – <i>Advice Note 5: Great Crested Newt Habitat Suitability Index</i> Biggs <i>et al.</i> , 2014 - <i>Analytical and methodological development for improved surveillance of the great crested newt. Technical advice note for field and laboratory sampling of great crested newt (Triturus cristatus) environmental DNA</i> Oldham <i>et al.</i> , 2001 - <i>Evaluating the suitability of habitat for the great crested newt (Triturus cristatus)</i>	June 2022
Habitats	Butcher <i>et al.</i> , 2020 - <i>The UK Habitat Classification User Manual Version 1.1</i>	June to August 2022
Otter	Chanin, 2003 – <i>Monitoring the Otter Lutra lutra</i>	September 2022
Water vole	Harris <i>et al.</i> , 2009 - <i>A method for assessing water vole habitat suitability</i> Strachan <i>et al.</i> , 2016 - <i>The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series)</i>	September 2022

9.3.6. At the time of writing this Scoping Report, wintering bird surveys and bat hibernation surveys to inform the preliminary design stage had yet to be undertaken. These will be undertaken in the winter of 2023/2024.

Statutory designated sites

- 9.3.7. There are no internally designated sites within 10km of the proposed scheme. Two nationally designated SSSIs and two locally designated LNRs are present within 2km of the proposed scheme. Further detail of the sites is provided in Table 9-2. See figure 9.1 in Appendix G for the locations of the statutory designated sites in relation to the proposed scheme.

Table 9-2: Nationally important statutory designated sites within 2km of the proposed scheme extent⁷

Site name / designation	Reason for designation	Location in relation to the proposed scheme
Coombe Pool SSSI	The site is one of the most important ornithological sites in Warwickshire for its herons <i>Ardea cinerea</i> , and other breeding birds, and for its wintering wildfowl.	Adjacent to the east of the proposed scheme
Herald Way Marsh SSSI	The site has been designated for its assemblage of invertebrates, a number of which are nationally rare.	1.6km south of the proposed scheme
Stoke Floods LNR	The reserve has a large lake, reedbeds and scrub next to the River Sowe. The lake is the result of mining subsidence and supports many wetland plants such as yellow flag <i>Iris pseudoacorus</i> and reed canary grass <i>Phalaris arundinacea</i> . Bird life is varied with many species of duck, seven species of warbler in the summer and occasional unusual migratory visitors such as black tern <i>Chlidonias niger</i> and yellow wagtails <i>Motacilla flava</i> .	650m south west of the proposed scheme
Herald Way Marsh LNR	One of the most important areas for rare invertebrates in the county. The site overlaps with Herald Way Marsh SSSI	1.45km south west of the proposed scheme

- 9.3.8. A screening exercise was undertaken to inform the options selection stage, as reported in the *Habitat Regulations Assessment No Significant Effects Report* (AECOM, 2021), to determine whether an Appropriate Assessment would be required regarding the proposed scheme's potential impact upon any European site SACs, candidate or possible SACs (cSACs or pSACs), SPAs, potential SPAs (pSPAs) and Ramsar sites). The report concluded there would be no likely significant effects on any European sites resulting from the proposed scheme.

⁷ The contents of Table 9-2 are taken from the *Environmental Scoping Report PCF Stage 2 (Highways England, 2020)*

Non-statutory designated sites

- 9.3.9. Ecosites is a term used by Warwickshire Biological Records Centre for sites which have ecological value. Ecosites include nationally, regional and locally importance sites and sites which have no formal designations. LWSs are county important sites defined in local plans and are a material consideration in planning applications.
- 9.3.10. Non-statutory sites located within 2km of the proposed scheme include seven LWS, one LWS/Ecosite, three Ecosites and one ungraded Ecosite. Further details of these sites are detailed within Table 9-3. Figure 9.1 in Appendix G shows those non-statutory designated sites within 2km of the proposed scheme upon which likely environmental effects have been scoped in for assessment in the ES in Table 9-4.

Table 9-3: Non-statutory designated sites within 2km of the proposed scheme⁸

Site name / designation	Reason for designation	Location in relation to the proposed scheme
Tributary of the River Sowe – Smite Brook, Headwaters and Tributaries Ecosite	Includes a small area of Smite Brook. A linear site which runs through Coombe Pool SSSI. A tributary of the River Sowe with historical records of white-clawed crayfish <i>Austropotamobius pallipes</i> , otter and water vole.	Within the proposed scheme
Gainford Rise LWS / Hungerley Hall Farm Ecosite	Floristically rich grassland with invertebrate interest. South west part of the site designated as Gainford Rise LWS.	Adjacent to the west of the proposed scheme (Gainford Rise LWS) Located within the proposed scheme (Hungerley Hall Farm Ecosite)
Coombe Abbey Pool (part SSSI) Ecosite	This ecosite includes areas designated as a nationally important SSSI. Designated for its ornithological interest, particularly large heronry with water vole and otter present on site. The site is good for invertebrates such as butterflies and moths.	Adjacent to the east of the proposed scheme
Sowe Valley Dorchester Way LWS	The river includes a considerable area of flood plain, including grassland, swamp, woodland, scrub, fen and mire. A good variety of bird species have been recorded on the river. Of particular importance is the strong colony of water vole on the Sowe. This species has disappeared from much of the county with the Coventry area being one of the few known remaining strongholds. Much of the river retains aquatic, emergent and bankside vegetation. Devil's-bit scabious <i>Succisa pratensis</i> ,	50m east of the proposed scheme

⁸ The contents of Table 9-3 are taken from the *Environmental Scoping Report PCF Stage 2 (Highways England, 2020)*

Site name / designation	Reason for designation	Location in relation to the proposed scheme
	harebell <i>Campanula rotunifolia</i> and betony <i>Stachys officinalis</i> still survive along its length in patches.	
Field by Caludon Castle School Ecosite	Area of amenity grassland used as a football pitch, with an adjacent hedgerow. Those areas where football is not played have a diverse flora, including lady's bedstraw <i>Galium verum</i> , great burnet <i>Sanguisorba officinalis</i> and meadowsweet <i>Filipendula ulmaria</i> . The margins next to the river have great hairy willowherb <i>Epilobium hirsutum</i> , couch grass <i>Elytrigia repens</i> and cleavers <i>Galium aparine</i> .	150m west of the proposed scheme
Stoke Floods LWS	Partly designated as the LNR of the same name however includes two semi-improved grassland fields not part of the LNR. The reserve has a large lake, reedbeds and scrub next to the River Sowe. See Table 9-2 Stoke Floods LNR.	500m south west of the proposed scheme
Binley Common Farm Wood Potential LWS	Ancient oak <i>Quercus sp</i> woodland that is being invaded by sycamore <i>Acer pseudoplatanus</i> , with an understorey of hazel, hawthorn, holly <i>Ilex aquifolium</i> and rowan <i>Sorbus aucuparia</i> . The ground flora includes bracken, tufted hair-grass <i>Deschampsia cespitosa</i> and wood sage <i>Teucrium scorodonia</i> .	500m south of the proposed scheme
Big Rough (ungraded ecosite) Ecosite/ungraded	Broadleaved plantation woodland with very little understorey and ground flora limited to bracken.	800m south-east of the proposed scheme
Binley Little Wood LWS	A small woodland that is a remnant of a once larger ancient woodland that is now surrounded by housing. It mainly consists of oak <i>Quercus sp</i> , hazel <i>Corylus avellana</i> , holly <i>Ilex aquifolium</i> and hawthorn <i>Crataegus monogyna</i> , with wild cherry <i>Prunus avium</i> , field maple <i>Acer campestre</i> and ash <i>Fraxinus excelsior</i> also present. The ground flora is limited, mainly comprising bramble <i>Rubus fruticosus</i> and creeping soft-grass <i>Holcus mollis</i> .	1.1km south-west of the proposed scheme
Old Pools Wood LWS	This is an open mixed woodland connected to Birchley and New Close Wood. There are grassy rides, as well as an avenue of old lime <i>Tilia spp</i> coppice, along with ash, oak and birch <i>Betula pendula</i> . The ground flora comprises hawthorn and hazel understorey, with the varied ground flora including red campion <i>Silene dioica</i> .	1.2km east of the proposed scheme
Piles Coppice LWS	Ancient woodland with an adjacent area of semi-improved grassland. The woodland is particularly important due to stands of sessile oak <i>Quercus petraea</i> and small-leaved lime <i>Tilia cordata</i> coppiced stands, making it one of the most historically important woodlands in the Midlands. The ground flora includes wood anemone <i>Anemone nemorosa</i> , bluebell <i>Hyacinthoides non-</i>	1.25km south of the proposed scheme

Site name / designation	Reason for designation	Location in relation to the proposed scheme
	<i>scripta</i> , primrose <i>Primula vulgaris</i> , sanicle <i>Sanicula europaea</i> and goldilocks <i>Ranunculus auricomus</i> . The sandy conditions result in a woodland type that is rare in the county and is of high conservation value. The site includes ponds to east which supports dragonflies.	
Claybrookes Marsh LWS	The site contains a range of wet communities which are scarce in the county and is one of the most important areas for rare invertebrates in the county.	1.3km south west of the proposed scheme
New Close Wood LWS	Ancient woodland comprising oak, birch and hazel coppice. Bluebell, bramble and bracken <i>Pteridium aquilinum</i> are plentiful in the ground flora, whilst there are also some marshy areas with sedges and reeds. The white admiral butterfly <i>Limenitis uratus</i> has been recorded on site.	1.5km south east of the proposed scheme

Habitats

- 9.3.11. The dominant habitat within the proposed scheme comprises arable fields to the north of the A46 Walsgrave Junction planted with cereal crops. The fields are bordered by native hedgerows (priority habitats) including boundaries adjacent to the A46.
- 9.3.12. The habitat to the east and south east of the proposed scheme comprises other broadleaved woodland.
- 9.3.13. The majority of the land within the highway boundary comprises other broadleaved woodland with small areas of mixed scrub and bramble *Rubus fruticosus* agg. Scrub.
- 9.3.14. There are small areas of parcels of modified grassland present within the proposed scheme along the northern edge of Coombe Park woodland and adjacent to Hungerley Hall Farm.
- 9.3.15. There are watercourses present within the proposed scheme including Smite Brook, the River Sowe and unnamed ditches and drains. Smite Brook is sourced at Coombe Pool to the east of the proposed scheme, runs beneath the A46 through a box culvert south of the junction and feeds into the River Sowe to the north west of the proposed scheme.

Ancient woodland

- 9.3.16. The desk study identified no areas of ancient woodland within 500m of the proposed scheme.

Priority habitats

- 9.3.17. A review of MAGIC mapping (Defra, 2023) identified the following priority habitats within 500m of the proposed scheme:
- coastal and floodplain grazing marsh within approximately 50m of the proposed scheme along the River Sowe corridor
 - deciduous woodland within the proposed scheme in the highway boundary to the east and south of the A46 Walsgrave junction and adjacent to the proposed scheme to the south west and south east in Coombe Pool SSSI at its closest locations
 - traditional orchard approximately 10m east of the proposed scheme
- 9.3.18. In addition to the above, the priority habitat lowland fens is identified on MAGIC mapping to the south west of the proposed scheme adjacent to the River Sowe approximately 600m from the proposed scheme. Indirect impacts upon this priority habitat will be assessed.

Great crested newt

- 9.3.19. A desk study undertaken in June 2022 identified 13 ponds within the study area, five of which were scoped out of further survey due to either being unsuitable for GCN (Coombe Pool is a fishery), barriers to GCN dispersal (the River Sowe) or being dry at the time of survey with no aquatic vegetation present which indicated that they are ephemeral.
- 9.3.20. Environmental DNA (eDNA) surveys undertaken in June 2022 confirmed GCN presence in one waterbody within the survey area to the north east of the A46 Walsgrave Junction (see figure 9.1 in Appendix G).

Breeding birds

- 9.3.21. Breeding bird surveys undertaken between March and July 2022 identified 53 species within the study area, with an additional two species identified incidentally during other ecological surveys. With regards to species' breeding status, 22 species were confirmed breeding, 17 probably breeding, 10 possibly breeding and six species considered non-breeding.
- 9.3.22. The majority of birds recorded within the study area were common, green-listed Birds of Conservation Concern (BoCC) (Stanbury *et al.*, 2021) species. Notable species include a minimum of three pairs of the BoCC red-listed skylark *Alauda arvensis* within the arable land, the BoCC red-listed species linnet *Carduelis cannabina*, starling *Sturnus vulgaris*, and swift *Apus apus* and the BoCC amber-listed song thrush *Turdus philomelos*. All of these BoCC red- and amber-listed species apart from swift are listed on Section 41 of the Natural Environment and

Rural Communities Act 2006 species. The latter four species are likely to be using the land within the proposed scheme for foraging, though linnet, starling and song thrush may potentially breed within the tall hedgerows and boundary trees along the A46. Further species listed as species of principal importance for biodiversity conservation on Section 41 of the Natural Environment and Rural Communities Act 2006 recorded within the study area include dunnoek *Prunella modularis* ((probably breeding) amber-listed), house sparrow *Passer domesticus* ((probably breeding) red-listed), house martin *Delichon urbica* ((possibly breeding) red-listed) and yellowhammer *Emberiza citrinella* ((confirmed breeding) red-listed). Black-headed gull *Chroicocephalus ridibundus* and the Section 41 species herring gull *Larus argentatus* are amber- and red-listed BoCC species respectively and were concluded to be possibly breeding.

- 9.3.23. Species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) recorded within the study area include kingfisher *Alcedo atthis*, however this species was non-breeding.

Barn owl

- 9.3.24. Barn owl surveys undertaken in June and July 2021 and updated in July 2022 assessed habitat within 1.5km of the proposed scheme for suitability to support barn owl. Five areas were classified in terms of suitability for barn owl foraging activity:

- an area to the west of the proposed scheme within Coombe Country Park was assessed as optimal for foraging activity
- an area adjacent to the west of the River Sowe was considered sub-optimal and of transient value to barn owl
- an area to the south west of the proposed scheme adjacent to Smite Brook was assessed as poor habitat for barn owl prey
- a relatively small area in comparison to those mentioned above, situated to the north west of the proposed scheme to the west of the River Sowe was assessed as poor habitat for barn owl prey
- a relatively small area in comparison to the above-mentioned optimal and sub-optimal areas, and poor area along Smite Brook, situated to the north east of the proposed scheme adjacent to Walsgrave Farm was assessed as poor habitat for barn owl prey

- 9.3.25. Surveys identified seven trees within Coombe Country Park and one tree within arable land to the west of the proposed scheme with features which have potential to support barn owl. Of these trees four were identified as potential nest sites, two as temporary roost sites, one as both a potential nest site and temporary roost site and one as a possible temporary roost site.

- 9.3.26. Buildings with potential to support barn owl include the following, identified during 2021:
- Walsgrave Hall Farm – a potential nest site and a temporary roost site
 - Hungerley Hall Farm – a potential nest site
 - Hill Fields Farm – a possible potential nest site
 - Old Lodge Farm – a possible potential nest site
- 9.3.27. Hill Fields Farm and Old Lodge Farm are considered possible potential nest sites, as opposed to potential nest sites, as these farms were not accessible for survey at this stage.
- 9.3.28. Anecdotal evidence from the Coombe Park Senior Estate Officer reports that barn owl sightings are occasional along the southern edge of Coombe Pool, and surveys to date conclude that it cannot be ruled out that barn owls are not breeding within the study area due to the lack of access to potential nest sites to undertake a full survey in 2022.

Wintering birds

- 9.3.29. Wintering bird surveys are programmed to be undertaken monthly between November 2023 and March 2024 and will inform an updated baseline in the ES.

Bats – roosting

- 9.3.30. Following ground-level preliminary roost assessments (PRAs) undertaken in March 2022 and tree climbing inspections undertaken in June 2022, 155 trees (including 60 that were scoped out of further survey as they will not be impacted by the proposed scheme due to the distance between them and construction works with potential to cause disturbance) and one group of trees within the study area have been identified as having bat roosting potential ranging from low to high potential. Of these, three trees were confirmed to have bat hibernation potential (see figure 9.1 in Appendix G).
- 9.3.31. The buildings at Hungerley Hall Farm are considered to have bat roosting potential, however due to safety concerns, the buildings could not be fully assessed.
- 9.3.32. Emergence/re-entry roost surveys were undertaken between May and September 2022 on those trees with moderate or high bat roosting potential following the tree climbing inspections. Surveys were also undertaken at Hungerley Hall Farm, with surveyors standing at a distance from the farm buildings and courtyard due to health and safety concerns. Potential roosts have been noted in three buildings.

- 9.3.33. No bat roosts have been confirmed within the study area. Surveys recorded two instances of potential roosting activity within Coombe Park woodland and concluded two potential roosts may be present within the woodland. These trees are outside of the study area and will not be impacted.

Bats – commuting and foraging

- 9.3.34. Bat activity surveys undertaken between April and October 2022 identified the following species present within the study area; common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *P. pygmaeus*, Nathusius' pipistrelle *P. nathusii* noctule *Nyctalus noctula*, Daubenton's bat *Myotis daubentonii*, Leisler's *Nyctalus leisleri* and brown long-eared *Plecotus auritus*. Additionally, *Myotis* sp. Unidentified to species level, were recorded within the study area.
- 9.3.35. Automated monitoring surveys recorded a higher level of bat activity within the Coombe Park woodland relative to other surveyed areas within the study area (such as surveyed arable field margins to the north of the Walsgrave junction east and west of the A46).
- 9.3.36. Bat crossing point surveys undertaken in 2022 at the Hungerley Hall Farm overpass, the hedge line perpendicular across the A46 in the location of the proposed new dumbbell junction and the Walsgrave Farm overpass have identified a small number (<5) of confirmed bat crosses in any one survey of the two overbridges. Bats confirmed crossing at the Hungerley Hall Farm overpass include soprano pipistrelle, common pipistrelle and noctule while the latter two species have been confirmed crossing the A46 at the Walsgrave Farm overpass. No bats have been confirmed crossing at the location of the proposed dumbbell junction.

Badger

- 9.3.37. Badger surveys undertaken between September and December 2022, including a walkover survey and bait marking survey, identified one active main sett, one partially active subsidiary sett and one partially-active outlier sett within the study area.
- 9.3.38. Additionally, the surveys identified a second active main sett outside of the study area.

Reptiles

- 9.3.39. A preliminary ecological appraisal (PEA) undertaken in 2018 (AECOM, 2018) identified potential reptile habitat at two locations, however both locations are outside of the proposed scheme and will not be subject to direct impacts.

- 9.3.40. Habitat within the proposed scheme extent suitable to support reptile populations is limited to small areas of scrub and grassland within the highway boundary.

Otter

- 9.3.41. Surveys undertaken on six waterbodies within the study area in September 2022 have confirmed otter presence on the River Sowe, Smite Brook and Coombe Pool with two confirmed couches on the northern banks of the Pool (see figure 9.1 in Appendix G). Five waterbodies and a section of the River Sowe within the study area were scoped out of further survey. Whilst these waterbodies are located at least partially within the survey area for otter (the proposed scheme plus 200m), they are located a minimum of 315m from any works which will impact on any semi-natural habitats outside of the current carriageway extent. A further five watercourses within the study area were found to be dry.

Water vole

- 9.3.42. Surveys undertaken in September 2022 have assessed the suitability of six waterbodies within the study area for water vole using a habitat suitability assessment (see figure 9.1 in Appendix G). Stretches of watercourse considered optimal for water vole exist within the study area on the River Sowe and Smite Brook, with sub-optimal water vole habitat within the study area on the river and the brook in addition to Coombe Pool and two further unnamed watercourses.
- 9.3.43. There were no confirmed water vole field signs recorded during the survey in September 2022. A second water vole survey will be undertaken in May 2023 and the results will be included in the ES.

Other notable species (Section 41 Natural Environment and Rural Communities Act 2006 species)

- 9.3.44. Habitats within the proposed scheme have the potential to support hedgehog and brown hare.

Consultation

- 9.3.1. The following statutory and non-statutory bodies will be consulted fully during the environmental assessment process and their responses will be included in the associated reporting: Natural England and Coventry City Council Biodiversity Officer.
- 9.3.2. Consultation with the following groups may also be required prior to fully developing robust mitigation measures:
- local wildlife organisations and groups
 - landowners

- 9.3.3. During the options selection stage consultations have been undertaken with Natural England in September 2022 regarding potential impacts of the proposed scheme upon ecological features as described in Chapter 4.

9.4. Potential impacts

- 9.4.1. The key ecological features that could potentially be impacted by the proposed scheme have been identified as:

- statutory designated sites – two SSSIs and two LNRs:
 - Coombe Pool SSSI
 - Herald Way Marsh SSSI
 - Stoke Floods LNR
 - Herald Way Marsh LNR
- non-statutory designated sites – four Ecosites and three LWSs:
 - Hungerley Hall Farm Ecosite
 - Gainford Rise LWS
 - Field by Caludon Castle School Ecosite
 - Coombe Abbey Pool (part SSSI) Ecosite
 - Tributary of the River Sowe – Smite Brook, headwaters and tributaries Ecosite
 - Stoke Floods LWS
 - Sowe Valley Dorchester Way LWS
- priority habitats deciduous woodland, coastal and floodplain grazing marsh and traditional orchard
- on-site terrestrial and aquatic habitats including Smite Brook, native hedgerows (priority habitat), cereal crops, modified grassland, bramble scrub, mixed scrub and other broadleaved woodland
- badger
- barn owl
- bats (roosting, foraging and commuting)
- breeding birds
- otter
- other notable species; hedgehog and brown hare
- reptiles
- water vole
- wintering birds (scoped in due to the absence of targeted surveys at this stage)

9.4.2. Table 9-4 presents a summary of the potential biodiversity impacts and identifies which likely environmental effects, with respect to biodiversity, will be assessed in the ES ((i.e., considered to be likely significant effects and therefore scoped in) and those which will not be assessed further (i.e. scoped out).

Table 9-4: Potential ecology impacts – construction and operation

Ecological feature	Scoped in / out	Potential impacts during construction	Potential impacts during operation
Coombe Pool SSSI	In	Potential impacts on SSSI and notable features (birds) through run-off (water pollution), dust (air pollution), vibration, lighting and/or noise from construction activities.	Potential impacts on SSSI and notable features (birds) through run-off (water pollution) and lighting.
Herald Way Marsh SSSI	Out	A considerable distance from the proposed scheme extent with no hydrological connection.	
Stoke Floods LNR	In	Potential impacts on LNR and notable features (habitats and birds) through run-off (water pollution).	Potential impacts on SSSI and notable features (birds) through run-off (water pollution).
Herald Way Marsh LNR	Out	A considerable distance from the proposed scheme extent with no hydrological connection.	
Hungerley Hall Farm Ecosite	In	Potential impacts include permanent and temporary habitat loss. Potential impacts on qualifying features (habitats and flora) through run-off (water pollution) and dust (air pollution) from construction activities.	Potential impacts on qualifying features (habitats and flora) through run-off (water pollution).
Gainford Rise LWS	In	Potential impacts on qualifying features (habitats and flora) through run-off (water pollution) and dust (air pollution) from construction activities.	Potential impacts on qualifying features (habitats and flora) through run-off (water pollution).
Coombe Abbey Pool (part SSSI) Ecosite	In	Potential impacts on site and notable features (birds, otter, water vole, invertebrates) through run-off (water pollution), dust (air pollution), vibration, lighting and/or noise from construction activities.	Potential impacts on site and notable features (birds, otter, water vole, invertebrates) through run-off (water pollution) and lighting.
Tributary of the River Sowe - Smite Brook, headwaters and tributaries Ecosite	In	Potential impacts on features of interest (otters and invertebrates) through run-off (water pollution), dust (air pollution), vibration, lighting and/or noise from construction activities.	Potential impacts on features of interest (otters and invertebrates) through run-off (water pollution) and lighting.

Ecological feature	Scoped in / out	Potential impacts during construction	Potential impacts during operation
		Potential loss of riparian corridor habitat due to land take for the proposed scheme.	
Stoke Floods LWS, Sowe Valley Dorchester Way LWS	In	Potential impacts on sites from run-off (water pollution) associated with construction activities.	Potential impacts on sites from run-off (water pollution).
Piles Coppice LWS, Claybrookes Marsh LWS, Binley Little Wood, Old Pools Wood LWS, New Close Wood LWS, Binley Common Farm LWS, Big Rough (ungraded ecosite) Ecosite/ungraded	Out	A considerable distance from the proposed scheme extent with no hydrological connection.	
Ancient woodland	Out	There are no parcels of ancient woodland within 500m of the proposed scheme.	
Priority habitats: deciduous woodland	In	Permanent loss of habitat to east and south east of the A46 Walsgrave junction. Potential impacts on habitats through run-off (water pollution) and dust (air pollution) from construction activities.	Potential impacts on habitats through run-off (water pollution).
Priority habitats: coastal and floodplain grazing marsh, traditional orchards	In	Potential impacts on habitats through run-off (water pollution) and dust (air pollution) from construction activities.	Potential impacts on habitats through run-off (water pollution).
Priority habitats: hedgerows	In	Permanent loss and severance of native hedgerows within land north of the A46 Walsgrave junction.	None identified
GCN	Out	Single waterbody with GCN presence confirmed is within 500m of in-carriageway works only. GCN confirmed likely absent from other waterbodies within study area. Should the design of the proposed scheme change, GCN may be scoped in.	
Breeding birds	In	Potential injury/mortality and loss of habitat (nest sites and foraging resource) from site clearance. Potential for impacts from noise, dust (air pollution) and light spill from construction activities.	Potential impacts through lighting. Mortality to birds from the creation of new road areas including the proposed dumbbell junction and link road.
Barn owl	In	Potential for impacts through noise, dust (air pollution) and lighting.	Potential impacts from the new road layout being closer to

Ecological feature	Scoped in / out	Potential impacts during construction	Potential impacts during operation
			potential nest sites at Hungerley Hall Farm.
Wintering birds	In	Potential injury/mortality and loss of habitat (roost sites and foraging resource) from site clearance. Potential impacts from noise, dust (air pollution) and light spill from construction activities.	Potential impacts through lighting. Mortality to birds from the creation of new road areas including the proposed dumbbell junction and link road.
Bats (roosting, commuting and foraging)	In	Loss of potential roosting locations. Potential impacts to future roosts through noise and lighting. Potential impacts during site clearance. Loss of foraging and commuting habitat. Severance of commuting routes and crossing points over the A46 through the loss of the Hungerley Hall Farm overbridge.	Potential impacts to future roosts, and to commuting and foraging bats, through lighting. Mortality to bats from the creation of new road areas including the proposed dumbbell junction and link road. Loss of available commuting and foraging area due to footprint of proposed scheme and severance of habitat.
Badger	In	Loss of a subsidiary sett. Loss of potential foraging habitat. Potential impacts through noise and lighting. Severance of habitat. Potential impacts during site clearance and construction works.	Potential impacts through lighting. Increased mortality from incidents on newly created roads including the proposed dumbbell junction and link road.
Reptiles	In	Potential injury/mortality from site clearance. Potential loss of habitat (including hibernation sites). Potential impacts through noise and lighting.	No operational impacts anticipated.
Otter	In	Potential impact on aquatic habitat through increased run off (water pollution). Potential impacts through noise and lighting. Potential impacts during site clearance and construction works.	Potential impacts through run-off (water pollution).
Water vole	In	Potential impact on aquatic habitat through increased run off (water pollution). Potential impacts from noise and lighting. Potential impacts during site clearance and construction works.	Potential impacts through run-off (water pollution).
Other notable species (hedgehog and brown hare)	In	Potential impacts during site clearance and construction works. Loss of potential habitat. Potential impacts from noise and lighting.	Increased mortality from incidents on newly created roads including the proposed dumbbell junction and link road.

9.5. Design, mitigation and enhancement measures

- 9.5.1. The design developed during the preliminary design stage will incorporate any necessary mitigation measures for baseline ecological features in accordance with the mitigation hierarchy as set out within the CIEEMs *Guidelines for Ecological Impact Assessment* (2018). Adverse impacts of the proposed scheme on ecological features would as a first measure be avoided where feasible, and where they cannot be avoided would be appropriately mitigated for. Compensation would be undertaken where significant effects upon ecological features exist after mitigation.
- 9.5.2. Enhancement opportunities with the potential to secure net gains for biodiversity exist within the design of the landscaping for the proposed scheme. There is potential to achieve Biodiversity Net Gain (BNG) for the proposed scheme by creating habitats of a higher distinctiveness and better condition than those habitats within the proposed scheme baseline. Habitat creation would preferably be within the proposed scheme extents, the majority of which is the National Highway boundary, with off-site compensation if required.
- 9.5.3. Any habitats created as part of any mitigation or compensation required would be implemented through planting works undertaken during the construction phase where practicable and in the first season available following completion of construction works.
- 9.5.4. A minimum five-year aftercare period would follow completion of the works for the proposed scheme. During this time, maintenance activities would be undertaken to ensure the successful establishment of planting and provision of new habitats. This may however need to be extended to a 30 year management period pending the implementation of biodiversity net gain legislation expected at the end of 2023.
- 9.5.5. An EMP will be produced and implemented by the Principal Contractor and would include any avoidance and mitigation measures required for ecological features.
- 9.5.6. Mitigation and potential enhancement measures will be considered further throughout the preliminary design stage and within the ES.

9.6. Description of the likely significant effects

- 9.6.1. There is potential for significant effects arising from the proposed scheme as a result of potential impacts detailed within Table 9-4, which include:
- direct mortality/injury of individuals
 - disturbance and displacement of species

- temporary and permanent loss, severance and fragmentation of habitat
- decreased water quality as a result of pollution

9.6.2. It may be possible to minimise significant effects through the adoption of appropriate and well-established mitigation techniques. This will be detailed further in the ES.

9.7. Assessment methodology

9.7.1. A qualitative ecological assessment will be undertaken based upon the DMRB LA 108 Biodiversity (Highways England, 2020e) and the Chartered Institute of Ecology and Environmental Management's (CIEEM's) Guidelines for Ecological Impact Assessment for the UK and Ireland (2018). Desk studies and ecological surveys to inform the assessment would be undertaken in accordance with the DMRB LD 118 Biodiversity Design and CIEEM's Guidelines for Preliminary Ecological Appraisal (2017), with surveys used to inform this ESR updated if appropriate in accordance with CIEEM's Advice Note on the Lifespan of Ecological Reports & Surveys (2019).

9.7.2. The assessment will include:

- an update to the desk study to refine understanding of any likely ecological constraints pertaining to protected and notable species and designated sites (May 2023)
- surveys for wintering birds (October 2023 – March 2024), barn owl (June/July 2023) and bat hibernation (January and February 2024) and a second survey for water vole (May 2023), to inform the baseline for these ecological features
- an update to the screening exercise and the *Habitats Regulations Assessment No Significant Effects Report* (AECOM, 2021) previously undertaken to inform the options selection stage for the preliminary design stage and the DCO application
- consultation with statutory bodies such as Natural England to discuss the key ecological considerations for the proposed scheme
- determination of whether effects are ecologically significant, which includes determining the geographic level of importance of each of the features (international, regional, local etc), the characterisation of the effect (direct/indirect, frequency, reversibility etc.) and whether the effect is significant or not
- consideration of the future baseline with regard to climate change
- an assessment of the ecological impacts of the proposed development, accounting for any mitigation measures, including embedded mitigation, will be undertaken in the form of an Ecological impact assessment (EcIA)
- recommendations for design intervention, mitigation and enhancement of biodiversity

- an assessment of residual significance of effects after mitigation
- a clear statement of the limitations of the baseline studies

9.7.3. The relative importance of each ecological feature shall be established in accordance with the guidance in Table 9-5.

Table 9-5: Guidance for determining the importance of ecological features (DMRB LA108 Table 3.9)

Resource Importance		Description
International or European value	Sites	National Site Network sites including: SPAs; Possible SPAs (pSPAs); SACs; Candidate SACs (cSACs) or Possible SACs (pSACs); Sites of Community Importance (SCIs) and Wetlands of International Importance (Ramsar sites). Biogenetic Reserves, World Heritage Sites and Biosphere Reserves. Areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such
	Habitats	N/A
	Species	Resident, or regularly occurring, populations of species which may be considered at an International or European level where: <ul style="list-style-type: none"> - the loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale - the population forms a critical part of a wider population at this scale - the species is at a critical phase of its life cycle at this scale
UK or national value	Sites	Designated sites including: SSSIs; Marine Protected Areas (MPAs) including Marine Conservation Zones (MCZs); and National Nature Reserves (NNRs). Areas which meet the published selection criteria e.g., Joint Nature Conservation Committee (JNCC) (1998) for those sites listed above but which are not themselves designated as such.
	Habitats	Areas of key / priority habitats identified in the UK Biodiversity Action Plan (BAP), including those published in accordance with Section 41 of the Natural Environment and Rural Communities (NERC) Act (2006) and those considered to be of principal importance for the conservation of biodiversity.
	Species	Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level where:

		<ul style="list-style-type: none"> - the loss of these populations would adversely affect the conservation status or distribution of the species at this scale - the population forms a critical part of a wider population at this scale - the species is at a critical phase of its life cycle at this scale
Regional value	Sites	Non-statutory designated sites, including heritage coasts.
	Habitats	Areas of key / priority habitats identified in the Regional BAP (where available); areas of key / priority habitat identified as being of Regional value in the appropriate Natural Area Profile (or equivalent); and areas that have been identified by regional plans or strategies as areas for restoration or re-creation of priority habitats.
	Species	<p>Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level and key / priority species listed within the BAP where:</p> <ul style="list-style-type: none"> - the loss of these populations would adversely affect the conservation status or distribution of the species at this scale - the population forms a critical part of a wider population - the species is at a critical phase of its life cycle <p>Species identified in regional plans or strategies</p>
County or equivalent authority importance	Sites	<p>Wildlife / nature conservation sites designated at a county (or equivalent) level, including: Sites of Nature Conservation Importance (SNCIs); CWS; LWS; Local Nature Conservation Sites (LNCS); Sites of Importance for Nature Conservation (SINCs) and LNRs.</p> <p>Areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such.</p>
	Habitats	Areas of key / priority habitats identified in the Local BAP; and areas of habitat identified in the appropriate Natural Area Profile (or equivalent).
	Species	<p>Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level where:</p> <ul style="list-style-type: none"> - the loss of these populations would adversely affect the conservation status or distribution of the species across the County or Unitary Authority Area - the population forms a critical part of a wider population

		<ul style="list-style-type: none"> - the species is at a critical phase of its life cycle <p>Species identified in county or equivalent authority area plans or strategies.</p>
Local value	Sites	Wildlife / nature conservation sites designated at a local level, including: SNCIs; LWS; LNCS; SINCS; Sites of Local Nature Conservation Importance (SLNCS) and LNRs.
	Habitats	<p>Areas of habitat considered to appreciably enrich the habitat resource within the local context, including features of importance for migration, dispersal, or genetic exchange.</p> <p>Trees that are protected by Tree Preservation Orders (TPOs).</p>
	Species	Populations / communities of species considered to appreciably enrich the habitat resource within the local context (such as veteran trees), including features of value for migration, dispersal or genetic exchange.

- 9.7.4. Characterisation of ecological impacts will be undertaken in accordance with the DMRB *LA108 Biodiversity* (Highways England, 2020e) and will take into consideration whether the impact is positive or negative, permanent or temporary (the impact duration), reversible or irreversible, the extent/magnitude of the impact and the frequency and timing of the impact.
- 9.7.5. The magnitude of impact on ecological features will be based on Table 9-6. As required by DMRB (paragraph 3.11.1) the EcIA will conclude the level of impact on biodiversity resources in accordance with CIEEM's Guidelines for Ecological Impact Assessment for the UK and Ireland. The importance of the resource and the level of impact will be used to determine the significance of effect based on Table 9-7 and the principles of DMRB LA 104.

Table 9-6: Level of impact and typical descriptions (taken from DMRB LA 108, Table 3.11)

Level of impact (change)		Typical description
Major	Adverse	Permanent/irreversible damage to a biodiversity resource. The extent, magnitude, frequency, and/or timing of an impact negatively affects the integrity or key characteristics of the resource.
	Beneficial	Permanent addition of, improvement to, or restoration of a biodiversity resource. The extent, magnitude, frequency, and/or timing of an impact positively affects the integrity or key characteristics of the resource.
Moderate	Adverse	Temporary/reversible damage to a biodiversity resource. The extent, magnitude, frequency, and/or timing of an impact negatively affects the integrity or key characteristics of the resource.
	Beneficial	Temporary addition of, improvement to, or restoration of a biodiversity resource. The extent, magnitude, frequency, and/or timing of an impact positively affects the integrity or key characteristics of the resource.
Minor	Adverse	Permanent/irreversible damage to a biodiversity resource. The extent, magnitude, frequency, and/or timing of an impact does not affect the integrity or key characteristics of the resource.
	Beneficial	Permanent addition of, improvement to, or restoration of a biodiversity resource. The extent, magnitude, frequency, and/or timing of an impact does not affect the integrity or key characteristics of the resource.
Negligible	Adverse	Temporary/reversible damage to a biodiversity resource. The extent, magnitude, frequency, and/or timing of an impact does not affect the integrity or key characteristics of the resource.
	Beneficial	Temporary addition of, improvement to, or restoration of a biodiversity resource. The extent, magnitude, frequency, and/or timing of an impact does not affect the integrity or key characteristics of the resource.
No change		No observable impact, either positive or negative.

Source: DMRB LA 108, Table 3.11

Table 9-7: Description of the significance of effect categories

	Level of Impact					
		No change	Negligible	Minor	Moderate	Major
	International or European importance	Neutral	Slight	Moderate or large	Large or very large	Very large
	UK or national importance	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
	Regional	Neutral	Neutral or	Slight	Moderate	Moderate

	importance		slight			or large
	County or equivalent authority importance	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
	Local importance	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight

Source: DMRB LA 108, Table 3.13

9.7.6. Where Table 9-7 includes two significance categories, evidence will be provided to support the reporting of a single significance category. Significant effects typically comprise effects that remain within the moderate, large or very large categories once mitigation has been taken into account.

9.7.7. The significance of the impacts will be considered during the following phases of the proposed scheme:

- construction
- operation

9.7.8. The output of the assessment will be an ES chapter presenting the baseline conditions of the proposed scheme, the potential impacts of the proposed development, design interventions, evaluation of effect significance as well as robust and appropriate mitigation measures as required. An assessment of any residual effects will also be provided. Prior to the production of the ES, the ecological baseline, including a survey update, will be presented within the PEIR and issued to the Planning Inspectorate.

9.8. Assessment assumptions and limitations

9.8.1. The desk study within this Scoping Report is based upon the data from Warwickshire Biological Records Centre as detailed within the ESR produced during the options selection stage.

9.8.2. Baseline surveys for roosting bats and barn owl were limited at some locations due to lack of internal access to farm buildings and courtyards between buildings (for a complete external inspection) due to health and safety concerns. Surveys undertaken during the preliminary design stage should include further assessment of this building complex for roosting bats and barn owl, subject to safe access.

10. Geology and soils

10.1. Introduction

- 10.1.1. This chapter considers the geology and soils issues (including contaminated land) which may impact, or may be impacted by, the construction and operation of the proposed scheme. This chapter has been prepared in accordance with the following standards: DMRB LA 103 and DMRB LA 109 Geology and Soils Revision 0 (Highways England, 2019d) (hereafter referred to as DMRB LA 109).
- 10.1.2. DMRB LA 109 notes that the scoping assessment shall report on:
- the likely nature and scale of geology and soils effects (positive, neutral or negative) during the construction and the operational phase of the project
 - the likelihood of a project to result in significant effects
 - the issues requiring further assessment and the methods to be applied
- 10.1.3. The proposed scheme has the potential to impact upon both the geology and soils of the area. Constraints could be imposed on the proposed scheme construction as a result of existing ground conditions. The potential requirement for further assessment will therefore be identified where required.

Legislation, policy and guidance

Guidance and best practice

- 10.1.4. The assessment will be undertaken in accordance with relevant published standards and guidance, with particular reference to:
- DMRB LA 109 Geology and Soils (and associated supporting guidance)
 - Environmental Protection Act 1990 (as amended by the Environment Act 1995)
 - Contaminated Land Risk Assessment – A Guide to Good Practice C552 (CIRIA, 2001)
 - Land contamination: Risk Management (Environment Agency, October 2020).
 - Highways (Environmental Impact Assessment) Regulations 2007
 - BS 10175:2011+A2:2017 Investigation of Potentially Contaminated Sites. Code of Practice (2017)

Consultation

- 10.1.5. The proposed works are not considered to warrant specific consultation in respect of land quality issues or potential contaminated land risks. These can be

addressed as part of routine investigation and assessment procedures which do not require a specific permit.

10.2. Study area

- 10.2.1. The study area for this assessment will consider all locations where physical works and ground disturbance would take place and extends to 250 m beyond this in order to identify any past pollution incidents which may have affected soil within the works area and sensitive off-site receptors. The 250m buffer has been chosen as the area in which potential significant effects could occur based on professional experience considering the scale and type of development proposed.

10.3. Baseline conditions

- 10.3.1. Sources of information include previous reporting, historical and geological mapping and online data sources. Key sources used include:
- Environmental constraints plan in Figure 2.3 (Appendix A)
 - A46 Coventry Junctions Upgrade (Walsgrave Junction). Preliminary Sources Study Report. PCF Stage 2. (AECOM November 2021).
 - A46 Coventry Junctions Upgrade (Walsgrave Junction) Environmental Scoping Report. PCF Stage 2. (AECOM, 2020).
 - A46 Coventry Junctions Upgrade (Walsgrave Junction). Environmental Assessment Report. PCF Stage 2. (AECOM, 2022)
 - A46 Coventry Junctions Upgrade (Walsgrave Junction). Ground Investigation Scope Report. PCF Stage 2 (AECOM, November 2021)
 - Groundsure Report (Groundsure, September 2020) (contained within the PSSR)
 - Detailed Unexploded Ordnance (UXO) Threat & Risk Assessment (Alpha Associates, January 2022)
 - MAGIC Mapping, <https://magic.defra.gov.uk/home.htm> (Defra, 2023)
 - British Geological Survey (BGS), GeoIndex Onshore, (BGS, 2023)
- 10.3.2. Ground investigation (GI) work comprising site reconnaissance, intrusive investigation, sampling and analysis is due to commence in April 2023 with reporting later in 2023. This is designed to provide data to assess the extent, depth and composition of any contaminated soils alongside gaining geotechnical data for design and construction purposes. Reporting from the GI will be used to inform the environmental assessment.
- 10.3.3. Currently available baseline data for the proposed scheme is set out in Table 10-1.

10.3.4. Effects on mineral deposits as a resource are covered in Chapter 11 Material assets and waste. Effects on geomorphology, hydromorphology, and hydrogeology are covered in Chapter 14 Road drainage and the water environment. Geotechnical risk is not considered in this chapter.

Table 10-1: Baseline data

Aspect	Details		
Geology	<p>A basic summary of the geological sequence in the vicinity of the proposed scheme based on previous reporting including the PSSR and BGS online mapping is as follows:</p> <p>Designated sites</p> <ul style="list-style-type: none"> No statutory or non-statutory designated sites such as UNESCO or SSSI have been designated for geological or geomorphological interest in the study area. <p>Made ground</p> <ul style="list-style-type: none"> Made ground – indicated to be present in the vicinity of, and under the existing roads and areas of infilled ground to the west of the A46, south of the existing roundabout and far north of the proposed scheme. <p>Superficial geology</p> <ul style="list-style-type: none"> Alluvium – present in the vicinity of the River Sowe and Smite Brook as silty clay with sand and gravel. <ul style="list-style-type: none"> River Terrace Deposits – located in areas across the study area described as sand and gravel, locally with lenses of silt, clay or peat. Wolston Formation: Bosworth Clay Member – glacial lacustrine muds in the north of the study area. Wolston Formation: Thrussington Member, Diamicton – brown or reddish-brown pebbly clay in the north of the study area and along the western flank of the A46. Baginton Sand and Gravel Formation – located under parts of the northern and southern sections of the study area described as sands and gravels, with lenses of silt and clay. <p>Bedrock geology</p> <ul style="list-style-type: none"> Mercia Mudstone – underlies the entirety of the study area described as a stiff to hard silty clay with occasional mudstone bands and a weathered thin to medium fine grained moderately strong to strong sandstone. <p>Previous ground investigation data, located within the PSSR indicate that topsoil, made ground, alluvium, River Terrace Deposits, Bosworth Clay Member, Baginton Sand and Gravel, Thrussington Member and Mercia Mudstone (weathered) were identified within the proposed scheme extent.</p> <p>The proposed GI will provide additional details of the geology within the proposed scheme and will be utilised for the Geology and soils main chapter of the ES.</p>		
Sites of geological interest	<table border="1"> <tr> <td data-bbox="352 1758 555 2029">Historical quarrying</td><td data-bbox="555 1758 1441 2029"> <p>Two historical surface mineral workings are located on-site and two off-site within 250 m, according to the Groundsure report:</p> <ul style="list-style-type: none"> On-Site - Coombe Woods, Coventry, Warwickshire. Located in the south. Commodity: sand and gravel. Operation ceased. On-Site - Walsgrave Hill, Coventry, Warwickshire. Located on the eastern site extent. Commodity: sand and gravel. Operation ceased. </td></tr> </table>	Historical quarrying	<p>Two historical surface mineral workings are located on-site and two off-site within 250 m, according to the Groundsure report:</p> <ul style="list-style-type: none"> On-Site - Coombe Woods, Coventry, Warwickshire. Located in the south. Commodity: sand and gravel. Operation ceased. On-Site - Walsgrave Hill, Coventry, Warwickshire. Located on the eastern site extent. Commodity: sand and gravel. Operation ceased.
Historical quarrying	<p>Two historical surface mineral workings are located on-site and two off-site within 250 m, according to the Groundsure report:</p> <ul style="list-style-type: none"> On-Site - Coombe Woods, Coventry, Warwickshire. Located in the south. Commodity: sand and gravel. Operation ceased. On-Site - Walsgrave Hill, Coventry, Warwickshire. Located on the eastern site extent. Commodity: sand and gravel. Operation ceased. 		

Aspect	Details	
		<ul style="list-style-type: none"> Off-Site - Binley Gravel Pit, Coventry, Warwickshire. 26 m southwest. Commodity: sand and gravel. Operation ceased. Off-Site - Binley Gravel Pit, Coventry, Warwickshire. 196 m south. Commodity: sand and gravel. Operation ceased.
	Local geological sites	No statutory or non-statutory designated geological sites such as UNESCO or SSSI sites in close proximity.
	BGS recorded mineral sites	Three BGS mines and quarries sites are within the survey area. These are for Coombe Wood, Walsgrave Hill and Binley Gravel Pit.
Hydrogeology	<p>The Environmental Agency website indicates that the proposed scheme is not within or located nearby to any groundwater Source Protection Zones (SPZs). The closest SPZ is 3km to the west of the proposed scheme.</p> <p>The Environment Agency (2017) has designated aquifer properties of the strata as follows:</p> <p>The alluvium, River Terrace Deposits and Baginton Sand and Gravel Formation are classified as Secondary A Aquifers (can support local water supplies, and may form an important source of base flow to rivers).</p> <p>The Thrussington Member (Wolston Formation) and Bosworth Clay Member (Wolston Formation) are classified as a Secondary Undifferentiated (aquifer of minor value) and Unproductive stratum respectively (unable to provide usable water supplies).</p> <p>The Mercia Mudstone is classified as a Secondary B aquifer (may store and yield limited amounts of groundwater).</p> <p>Refer to Chapter 14: Road drainage and the water environment for more information.</p>	
Hydrology	<p>Coombe Pool, a man-made feature located adjacent to the east of the proposed scheme and is designated as a SSSI as a standing open water and canals habitat.</p> <p>Water from Coombe Pool flows into Smite Brook via a weir close to the Walsgrave Junction. Smite Brook flows east to west from Coombe Pool weir which then passes underneath the A46 through a culvert. Smite Brook is a tributary to the River Sowe, which runs north to south on the western extent of the study area.</p> <p>A surface water pond is located within the proposed scheme extent approximately 100 m from the A46 to the north. Two ponds are located east of the proposed scheme extent, approximately 250 m east.</p> <p>Refer to Chapter 14: Road drainage and the water environment for more information.</p>	
Soil survey	<p>The UK Soil Observatory map viewer identifies the soils as predominantly arable and horticultural, with a section of urban cover in the centre of the proposed scheme. Broadleaved woodland is present to the south and east, and improved grassland to the west.</p> <p>Agricultural land classification (MAFF, 1988) to the east of the A46 in the northern part of the study area is classified as a mixture of Grade 3a (good quality agricultural land) and Grade 3b (moderate quality agricultural land) land with a small parcel of Grade 2 (very good quality agricultural land) listed agricultural land.</p> <p>Agricultural land to the west of the A46 is classified as Grade 2 and Grade 3.</p>	
Landfill records	<p>No active or recent landfills have been identified within a 250 m radius of the proposed scheme.</p> <p>An on-site historical landfill (shown on Figure 2.3 in Appendix A) is located in the north of the study area with a further historical landfill located in the south of the study area, both within the proposed scheme and in close proximity.</p>	

Aspect	Details
	Wastes accepted by the landfills, where known, include inert, special and industrial material.
Current land use and man-made features	<p>The A46, also known as Coventry Eastern Bypass, is a two-lane dual carriageway with central reserve which leads south to a three-arm roundabout. The southeast arm of the roundabout extends the A46 to the southeast and the western arm exits onto the B4082. A bridge is located on the B4082 which crosses over Smite Brook.</p> <p>To the west of the B4082, another three-arm roundabout is present, the northern arm leads Clifford Bridge Road north towards Wyken. A bridge is located to the north which crosses the River Sowe. The southern arm leads onto Clifford Bridge Road towards Binley and the eastern arm leads towards Coombe Abbey Country Park.</p> <p>The principal land use within the proposed scheme area is agriculture to the north and east with urban areas to the west and southwest.</p> <p>The principal man-made features are the existing A46, B4082 and Clifford Bridge Road with associated bridges and roundabouts.</p> <p>The principal land uses surrounding the proposed scheme are:</p> <ul style="list-style-type: none"> Urban residential to the west and south <ul style="list-style-type: none"> Hungerly Hall Farm to the north of the junction Coombe Pool (ecological SSSI) to the east Agricultural to the north of Walsgrave Junction <p>Drainage channels are located within the proposed scheme extent which ultimately connect to the River Sowe.</p> <p>Smite Brook runs east west across the site from Coombe Pool with a section culverted beneath the A46.</p> <p>Coombe Pool is an artificial lake designated as a SSSI and is located directly east of the proposed scheme.</p>
Route history	<p>The historical development of the area had been summarised from historical Ordnance Survey (OS) mapping contained within the Groundsure report.</p> <p>The study area is dominated by agricultural fields in the earliest map from 1886 with Coombe Pool (labelled as The Pool) shown directly to the east. Hungerley Farm is shown in its current position.</p> <p>In 1926, the current Clifford Bridge Road was named Binley Lane to the north and Sowe Lane to the south. On the 1955 map, this shows the change to the current name of Clifford Bridge Road (B4082).</p> <p>In 1955 gravel pits are shown at the southern extent of the proposed scheme. These are no longer presented in the 1980 map.</p> <p>1991 shows the current A46 layout which trends generally north-south through the proposed scheme with the A4082 heading west from the roundabout. The A4082 became the current B4082 in 2001.</p>
Potential contamination risks	<p>No major or significant environmental incidents have occurred in the proximity to the proposed scheme.</p> <p>The potential sources of contamination which may be present at or near the proposed scheme comprise:</p> <ul style="list-style-type: none"> former landfills <ul style="list-style-type: none"> former and current scrap yard/metal recyclers and commercial premises residual hydrocarbon contamination from any accidental releases of vehicle fuel or loads

Aspect	Details
	<ul style="list-style-type: none"> • agricultural chemicals and products applied to the agricultural land to the north and east • contaminated materials within imported fill material used for the road construction • residual contaminants from unspecified ground workings • unspecified tanks and below ground features <p>These potential sources present theoretical risks to construction materials, ground conditions, site workers, site users, neighbouring agricultural land and adjacent surface waters including the River Sowe, Smite Brook and Coombe Pool.</p>
UXO risk	<p>The site comprises of medium risk and low risk areas of encountering UXO. The medium risk area is located to the north of the proposed scheme as detailed by the '1st Line Defence' Detailed UXO Risk Assessment within the PPSR. Risk mitigation measures are recommended.</p>

10.4. Potential impacts

10.4.1. The assessment of potential impacts from construction and operational phases will consider the following potential receptors:

- public open space users, residential/commercial users, current site users
- construction workers and future site users
- agricultural land
- Coombe Pool SSSI
- secondary A and B aquifers, surface waters

Construction

10.4.2. Potential impacts are likely to be higher during the construction phase of the proposed scheme. Potential impacts during the construction phase include:

- disturbance and mobilisation of contamination
- mobilisation of silts and soils during any dewatering events
- introduction of new sources of contamination through spills, leaks and accidental loss of fluids, fuels and oils
- potential to create preferential migration pathways through excavation and piling which may lead to impacts to receptors

10.4.3. Impacts on mineral deposits as a resource are covered in Chapter 11 Material assets and waste.

Operation

- 10.4.4. The operational phase will have a lower probability to introduce potential impacts related to the proposed scheme. Potential impacts during the operational phase are:
- release of water incident on the road surfaces to the environment due to failure/bypassing of scheme drainage
 - accidental release of fuels, oils etc relating to vehicle collisions
- 10.4.5. Potential impacts on groundwater and surface water associated with drainage and water discharge will be considered within Chapter 14 Road drainage and the water environment.

10.5. Design, mitigation and enhancement measures

Construction

- 10.5.1. Made ground underlies the proposed scheme with landfills in the north and south of the proposed scheme. Management of the associated potential risks would be undertaken in accordance with good practice including:
- monitoring of potential ground gases and vapours in confined spaces during construction
 - design of in-ground structures to appropriate concrete design classification
 - suitable PPE and hygiene practices for construction and maintenance workers
- 10.5.2. The findings of the GI work (reporting in 2023) will identify the requirement and scope of any potential remediation works required. The remediation strategy, if required, will examine feasible and sustainable options to manage, remove/dispose or treat identified contaminated material where it is cost effective and practicable to do so. The potential effects would be established and reported in the environmental assessment.
- 10.5.3. The remediation strategy will address any particular regulatory requirements under development control for managing any previously unknown contamination encountered during the works.
- 10.5.4. In addition, the implementation of an EMP will set out controls to ensure identified risks associated with contamination are appropriately managed and minimised. Mitigation measures within the EMP will include best practice environmental management procedures and appropriate waste management, such as:

- ensuring adequate space for storage of topsoil and subsoil which must be segregated during excavation
- protection of watercourses from entry of polluting matter
- protection of aquifers from migration of potential contaminants
- stripping, storing and reinstating of soils using best practice measures to minimise the risk of degradation to soils
- suppression of odour and dust using best practice measures

10.5.5. UXO mitigation measures will be employed to reduce the risks to as low as reasonably practicable. These may include a UXO emergency response plan, safety and awareness briefings, magnetometer surveys, both intrusive and non-intrusive surveys and watching briefs.

Operation

10.5.6. Mitigation measures for the protection of geology and soils during the operation of the proposed scheme relate to the implementation of a comprehensive and robust drainage design as measures which protect the water environment are also likely to protect soils and groundwater.

10.5.7. Maintenance activities which may lead to potential risks to geology and soils will be managed through the standard maintenance requirements and environmental protection measures which apply to the National Highways network and are documented in the Network Maintenance Manual (Highways Agency, 2009) and the Routine and Winter Service Code (Highways Agency, 2009).

10.6. Description of the likely significant effects

10.6.1. Excavation works associated with the proposed scheme have the potential to directly affect underlying geological features. However, since the proposed scheme is not located within a geologically protected site, and there are no important geological deposits identified on site, it is not predicted that there would be significant effects on geology.

10.6.2. It is predicted that operation of the proposed scheme is unlikely to give rise to any significant effects upon geology or soils. This phase would only include occasional maintenance and therefore would be of minimal impact.

10.6.3. Table 10-2 provides a summary of potential construction and operational effects on geology and soils for the proposed scheme.

Table 10-2: Summary of potential geology and soil effects

Potential construction effects	Potential operation effects
Potential to affect agricultural land.	Potential to permanently take agricultural land.
Potential mobilisation of contaminants in made ground/landfills during construction activities affecting sensitive receptors including human health and controlled waters.	

Proposed level of scope and assessment

10.6.4. Table 10-3, in accordance with DMRB LA 109, sets out the proposed scope for further assessment. Where the response to one or more of the scoping assessment questions is 'yes', further assessment will be undertaken.

Table 10-3 : Baseline data

Scoping question	Response based on current understanding	Scope in?
Is the project likely to affect designated geological sites (statutory or non-statutory)?	No statutory or non-statutory geological sites recorded within the proposed construction extent.	No
Is the project likely to affect the function or quality of soil as a resource?	While additional land will be taken, the operational land use would remain largely the same compared to baseline conditions. It is not considered that the proposed scheme would significantly affect the function or quality of soil as a resource, however as the design is not finalised an assessment will be undertaken. The impact on agricultural land, through which the proposed scheme passes will be assessed separately (see question below).	Yes
Is the project likely to affect agricultural land classified as best and most versatile (BMV) or prime land?	The proposed scheme encroaches on land being used for agriculture. The proposed scheme is anticipated to potentially affect the quality of agricultural soils with Agricultural Land Classification Grades 2, 3a and 3b land present within the study area.	Yes
Is the project likely to disturb historical contamination?	Historical landfills are present in the north and south of the proposed scheme. The extent of the landfill and materials landfilled will need to be assessed further. No additional significant sources of confirmed historical contamination have been identified within the proposed scheme extent, however, there is the possibility of unidentified contamination to be present.	Yes
Is the project likely to introduce significant sources of contamination?	No significant sources of contamination are likely to be introduced as part of the proposed scheme's construction or operation.	No

10.7. Assessment methodology

Proposed methodology including significance

- 10.7.1. The proposed further assessment for geology and soils (with the exclusion of those effects which have been scoped out of requiring further assessment in section 10.6) will be undertaken in accordance with DMRB LA 109.
- 10.7.2. Following DMRB LA 109, receptors for the assessment for disturbed historical contamination are:
- human health
 - surface water
 - groundwater
- 10.7.3. The baseline for the environmental assessment will include data if available from the planned GI due to report in 2023. The findings of the GI will be considered when assessing the potential impacts.
- 10.7.4. Significance of effect will be determined by the predicted deviation from the baseline conditions and the scale of impact drawing on the criteria provided in DMRB LA 109.

10.8. Assessment assumptions and limitations

- 10.8.1. The baseline information is based on a desk study of currently available information at the time of writing.
- 10.8.2. A GI is planned for 2023 and the findings will be considered if available during the production of the full assessment.
- 10.8.3. The full extent of land-take (permanent or temporary) during construction is unknown at this stage.
- 10.8.4. Potential impacts to agricultural land have been based on data presented in the Groundsure report and Environmental assessment report (AECOM, 2022) and have been assumed to be accurate. Surveys may be required at detailed assessment stage.
- 10.8.5. To the extent that this chapter is based on information supplied by other parties, it has been assumed that this information is complete and correct. All sources used have been listed within section 10.3 of this chapter.
- 10.8.6. Reported baseline conditions from the PSSR (AECOM, 2021) and Environmental assessment report (AECOM, 2022) have been assumed to be

accurate, however, owing to the dynamic nature of the environment, conditions may change during the construction and operational phases.

- 10.8.7. To the extent that this chapter uses information obtained from a GI, persons using or relying on it should recognise that any such investigation can examine only a fraction of the subsurface conditions.
- 10.8.8. In relation to contaminated land, GIs may not identify small areas of historical/hidden contamination and there is the potential for previously unidentified contamination to be encountered during the construction process.

11. Material assets and waste

11.1. Introduction

- 11.1.1. This chapter identifies potential impacts with regards to material assets and waste that may occur during the construction and operation of the proposed scheme.
- 11.1.2. This scoping assessment follows the approach detailed within DMRB LA 110 Material assets and waste, Revision 0, Highways England, 2019 (hereafter referred to as DMRB LA 110).
- 11.1.3. The assessment of material assets and waste includes the:
- consumption of materials and products (from primary, recycled or secondary, and renewable sources, the use of materials offering sustainable benefits, and the use of excavated and other arisings that fall within the scope of waste exemption criteria)
 - sterilisation of peat and mineral reserves
 - production and disposal of waste
- 11.1.4. The proposed scheme is described in Chapter 2 of this ESR but for the purposes of this scoping, assessment focuses on potential impacts associated with construction of the proposed scheme as well as the impacts associated with temporary construction compounds and haul routes.
- 11.1.5. Information on land uses (current and former) and potential sources of land contamination is presented in Chapter 10 Geology and soils. If present, these land uses and potential contamination sources may require management, treatment and disposal during construction.

Legislation, policy and guidance

- 11.1.6. The following relevant European, national and local policies have been considered as part of the material assets and waste assessment. They have been considered where these have informed the identification of receptors, resources and their sensitivity, the assessment methodology, the potential for significant environmental effects and required mitigation and enhancement measures.

European legislation

- EU Waste Framework Directive 2008/98/EC (WFD 2008) (November 2008)

National legislation

- The Waste (England and Wales) Regulations 2011 (March 2011) (as amended)
- Hazardous Waste (England and Wales) Regulations 2005 (March 2005) (as amended) - implements the Hazardous Waste Directive (91/689/EC)
- Hazardous Waste (Miscellaneous Amendments) Regulations 2015 (June 2015) - forms the current legal framework covering the appropriate assessment of waste
- Environmental Permitting (England and Wales) Regulations 2016 (December 2016) (as amended)
- Environment Agency Standard Rules SR2015 No 39 (February 2016) - use of waste in a deposit for recovery operation
- Department for Environment Food and Rural Affairs (Defra) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites, (September 2009)
- Environmental Protection Act 1990, Part II, Section 34 (November 1990) - sets out the legal framework for 'duty of care'
- The Waste (Circular Economy) (Amendment) Regulations 2020

11.1.7. The Waste legislation (England and Wales) Regulations 2011 (as amended) implements the European Union (EU) Waste Framework Directive⁹ (WFD) 2008/98/EC (EU WFD 2008) and require the Secretary of State to establish waste prevention programmes and waste management plans that apply the waste hierarchy.

11.1.8. These regulations require businesses to apply the waste hierarchy when managing waste. They also require that measures are taken to ensure at least 70% by weight of non-hazardous construction and demolition waste is subjected to material recovery by the year 2020 and beyond. This target specifically excludes naturally occurring materials with List of Waste (LoW) Code 17 05 04 (non-hazardous soil and stones).

11.1.9. The foundation for waste management is the five-step waste hierarchy of the EU WFD 2008 (Figure 11-1 below) which establishes an order of preference for managing and disposing of waste where preventing waste is the preferred option and sending waste to landfill is the last resort. Waste hierarchy principles will be considered during the design to achieve mitigation of potential impacts within the design process.

⁹ The UK left the EU on 31 January 2020 however English and Welsh legislation, which implements requirements of EU law such as the Waste Framework Directive, remains in force and has been largely unaltered.

Figure 11-1 : Waste hierarchy



National strategy and planning policy

National strategy

- 11.1.10. The Resource and Waste Strategy for England (December 2018) sets out how the country will preserve material resources by minimising waste, promoting resource efficiency and moving towards a circular economy in line with the Government's 25 year Environment Plan (December 2018).
- 11.1.11. The primary basis for deciding whether or not to grant a DCO is the NPSNN which sets out policies to guide how DCO applications would be decided and how the impacts of national networks infrastructure should be considered.
- 11.1.12. The NPS NN policies relevant to material assets and waste assessment are NPS NN paragraph: 5.42 and 5.43 (waste management). These paragraphs state that the applicant should set out the arrangements that are proposed for managing any waste produced. The arrangements described should include information on the proposed waste recovery and disposal system for all waste generated by the development. The applicant should seek to minimise the volume of waste produced and the volume of waste sent for disposal unless it can be demonstrated that the alternative is the best overall environmental outcome.

National planning policy

- 11.1.13. In addition to NPS NN, other policies can have weight as relevant and important matters in decision making:
- National Planning Policy Framework (NPPF) (March 2012): Sets out the Government's planning policies for England and how these should be applied, the document was revised in July 2021 and Chapter 17: facilitating the sustainable use of minerals, paragraph 210, is of relevance to the proposed scheme
 - the Waste Management Plan for England (December 2013): Fulfils EU WFD 2008 Article 28 mandatory requirements, and other required content as set

out in Schedule 1 to the Waste (England and Wales) Regulations 2011 (March 2011)

- National Planning Policy for Waste (NPPW) (October 2014): sets out the government's detailed waste planning policies
- the National and Regional Guidelines for Aggregates Provision in England 2005 to 2020 (June 2009): Contains the relevant regional recycled aggregates target given in Table E/1.2 of DMRB LA 110

Local planning policy

11.1.14. Warwickshire County Council's Development plan for the county comprises:

- Warwickshire Minerals Local Plan 2018-2032 was adopted by Warwickshire County Council on 19 July 2022 to assist in making decisions on mineral planning applications for mineral extraction, processing and restoration and resources to provide assistance to Boroughs and Districts to ensure that minerals resources and infrastructure are not sterilised by non-mineral development. Objectives of the adopted Warwickshire Minerals Local Plan 2018 to 2032 include:
 - securing a steady and adequate supply of aggregates and other minerals required to support sustainable economic growth at the national, sub-regional and local level
 - help deliver sustainable mineral development by promoting the prudent use and safeguarding of Warwickshire's mineral resources and help prevent sterilisation of land from non-mineral development
 - encourage the use of recycled and/or secondary materials and promote waste minimisation to reduce the overall demand for primary mineral extraction for construction aggregates, by supporting proposals for the production of materials where they are consistent with the policies of the adopted Waste Local Plan
- Warwickshire Waste Development Framework Core Strategy Adopted Local Plan 2013 to 2028 serves to assist in planning the county's waste management facilities up until 2028
- Coventry City Council Local Plan 2011 to 2031 Local Plan (adopted 6 December 2017) ensures that all the waste management needs of the area are met and promotes the use of recycled and secondary materials to help minimise both primary extraction and waste. The plan also defines Mineral Safeguarding Areas (MSA) in order that proven mineral resources are not needlessly sterilised

Planning practice guidance

11.1.15. The National Planning Practice Guidance (PPG) for Minerals (Department for Levelling Up, Housing and Communities (DLUHC) 2014) and Waste (DLUHC 2015) provide more in-depth guidance to the NPPF. The PPG aims to make planning guidance more accessible, and to ensure that the guidance is kept up

to date. As such, the PPG was amended in July 2017 to reflect the updated EIA Regulations, and further updated in 2019.

11.1.16. Matters of relevance to the Material assets and waste assessment include:

- PPG for Minerals (DLUHC 2014) provides context to the NPPF and advises on the safeguarding of mineral resources
- PPG for Waste (DLUHC, 2015a) provides guidance on waste planning and implementing the waste hierarchy

11.1.17. Both documents have been considered as part of the assessment of effects associated with material assets and waste.

11.2. Study area

11.2.1. In accordance with DMRB LA 110 the assessment has established two geographically different study areas to examine the use of material assets and management of waste.

11.2.2. The western extent of the proposed scheme sits within the planning authority of Coventry City Council whilst the eastern extents are within Rugby Borough Council. Warwickshire County Council encompasses the local authorities of Coventry City Council and Rugby Borough Council. Using the proximity principle, this baseline considers Warwickshire County Council to be the local minerals and waste disposal authority for the proposed scheme.

First study area

11.2.3. The first study area covers land within the proposed scheme extent and includes areas where site clearance, earthworks and construction are proposed and materials will be consumed (used, re-used and recycled) and waste generated.

11.2.4. As well as including the footprint of the proposed scheme the first study area includes any temporary land requirements during the construction phase such as temporary offices, compounds and storage.

11.2.5. The study area for considering mineral site or peat resource sterilisation is defined by the proposed scheme extent.

Second study area

11.2.6. The second study area covers:

- feasible sources for and the availability of construction materials required to construct the proposed scheme's main elements

- suitable regional waste management infrastructure (specifically landfill capacity¹⁰) that could accept arisings and or waste generated by the proposed scheme

- 11.2.7. The study area for the source of material assets is the West Midlands region. This region comprises Herefordshire, Shropshire, Staffordshire, Warwickshire, and Worcestershire counties plus West Midlands metropolitan county. The proposed scheme lies within the West Midlands (Coventry) and Warwickshire counties.
- 11.2.8. The study area for the management of inert and non-hazardous wastes comprises the West Midlands region. Landfills licenced to accept these wastes are located within this region.
- 11.2.9. There are no hazardous waste landfill sites in the West Midlands region. Using the proximity principle, the study area for the management of hazardous wastes is the adjacent East Midlands region. The closest hazardous waste landfill therein is in Northamptonshire (in the district of East Northamptonshire).
- 11.2.10. Boundaries of the East and West Midlands regions are shown in figure 11.2 within Appendix H.

11.3. Baseline conditions

- 11.3.1. In accordance with DMRB LA 110, this scoping assessment documents the initial baseline to make recommendations on the scope for further assessment if required.
- 11.3.2. The initial baseline utilises desk study information and available the option selection stage estimates for material resource use and waste generation during construction. Baseline conditions are also informed by the PCF stage 2 Environmental Assessment Report (Reference: HE604820-ACM-EGN-WAL_SW_000_Z-RP-LE-0003) where relevant.

Mineral and other finite raw material resources

Primary (virgin) aggregates

- 11.3.3. Based on calculations within the most recent 2017 Warwickshire Local Aggregates Assessment (LAA), the adopted Warwickshire Minerals Local Plan 2018 to 2032 notes:

¹⁰ The capacity of landfill is considered and not the capacity of all waste management infrastructure as disposal to landfill and use of available landfill capacity is, overall, a permanent irreversible impact. Impacts on other types of waste management infrastructure (for example material recovery facilities) are temporary, with such waste management infrastructure better placed to react to demands of the waste management market.

- Warwickshire's landbank for sand and gravel provisions currently stands at 13 years with a 6,689,000 tonnes reserve as of December 2016. Nationally and locally the main use of sand and gravel is for concrete (67% of the total sand and gravel sold). Other uses for sand include mortar and asphalt while for gravel it includes drainage layers or construction fill
- Warwickshire's landbank for crushed rock was approximately 29 years with a 25,680,700 tonnes reserve as of December 2013. It is mainly used as bulk minerals in the construction industry

Alternative (secondary and recycled) aggregates

11.3.4. Alternative aggregates comprise secondary aggregates which are by-products from industrial and mining operations and recycled aggregates which are produced from construction and demolition waste (CDW).

11.3.5. The adopted Warwickshire Minerals Local Plan 2018 to 2032 notes:

- recycling of aggregates is important in Warwickshire with nine operational sites providing materials to the local and regional construction industry. 830,250 tonnes of construction and demolition waste material was recycled in the County in 2015
- monitoring works for the adopted Warwickshire Minerals Local Plan 2018 to 2032 Policy MCS 4 looked at permitted capacity of such CDW recycling sites and when added to recent permissions gives a total of 830,250 tonnes of capacity per annum
- several of these facilities are time limited and due to expire within the 2018 to 2032 plan period. However, Policy MCS 4 notes that proposals for the reception, processing, treatment and distribution of waste materials in order to produce recycled and secondary aggregates will be supported where the proposal will promote the sustainable management of waste in accordance with the principles of the waste hierarchy and will facilitate a reduction in the need for primary aggregates. This approach to sustainable materials management is supported by Coventry City Council in their 2017 Local Plan whereby new methods of processing and recycling at waste management sites are encouraged

11.3.6. Baseline recycled content targets for alternative aggregates are set out in the National and Regional Guidelines for Aggregates Provision in England 2005 to 2020. As detailed in DMRB LA 110 the proposed scheme's target is 27%, the guideline set for the West Midlands in 2018.

11.3.7. Non-aggregate based materials such as wood, plastic and steel will be used within the proposed scheme, however, the overall quantities are anticipated to be relatively small and, in some cases, negligible.

Mineral sites

- 11.3.8. The adopted Warwickshire Minerals Local Plan 2018 to 2032 notes the key safeguarded mineral resources in Warwickshire to be sand and gravel, crushed rock, brick-making clay resources, cement raw materials, shallow coal and building stone. The Coventry City Council 2017 Local Plan states the predominant economic mineral resource for Coventry to be coal. These resources across Coventry and Warwickshire have been identified for long-term safeguarding and are designated as Mineral Safeguarding Areas (MSA). MSAs are designated to prevent needless sterilisation of proven mineral resources by non-mineral development.
- 11.3.9. Available mapping from Warwickshire County Council and Coventry City Council identifies MSA for:
- sand and gravel across the full extents of the proposed scheme
 - deep coal located in the southern extents south of the A46 Walsgrave Junction
- 11.3.10. Despite these MSA the sterilisation of mineral resources of local, regional or national importance or posing a serious hindrance to future winning and working of minerals are considered unlikely to occur as a result of the proposed scheme. Reasons for this include:
- the adopted Warwickshire Minerals Local Plan 2018 to 2032 indicates there are no existing or allocated mineral sites (which according to DMRB LA 110 are operational sites or sites identified within strategic planning documents for the extraction of minerals) within the proposed scheme's extents
 - given the urban nature of Coventry and lack of quarrying activity, as outlined in the Coventry City Council 2017 Local Plan, there are no anticipated active mineral sites that are being brought forward during the plan period of 2011 to 2031
 - the majority of safeguarded minerals are already sterilised by the existing highways infrastructure and the presence of Combe Pool SSSI (Defra, 2023) in the south east extents of the proposed scheme. In future a large area is designated for housing that coincides with the majority of the MSA to the west of the A46 (detailed on available mapping from Coventry City Council)

Safeguarded peat resources

- 11.3.11. Available mapping (Natural England mapping, last updated 24 August 2021 from Natural England's publication "England's Peatland - carbon storage and greenhouse gases" (NE257)) indicates peat is not present within the area of the proposed scheme.

Regional waste management infrastructure (specifically landfill capacity)

Construction generated wastes

- 11.3.12. The national target for the recovery of CDW either on or off the proposed scheme is 70% by weight as set out in the EU WFD 2008 and the Waste Management Plan for England (January 2021). Non-hazardous excavated soil and stones (List of Waste (LoW) code 17 05 04) are specifically excluded from this target.
- 11.3.13. DMRB LA 110 states that projects should aim to achieve at least 90% (by weight) material recovery of non-hazardous construction and demolition waste

Waste generation: landfill capacity

- 11.3.14. Baseline information comprises the current landfill capacity in the waste disposal authority (Warwickshire) and in the wider West Midlands region.
- 11.3.15. The urban nature of Coventry and the lack of quarrying activity means there is no opportunity for existing or future landfill capacity, therefore, the City relies on landfill capacity within surrounding authorities. Coventry City Council's Local Plan was adopted in 2017 and includes several policies and objectives relating to waste and material management. This includes Policy EM2: Building Standards, which includes a requirement for new development to “minimise waste and maximise recycling during construction and operation”.
- 11.3.16. In lieu of hazardous waste landfill sites within the West Midlands, using the proximity principle within DMRB LA 110, the data interrogator was used to assess remaining hazardous landfill capacity for the adjacent East Midlands region.
- 11.3.17. Landfill capacity data provided by the Environment Agency has been assessed. This records the remaining landfill capacity in England as at the end of 2021 and is presented by Environment Agency area. Statistics on remaining landfill capacities for the West Midlands region, Warwickshire sub-region and East Midlands region (hazardous landfill) are summarised in Table 11-1.

Table 11-1: Remaining landfill capacity summary (end 2021)

Landfill type	Remaining capacity	
	Warwickshire sub-region	West Midlands region
Non-hazardous	5,427,812m ³	25,892,429m ³
Inert	2,595,967m ³	7,877,223m ³
Stable non-reactive hazardous waste	3,202,644m ³	5,385,159m ³

(SNRHW) cell ¹¹ within non-hazardous landfill		
Landfill type	Warwickshire sub-region	East Midlands region
Hazardous ¹²	No hazardous waste landfill sites within Warwickshire and West Midlands region.	No hazardous waste landfill sites within east of England. The closest hazardous waste landfill is Augean, East Northants Resource Management Facility (Permit Ref: EPR/TP3430GW) located in East Northamptonshire approximately 60 miles from the proposed scheme with a remaining capacity of 800,000m ³ .

11.3.18. There is no available information on any potential changes to landfill capacity by the time of construction of the proposed scheme. The Warwickshire Waste Core Strategy adopted in 2013 considers “there is sufficient landfill capacity or void within the county to manage the maximum landfill diversion amounts over the plan period” of 2013 to 2028.

11.4. Potential impacts

Construction

11.4.1. The likely potential impacts are:

- depletion of natural resources through the use of primary aggregates and the use of recycled and or secondary aggregates below the 27% West Midlands regional target
- depletion of natural resources through recycling and or recovery of CDW below the Government’s 70% recovery target
- sterilisation of one or more mineral and peat safeguarding sites
- reduction in the capacity of regional inert and non-hazardous landfill facilities through generation of surplus excavation materials, generation and disposal of CDW from the demolition of any existing buildings or structures and generation of packaging materials and construction material wastage through damage and over-ordering
- generation of hazardous waste requiring disposal to hazardous waste landfill facilities outside the region

Operation

11.4.2. Significant environmental effects are considered unlikely during the operational phase (i.e., post-construction). This phase should only involve small-scale, routine or ad-hoc maintenance activities that would have minimal materials

¹¹ Some non-hazardous sites can accept some SNRHW into a dedicated cell, but this is usually permitted as a small part of the overall capacity of the site

¹² Hazardous merchant sites only. Hazardous restricted sites are not included since their capacity may not be available to the proposed scheme

requirements and generate insignificant volumes of waste. Consequently, assessment of material assets and waste during the operational phase of the proposed scheme has been scoped out.

11.5. Design, mitigation and enhancement measures

Waste guidance and best practice

- 11.5.1. The proposed scheme would be undertaken in consideration of best practice mitigation measures and Defra's Resources and Waste Strategy for England (December 2018).
- 11.5.2. Re-using soil arisings (either on or off the proposed scheme) reduces haulage requirements and minimises disposal costs which is a more sustainable waste management approach.
- 11.5.3. An environmental permit¹³, exemption or materials management plan (MMP) prepared in accordance with the CL:AIRE Development Industry: Definition of Waste Code of Practice (DoW CoP), Version 2, 2011 may be required dependant on the anticipated quantity of excavation arisings. An exemption or MMP would enable re-use of excavated materials on or off the proposed scheme or allow the direct transfer of suitable soils and stones between other local development schemes dependent upon anticipated quantities of excavation arisings. This will be considered further during design and delivery of the proposed scheme.
- 11.5.4. Certain wastes, including but not limited to concrete and brick structures, may require processing in line with permitted controls before they can be considered suitable for re-use as a non-waste.
- 11.5.5. Soils should be managed in accordance with DEFRA Construction Code of Practice for the Sustainable Use of Soils on Construction Sites, September 2009.

Environmental management plan

- 11.5.6. In accordance with DMRB LA 120, an EMP will be produced and will be submitted as part of the DCO application. It will be prepared in parallel to the development of the proposed scheme design and construction methodologies. Measures and procedures in the EMP will include design and construction mitigation. These will be developed in more detail at later stages of the design and implemented during construction.

¹³ Including but not limited to Environment Agency (Standard Rules SR2015 No 39) - use of waste in a deposit for recovery operation

11.5.7. The EMP will set out the following performance targets for material assets and waste:

- at least 27% (by weight) of aggregates imported to site for use within the proposed scheme should comprise alternative (reused, recycled or secondary) aggregates, for those applications where it is technically and economically feasible to substitute these alternatives to primary aggregates. Where primary aggregate materials are mandated within DMRB they would be excluded from the target.
- recovery of at least 70% (by weight) of non-hazardous construction and demolition waste (excluding non-hazardous naturally occurring materials with LoW Code 17 05 04 i.e., soil and stones), with the aim to achieve recovery of 90% (by weight).

11.5.8. The environmental actions and commitments specified in the EMP will be secured by the requirements in the DCO, ensuring that they will be provided as part of the proposed scheme.

11.5.9. The EMP will be developed before construction works commence. It will include the adoption and implementation of industry standard practice and measures for controlling the impacts of the proposals on material assets and waste. It will comprise three core documents specifically relating to the management of these aspects:

- Materials logistics plan (MLP)
- Site waste management plan (SWMP)
- Material Management Plan (MMP)

Enhancement measures

11.5.10. Enhancement opportunities will be identified as the proposed scheme progresses associated with the re-use of suitable excavation arisings on developments concurrent with the construction phase of the proposed scheme. For example, this may include:

- provision of materials to other major developments in the wider region e.g., road and rail improvement projects
- construction of noise and landscape bunding off the proposed scheme, for example on other National Highways projects where improvements are planned
- use of surplus recycled or recovered wastes in community projects e.g., use of recycled mulch from tree felling on local community facilities

11.5.11. Further enhancement measures relating to material assets and waste would be considered and implemented where applicable during subsequent stages of the proposed scheme.

11.6. Description of the likely significant effects

- 11.6.1. In accordance with DMRB LA 110 sections 3.1 and 3.2 the scoping assessment documents the initial baseline studies undertaken and makes a recommendation on the scope of further assessment. The scoping assessment addresses the questions in section 3.2 of DMRB LA 110 to gain an understanding of the need to undertake further assessment.
- 11.6.2. In accordance with Table 11-2, receptors considered within this assessment are:
- mineral and other finite raw material resources
 - safeguarded mineral sites and peat resources
 - regional waste management infrastructure (specifically landfill capacity¹⁴)

Construction

- 11.6.3. Table 11-2 presents a summary of the scoping assessment for the construction phase. It identifies whether and which likely environmental effects should be assessed in any subsequent EIA (scoped in) and those which will not be assessed further (scoped out). The scoping assessment has applied established and reliable design, mitigation and best practice measures when reporting against the scoping questions in accordance with section 3.4 of DMRB LA 110. Based upon the assessment presented in Table 11-2 material assets and waste has been scoped out from further assessment during construction.

Operation

- 11.6.4. Significant environmental effects are considered unlikely during the operational phase (i.e., post-construction). This phase should only involve small-scale, routine or ad-hoc maintenance activities that would have minimal materials requirements and generate insignificant volumes of waste. Consequently, assessment of material assets and waste during the operational phase of the proposed scheme has been scoped out.

¹⁴ The capacity of landfill is considered and not the capacity of all waste management infrastructure as disposal to landfill and use of available landfill capacity is, overall, a permanent irreversible impact. Impacts on other types of waste management infrastructure (for example material recovery facilities) are temporary, with such waste management infrastructure better placed to react to demands of the waste management market.

Table 11-2: Potential material assets and waste impacts – construction

Potential impact	To be assessed in the ES	Reason
Is the project likely to recover or re-use little on-site material thereby requiring materials to be imported to the proposed Scheme?	No (scoped out)	<p>Significant environmental effects from this potential impact are not predicted.</p> <p>In the proposed scheme, priority would be given to re-using suitable site generated wastes wherever practicable over the import of aggregates and earthworks materials for engineering or backfill purposes (consistent with the preliminary design).</p> <p>The option selection stage design information indicates approximately:</p> <ul style="list-style-type: none"> 26,000m³ of topsoil anticipated be generated during construction of which 20,000m³ would be re-used where suitable during re-instatement works 80,500m³ of sub-soils anticipated to be generated during construction. Pending findings of the proposed ground investigation it is assumed 60,375m³ (75%) of these arisings will be chemically and geotechnically suitable for re-use on the proposed scheme (best-case) 5,000m³ of site-won sub-base will be generated and re-used as general fill during construction of the proposed scheme. <p>Therefore, of the total of 126,500m³ generated construction waste (including soils, stones and CDW) approximately 85,375m³ (67%) of these would be re-used directly on the proposed scheme during construction. Construction waste requiring removal would be taken to a local development project or recycling/re-use facility and therefore be re-used either immediately or via an intermediary site rather than being disposed to landfill.</p> <p>Whilst approximately 92,625m³ of general fill materials require import. These will be secondary/recycled and imported from various sources including other local development projects.</p> <p>The proposed scheme would be undertaken in consideration of best practice mitigation and England's Resources and Waste Strategy (2018) and designed to avoid and minimise the environmental impacts of natural resources. Throughout the design process, a number of embedded mitigation features would be included with the potential to reduce consumption of natural resources. Essential mitigation measures may include, amongst others:</p> <ul style="list-style-type: none"> proposed scheme designed to optimise a cut/fill balance with minimal materials requiring import application of the 'Principles of Designing Out Waste' to reduce the demand for resources prioritising the use of site-won resources in accordance with the relevant legislation, standards and specification for the proposed scheme an EMP and, where applicable, MLP, SWMP and MMP would be prepared and implemented <p>Through implementation of 'good practice' during construction and the local and regional availability of waste processing, treatment and recovery facilities, it is predicted that the Government's 70% target for the recovery or</p>

Potential impact	To be assessed in the ES	Reason
		recycling of CDW (either on or off the proposed scheme or both) would be adopted, where technically appropriate and economically feasible.
Is the project likely to use little or no recycled or secondary materials thereby requiring the majority of materials used on the project to comprise primary materials?	No (scoped out)	<p>Significant environmental effects from this potential impact are not predicted.</p> <p>The option selection stage design information indicates that approximately 35,600m³ of primary aggregates are anticipated to require import for use as sub-base (15,000m³) and in asphalt (20,600m³).</p> <p>Whilst 35,600m³ of the asphalt and sub-base requiring import constitute primary aggregates, around 92,625m³ of secondary/recycled general fill materials will be imported from various sources including other local development projects. This equates to 62% of the materials used being secondary or recycled in origin.</p> <p>Final material specifications would be confirmed as the design progresses and would be used to inform the forecasting and monitoring of the use of alternative aggregates as required by the EMP.</p> <p>The proposed scheme would be undertaken in consideration of best practice mitigation and England's Resources and Waste Strategy (2018) and designed to avoid and minimise the environmental impacts of natural resources. Throughout the design process a number of embedded mitigation features would be included with the potential to reduce consumption of natural resources. Essential mitigation measures may include, amongst others:</p> <ul style="list-style-type: none"> • proposed scheme designed to optimise a cut/fill balance to minimise the quantity of materials requiring import • application of the 'Principles of Designing Out Waste' to reduce the demand for resources • prioritising the use of secondary, recycled or site-won resources (including soils and stones from other development schemes in the locality) in accordance with the relevant legislation, standards and specification for the proposed scheme • implementing the principles of local and responsible sourcing of key resources • an EMP and, where applicable, MLP, SWMP and MMP would be prepared and implemented <p>Through achieving 'good practice' during construction and the availability of secondary and recycled aggregates or earthworks materials from other development schemes within the locality, it is predicted the regional guideline target of 27% relating to secondary and recycled aggregates use could be achieved where technically appropriate and economically feasible.</p>
Is the project likely to sterilise (substantially constrain or prevent existing and potential	No (scoped out)	<p>Significant environmental effects from this potential impact are not predicted.</p> <p>Available mapping shows peat is not present within the area of the proposed scheme, therefore, there will be no needless sterilisation. Notwithstanding this, the works would be undertaken in consideration of best practice mitigation. Therefore, if encountered any excavated any peat would be dealt with as a commodity for re-sale or beneficial re-use. This would avoid waste and make best use of a finite resource.</p>

Potential impact	To be assessed in the ES	Reason
future use of) peat resources?		
Is the project likely to sterilise (substantially constrain or prevent existing and potential future use of) mineral sites?	No (scoped out)	<p>Significant environmental effects from this potential impact are not predicted.</p> <p>Available mapping shows that whilst the proposed scheme falls within a MSA there are no existing or allocated mineral sites within the scheme extent, therefore, there will be no needless sterilisation. Notwithstanding this, the works would be undertaken in consideration of best practice mitigation.</p> <p>There are limited opportunities to excavate the safeguarded deposits before construction of the proposed scheme due to external constraints such as Combe Pool SSSI, the River Sowe, existing road infrastructure and their close proximity to the outskirts of Coventry City to the west. If opportunities arise, any excavated any minerals would be dealt with as a commodity for re-sale or beneficial re-use. This would avoid waste and make best use of a finite resource. Safeguarded minerals would therefore be re-used either immediately or via an intermediary site rather than disposed to landfill. This approach is in accordance with the WFD 2008 waste hierarchy and is considered to present an appropriate means of ensuring proven mineral resources are not needlessly sterilised by non-mineral development.</p> <p>Where deposits of safeguarded minerals are present outside of the area of the DCO, the proposed scheme is not considered likely to further constrain future extraction of deposits.</p>
Would the project generate large quantities of waste relative to regional landfill capacity?	No (scoped out)	<p>Significant environmental effects from this potential impact are not predicted.</p> <p>The option selection stage design information indicates that of the total of 126,500m³ generated construction waste (including soils and stones and CDW) approximately 85,375m³ (67%) would be re-used directly on the proposed scheme during construction where suitable.</p>
Would the project have an effect on the ability of waste infrastructure within the region to continue to accommodate waste from other sources?	No (scoped out)	<p>The option selection stage design information indicates the following generated wastes will require removal from the proposed scheme. A waste assessment to establish the likely classification of these arisings (inert, non-hazardous or hazardous) will not be available until completion of the proposed ground investigation. In the interim a worst-case assumption has been made that 10% of these wastes might be classified as hazardous.</p> <ul style="list-style-type: none"> • 6,000m³ topsoil: (5,400m³ non-hazardous waste, 600m³ hazardous waste) • 20,125m³ sub-soil (18,112m³ non-hazardous waste, 2,013m³ hazardous waste) • 15,000m³ asphalt (13,500m³ non-hazardous waste, 1,500m³ hazardous waste) <p>Such construction waste requiring removal (41,125m³) would be taken to a local development project or recycling/re-use facility and therefore be re-used either immediately or via an intermediary site rather than being disposed to landfill.</p> <p>Wastes also arise from the use of key materials and their supply for construction. For example, waste generated through surplus, out of specification or damaged construction materials. Approximate wastage rates at 'good</p>

Potential impact	To be assessed in the ES	Reason
		<p>practice levels' ranging from 2% to 5% of total materials used can be adopted to estimate this quantity. This is considered to be a negligible quantity but the proposed scheme design and purchasing and management procedures will be employed to reduce this so far as technically and commercially feasible.</p> <p>The proposed scheme would be undertaken in consideration of best practice mitigation and England's Resources and Waste Strategy (2018) and designed to avoid and minimise the environmental impacts of waste. Throughout the design process, a number of embedded mitigation features would be included with the potential to reduce waste generation. Essential mitigation measures may include, amongst others:</p> <ul style="list-style-type: none"> Proposed scheme design optimised to maximise a cut-fill balance with minimal materials requiring disposal applying the principles of the waste hierarchy to the management of waste. the 'Principles of Designing Out Waste' will be implemented where CDW and excavation arisings generated by the proposed scheme cannot be re-used on the proposed scheme opportunities will be sought to re-use them on other construction projects. Where this is not possible they will be diverted from landfill to another off-site development or sent to an appropriately licenced recovery, treatment and recycling facility. This waste would therefore be re-used either immediately or via an intermediary site rather than being disposed to landfill. compliance with all relevant waste legislation relating to waste handling, storage, transport and disposal. an EMP and, where applicable MLP, SWMP and MMP will be prepared and implemented <p>The proposed scheme is unlikely to generate large quantities of waste relative to regional landfill capacities or affect the ability of regional waste infrastructure to accommodate waste from other sources:</p> <ul style="list-style-type: none"> The option selection stage design information and assumptions on re-use suitability indicates approximately 37,012m³ of unsuitable or surplus arisings unsuitable for use on site will be generated during construction. The significance threshold for quantities of waste requiring disposal is >1% of available local landfill capacity. Warwickshire sub-region's remaining inert/non-hazardous landfill capacity is approximately 8,000,000m³ (1% significance threshold of 800,000m³) and the wider West Midlands region's capacity is approximately 33,770,000m³ (1% significance threshold of 337,700m³). The anticipated quantity of non-hazardous/inert wastes requiring disposal is less than either threshold value <ul style="list-style-type: none"> significant quantities of SNRHW or hazardous waste are unlikely to be encountered during construction (approximately 4,113m³ assuming 10% of all wastes generated are hazardous). The significance threshold for the quantities of waste requiring disposal is >1% of available local landfill capacity. The closest hazardous landfill in the adjacent East Midlands region and has a capacity of approximately 800,000m³ (1% significance threshold of 80,000m³). The anticipated quantity of hazardous wastes requiring disposal is less than this threshold value. Despite this, if encountered it

Potential impact	To be assessed in the ES	Reason
		<p>is likely be processed, treated or recovered within the region at a non-landfill facility licenced to accept these wastes and are considered unlikely to constitute a significant quantity</p> <ul style="list-style-type: none"> • through good construction practice and the local and regional availability of waste processing, treatment and recovery facilities the recovery and recycling of generated waste (either on or off site) could be achieved where technically appropriate and economically feasible as opposed to landfill disposal • waste arisings requiring disposal to landfill would be expected to decline in the future in line with waste management targets and a drive to a more circular economy

11.7. Assessment methodology

- 11.7.1. As described in section 11.6 of this chapter significant effects are not predicted. Material assets and waste has been scoped out from further assessment for both construction and operation.

11.8. Assessment assumptions and limitations

- 11.8.1. The baseline information is based on a desk study of currently available information at the time of writing. No applicable ground investigation data was available for review at the time of production of this chapter. Reported baseline conditions in this report and by third parties have been assumed to be accurate, however, owing to the dynamic nature of the environment, conditions may change during the construction and operational phases.
- 11.8.2. The quantity of material resources and waste predicted for the proposed scheme by the Principal Contractor and used in this assessment are based on the option selection stage estimates. These may be subject to change during the preliminary design stage and at more detailed design stages and have been estimated, wherever possible, on a worse-case scenario basis. Any further design changes are expected to result in the same outcome as this scoping assessment. As the design progresses it is likely that there will be a betterment in the worst-case scenario presented here based upon the options selection stage design. Mitigation identified in this scoping assessment will be included in the EMP as standard practice as described in section 11.5 of this chapter.
- 11.8.3. It is assumed worst case, for the purpose of this assessment, that prior to mitigation, CDW and excavation arisings, which are surplus to requirements or unsuitable for use in construction of the proposed scheme would require disposal to landfill. However, it is assumed through the design, mitigation and enhancement measures detailed in section 11.5 (and secured in the EMP) that the proposed scheme aims to prioritise waste prevention, followed by preparing for re-use, recycling and recovery and lastly disposal to landfill in accordance with the EU WFD 2008 'waste hierarchy'.
- 11.8.4. This assessment does not consider the environmental impacts associated with the extraction of raw materials and the manufacture of products. These impacts are subject to the applicable environmental assessment, permitting and planning approval requirements for the relevant facilities. The embodied carbon in these processes has been assessed as part of the consideration of the proposed scheme's carbon footprint, see Chapter 15 Climate. In addition, it does not consider the permanent reduction in capacity of waste processing, treatment and recovery facilities.

- 11.8.5. There are limitations associated with the use of landfill capacity data provided by the Environment Agency as data for sites with a commercial confidentiality in place are not provided.

12. Noise and vibration

12.1. Introduction

- 12.1.1. This chapter has been prepared in accordance with the scoping process set out in DMRB LA 111 Noise and vibration Revision 2 (Highways England, 2020f) (hereafter referred to as DMRB LA 111). DMRB LA 111 describes a methodology for assessing and reporting the effects of highway noise and vibration from construction, operation and maintenance projects within the UK.
- 12.1.2. Based on the existing available information, the construction and operational phases of the proposed scheme have the potential to adversely affect noise and vibration at sensitive receptors in the area. Therefore, further assessment of construction noise, construction vibration and operational noise are proposed, the outcome of these assessments will be presented within the ES.

Legislation, policy and guidance

Guidance and best practice

- 12.1.3. The following legislation, standards and best practice guidelines are considered to be relevant to the proposed scheme:
- Environmental Noise (England) Regulations 2006 (as amended 2008, 2009, 2010)
 - The National Planning Policy Framework 2021
 - The Noise Policy Statement for England 2010
 - The National Policy Statement for National Networks 2014
 - The Land Compensation Act 1973 Part 1
 - The Noise Insulation Regulations 1975 (amended 1988)
 - Sections 60 and 61 of The Control of Pollution Act 1974
 - The Environmental Protection Act 1990
 - Planning Practice Guidance 2019
 - British Standard (BS) 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites – Part 1: Noise'
 - BS5228-2:2009 'Code of construction practice for noise and vibration control on construction and open sites - Part 2: Vibration'
 - BS 7385:1993 'Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground-borne vibration'
 - Design Manual for Roads and Bridges (DMRB) LA 111 Noise and vibration (formerly HD 231/11, IAN 185/15)

- Calculation of Road Traffic Noise (CRTN), Department of Transport (Welsh Office) 1988
- Transport Research Laboratory (TRL), Method for Converting the UK Road Traffic Noise Index LA10,18h to the EU Noise Indices for Road Noise Mapping
- Guidelines for Noise Impact Assessment, Institute of Environmental Management & Assessment (IEMA) 2014
- The Roads Investment Strategy 2 (RIS2): 2020 to 2025 (Department for transport, 2020)
- The Highways England Delivery Plan (2020-2025) (Highways England, 2020k)
- Coventry City Council Local Plan 2011-2031 (Coventry City Council, 2017)
- Rugby Borough Council Local Plan 2011-2031 (Rugby Borough Council, 2019)

12.1.4. The above list is not exhaustive and further guidance will be referred to if necessary.

12.2. Study area

12.2.1. The study area for assessing and reporting the effects of noise and vibration according to DMRB LA 111 is outlined in Table 12-1 below. The relevant sections are identified after the individual section text.

Table 12-1: Indicative study area for each phase and activity

Activity/Phase	Study Area
Construction noise	300m from the closest construction activity. (LA 111, Section 3.5, Note 1)
Construction traffic noise	50m width from the kerb line of public roads with the potential for an increase in baseline noise level (BNL) of 1dB(A) or more as a result of the addition of construction traffic to existing traffic levels. (LA 111, Section 3.8)
Diversion traffic noise	25m width from the kerb line of the diversion route. (LA 111, Section 3.7)
Construction vibration	100m from the closest construction activity with the potential to generate vibration. (LA 111, Section 3.29, Note 1)
Operational noise	600m from new road links or road links physically changed or bypassed by the proposed scheme 50m from other road links with potential to experience a short term BNL change of more than 1dB(A) as a result of the proposed scheme. (LA 111, Section 3.44, Note 1)

12.2.2. It is noted that each study area above should include:

- all sensitive receptors that are potentially affected by noise and / or vibration

- areas where there is reasonable stakeholder expectation that a noise and / or vibration assessment would be undertaken

12.2.3. For the operational noise assessment, areas within 50m of other road links with potential to experience a short-term basic noise level change of more than 1dB(A) as a result of the proposed scheme should also be included. Consequently, the spatial extents of the assessment may extend beyond the physical works associated with the proposed scheme.

12.3. Baseline conditions

12.3.1. No baseline noise measurement data was obtained for the study area during the options selection stage however baseline noise monitoring will be undertaken as part of the assessment work for preliminary design stage.

12.3.2. The proposed noise survey is proposed to be undertaken in the following locations:

- Land east of Gainford Rise and north of Valencia Road. This is near to the existing A46 carriageway. The proposal will remove the roundabout to the north allowing the traffic on this part of the A46 to travel at 50mph
- Hungerley Hall Farm. This is currently the nearest noise sensitive receptor to the proposed development. This is in part due to an extension of the B4082 which will run between the A46 and Hungerley Hall Farm
- Land east of Birdport Close and Abbotsbury Close. These are the nearest noise sensitive receptors to the proposed roundabouts. The receptors will therefore potentially be subject to noise during the construction stage and increases in traffic noise during operation
- Coombe Pool SSSI. This area is designated for its ornithology. Background noise measurements are required so that the potential impact on wildlife can be assessed

12.3.3. The baseline noise environment is likely to be dominated by road traffic, with some localised commercial sources. In addition to the A46, there are a number of other potentially significant sources of road traffic noise, including:

- B4082 and Clifford Bridge Road
- a number of minor roads, in particular around the Star Industrial Park and University Hospital Coventry and Warwickshire, which will contribute to ambient noise levels
- other noise sources include noise associated with general urban and rural activities

12.3.4. The area around A46 Walsgrave Junction is a mix of residential, community and commercial use as well as areas of undeveloped semi-natural environment. This includes:

- residential communities to the north (1km to the north), west (300m to the west) and south-west (100m to the south-west) of the existing junction
- schools such as Clifford Bridge Academy (350m to the west) and Pearl Hyde Primary School (600m to the north), and Wyken Community Centre (800m to the west)
- University Hospital Coventry and Warwickshire (1km to the north)
- Coombe Pool SSSI, located directly east of the junction, is designated for its ornithology. This SSSI is located within Coombe Abbey, which is a Grade II* Park and Garden
- public right of way which crosses the A46 to the north of the proposed scheme extents
- three Grade II listed buildings at Hungerley Hall Farm within the proposed scheme extent

12.3.5. There are no NIAs located within the immediate vicinity of the proposed scheme extents. However, there are a number of NIAs located on surrounding roads. These include:

- one on the A46 south of the Binley Junction, >1.5km from the Walsgrave Junction (ID 14307)
- three NIAs situated on the A4600 Antsy Road (IDs 324 (2.4km north, 11796 (1.5km west) and 14385 (1.6km north-west))
- two on the A428 Brandon Road (ID 330, 1km south-west)) and Binley Road (ID 11800, 1.25km south-west)

12.3.6. The assessment of ecological noise sensitive receptors is outside of the scope of Chapter 12 Noise and vibration, further detail regarding the ecological assessment can be found in the associated Chapter 9 biodiversity.

12.3.7. No Environmental Noise Directive (END) quiet areas or potential END quiet areas have been identified in the study area for any of the three options. However, any areas valued for their tranquillity will be identified through consultation responses and discussions with Coventry City Council and Rugby Borough Council.

Consultation

12.3.8. Consultation with Rugby District Council and Coventry City Council will be progressed during the preliminary design stage environmental assessment.

Discussion will take place with the Environmental Health Officers on potential impacts and mitigation.

12.4. Potential impacts

Construction

12.4.1. DMRB LA 111 provides scoping assessment questions to gain an understanding of the need to undertake a further noise assessment:

- does construction noise generated by the project have the potential to adversely affect any receptors?
- are there any receptors where there would be a reasonable stakeholder expectation that an assessment be undertaken?

12.4.2. During construction, temporary noise and vibration impacts associated with the proposed scheme have the potential to directly affect the sensitive receptors. The worst affected receptors are expected to be those in close proximity to the proposed scheme extents, although effects could extend along elements of the existing road network, subject to diversions, haul routes and construction-related traffic.

12.4.3. The potential for temporary construction vibration impacts is dependent on the need for construction works which are a potentially significant source of vibration, such as piling associated with bridge construction or compaction of earthworks and pavement layers using vibratory rollers. Potential construction vibration impacts may include:

- increased vibration levels at properties close to Hungerley Hall Farm due to compaction of earthworks and pavement layers
- increased vibration levels at properties close to Hungerley Hall Farm due to piling works

12.4.4. Construction traffic can have a temporary impact on sensitive receptors located along existing roads used by these vehicles. The potential for such impacts is dependent on the volume and route of construction traffic. Currently construction traffic flows are not available, therefore as a precautionary approach construction traffic noise impacts are scoped into the assessment for the potential changes in traffic flows. This will be reviewed as more detailed information becomes available.

Operation

12.4.5. The proposed scheme has the potential to result in adverse operational noise impacts at surrounding noise sensitive receptors. Factors which have the potential to affect road traffic noise include:

- overall traffic volume
- proportion of heavy vehicles
- traffic speed (i.e., changes in free-flow conditions and waiting times at junctions)
- road alignment (vertical and horizontal alignment)
- the type of carriageway surfacing material
- change to the noise character of the existing area

- 12.4.6. Impacts due to changes in noise may affect both human and ecological receptors. The focus of the noise and vibration assessment is on the effect the potential change in noise levels would have on human receptors. Although the proposed survey does include the ecological receptors, any assessment of effect is set out in Chapter 9 Biodiversity.
- 12.4.7. DMRB LA 111 provides scoping assessment questions to gain an understanding of the need to undertake a further noise assessment. The scoping assessment questions are outlined below:
- is the project likely to cause a minor magnitude of impact in the short or long term (i.e., a change in the basic noise level of 1dB $L_{A10,18hr}$ in the short term or 3dB $L_{A10,18hr}$ in the long term)?
 - does the project involve the construction of new road links within 600m of noise sensitive receptors?
 - would there be a reasonable stakeholder expectation that an assessment be undertaken?
- 12.4.8. The proposed scheme will adjust the alignment of the main road, remove the existing roundabout and add a slip road, bringing the A46 closer to the existing noise sensitive properties at Hungerley Hall Farm. This is likely to result in a temporary noise increase during construction and a permanent noise increase during operation. The magnitude of the impact will be determined within the ES once both the design and construction programme have been finalised. The addition of the new roundabouts to allow for the slip roads will bring the road closer to the residential properties west of the proposed scheme. Finally, the removal of the existing roundabout, by the residential dwellings to the south-west, will likely allow the road to travel at a higher average speed therefore possibly creating a permanent noise increase once in operation.
- 12.4.9. It is anticipated that the proposed scheme will lead to changes in both traffic flows and speeds. However, in the absence of appropriate traffic data at the time of this scoping exercise, the magnitude of impact cannot be determined. Therefore, further assessment of operational noise is proposed and will be undertaken during the preliminary design stage environmental assessment.

- 12.4.10. It is noted that mitigation must be considered to reduce the noise levels at the six NIAs in line with the Environmental Noise Directive (Directive 2002 / 49 / EC) as amended in The Environmental Noise (England) Regulations 2018.
- 12.4.11. With the implementation of appropriate mitigation, potential adverse effects will be minimised. Nonetheless, it is considered that there is the potential for significant residual adverse effects to noise sensitive receptors which warrants further assessment.
- 12.4.12. DMRB LA 111 section 1.4 notes that “*operational vibration is scoped out of the assessment methodology as a maintained road surface will be free of irregularities as part of project design and under general maintenance, so operational vibration will not have the potential to lead to significant adverse effects*”. Operational vibration is therefore scoped out from further assessment.

12.5. Design, mitigation and enhancement measures

Construction

- 12.5.1. Mitigation measures to reduce and manage noise and vibration during construction will be included where required and may include measures such as:
- implementation of best practicable means (BPM) with reference to the methods for the control noise and vibration arising from construction activity described within BS 5228
 - control of the timing of works
 - restrictions on the noisiest of activities (hours of operation or duration of operation in a working day)
 - shielding noisy items of plant
 - use of acoustic screening or enclosures around noisy items of plant and/or machinery
 - careful siting of haul routes
 - early construction of mitigation or screening where required for operational purposes
 - careful site layout to minimise noise and vibration impacts
 - noise and vibration monitoring (where significant effects are anticipated)
 - noise insulation or temporary rehousing
 - training of onsite staff with regard to onsite noise control measures, both for operation of equipment and for other site noise
- 12.5.2. During the construction phase appropriate mechanisms to communicate with local residents would be set up to highlight potential periods of disruption (such

as web-based, newsletters, newspapers, radio announcements etc.), and an appropriate communication strategy will be developed.

12.5.3. Monitoring should take place where significant environmental effects from noise or vibration during construction are anticipated. Monitoring should include one or more of the following:

- verifying that mitigation measures are in place for activities where significant effects are likely to occur in their absence
- measurement of noise and / or vibration levels
- checking that noise and vibration management procedures and practices are sufficient to ensure that adverse effects are no worse than set out in the assessment report

12.5.4. Noise and vibration construction mitigation measures will be included within the first iteration EMP in accordance with DMRB LA 120. With strict adherence to mitigation, construction noise and vibration would be mitigated as far as practicable to reduce likelihood of significant direct effects. However, at this stage with insufficient information on construction activities further assessment is recommended to confirm this and to inform the mitigation strategy. This will be undertaken based upon the requirements of BS 5228 Parts 1 and 2.

Operation

12.5.5. Operational noise mitigation measures will be included in the proposed scheme design where required and may include a combination of measures such as:

- acoustic barriers
- acoustic bund
- low noise road surfacing

12.5.6. It is suggested in the options selection stage environmental assessment report that a noise barrier along the top of the cutting alongside the northbound carriageway of the B4082 link road to minimise traffic noise levels on the front of Hungerley Hall Farmhouse should be considered. It is noted, however, that such a barrier would be in close proximity to the property and, as a result, may lead to non-noise adverse impacts (such as heritage and landscape). In addition, such a barrier is unlikely to be considered a sustainable noise mitigation measure, when considering the cost of both its installation and ongoing maintenance with the noise reduction benefits, which will be limited to a single property.

12.5.7. As part of the preliminary design stage assessment, the feasibility of the mitigation measures set out in paragraph 12.6.6 and at any other locations identified will be considered and proposed as appropriate.

- 12.5.8. The incorporation of these mitigation measures outside of identified need and the noise reduction that would be achieved, could also be considered an enhancement to the local environment. The feasibility of such enhancements will be investigated during the assessment process.

12.6. Description of likely significant effects

Construction

- 12.6.1. The options selection stage environmental assessment identified potential significant effects due to night-time construction activity affecting the nearest receptors. This was based on magnitude of impact only and was concluded as 'significant' based on the likely proximity and nature of the works. However, it was noted that the impacts are dependent on the working methods of the appointed contractor, which could affect the magnitude and duration of impact, and therefore this should be considered further during the preliminary design stage environmental assessment.
- 12.6.2. The greatest risk of potential significant effects due to construction noise and vibration would occur at the closest receptor locations during extended periods of any proposed compaction or piling works (due to both noise and vibration), or during night works when sensitivity is greater as a result of lower baseline noise levels. Noise from extended use of diversion routes may also result in potential significant adverse effects.
- 12.6.3. With strict adherence to mitigation measures construction noise and vibration impacts are expected to be managed to be within appropriate levels and are therefore not anticipated to result in significant adverse effects. However, at this stage there is insufficient information on potential construction methods, activities or programme, to determine whether significant effects would occur due to construction.
- 12.6.4. Further detailed assessment and consideration of mitigation measures will be undertaken for the preliminary design stage environmental assessment to determine potential significant effects from noise and vibration during construction.

Operation

- 12.6.5. The options selection stage assessment did identify significant effects due to operational road traffic noise as a result of the proposed scheme.
- 12.6.6. The magnitude of operational traffic noise impacts at a receptor is dependent on a range of factors, including the traffic flow, composition, speed, road surface, ground topography, the presence of intervening buildings and structures, and the distance to the road.

- 12.6.7. The operation of the development has the potential to result in both beneficial and adverse permanent traffic noise impacts. The development would alleviate traffic flow on the existing B4082 close to some receptors; however, the development would also provide a new noise source close to other receptors, as described below.
- 12.6.8. The development means that the B4082 traffic moving away from properties located to the south-west of the junction. However, this would also result in traffic noise moving closer to properties in the vicinity of Dorchester Way. This would also result in traffic noise moving closer to the rear façade of Hungerley Hall Farmhouse.
- 12.6.9. DMRB LA 111 scopes out operational vibration impacts as a maintained road surface will be free of irregularities as part of project design and general maintenance. As such, operational vibration does not have the potential to lead to significant adverse effects and is scoped out of this assessment.
- 12.6.10. Potential adverse effects due to changes in noise level are expected to be mitigated, where required, with the implementation of appropriate mitigation such as the provision of noise barriers and low noise road surfacing. Nonetheless, it is considered that there is the potential for significant residual adverse effects to noise sensitive receptors which warrants further assessment.

Scope of the environmental assessment

- 12.6.11. The effects that are scoped in for further consideration within the preliminary design stage environmental assessment are:
- construction phase impacts due to noise from site activity, and changes in road traffic noise due to the additional vehicles associated with construction and due to temporary diversion routes
 - construction phase impacts due to vibration from site activity
 - operational phase impacts due to noise from road traffic
- 12.6.12. Operational phase vibration impacts are scoped out from further assessment in accordance with DMRB LA 111 section 1.4 (see paragraph 12.4.12).

12.7. Assessment methodology

- 12.7.1. The proposed scheme has the potential to directly alter the noise and vibration baseline for several sensitive receptors both temporarily (during construction) and permanently (during operation). Further assessment is proposed in order to establish significant effects and to inform the mitigation strategy.

Significance of effects

- 12.7.2. The assessment of construction noise and vibration and operational noise impacts will be undertaken using guidance from both British Standard 5228 (Parts 1 and 2) and the DMRB LA 111 methodology to identify potential significant effects.
- 12.7.3. The NPSNN requires that ‘due regard’ must be given to relevant sections of the NPPF, the NPSE and the associated National Planning Policy Guidance on noise. In order to comply with these policies, it is necessary to determine the Lowest Observed Adverse Effect Level (LOAEL) which is *“the level above which adverse effects on health and quality of life can be detected”*, and the Significant Observed Adverse Effect Level (SOAEL) which is the level *“above which significant adverse effects on health and quality of life occur”* for noise effects. The mitigation strategy will depend upon the magnitude of any impacts at sensitive receptors between LOAEL and SOAEL, in addition to exceedances of SOAEL.
- 12.7.4. In order to comply with these policies, it is necessary to determine the Lowest Observed Adverse Effect Level (LOAEL) which is *“the level above which adverse effects on health and quality of life can be detected”*, and the Significant Observed Adverse Effect Level (SOAEL) which is the level *“above which significant adverse effects on health and quality of life occur”* for noise effects. The mitigation strategy will depend upon the magnitude of any impacts at sensitive receptors between LOAEL and SOAEL, in addition to exceedances of SOAEL.
- 12.7.5. The environmental assessment of significant effects on human health and determination of mitigation measures will be completed in accordance with the requirements of DMRB LA 111. DMRB LA 111 Annex E/1 summarises the national policy requirements of NPSE and NPPF and NPSNN for environmental assessment.

Construction noise

- 12.7.6. For construction noise, LOAEL should be determined with reference to baseline noise levels and SOAEL should be set at the threshold level determined in accordance with BS 5228-1:2009+A1:2014.
- 12.7.7. The construction assessment will be carried out in accordance with the methodology in BS 5228: 2009+A1: 2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites.
- 12.7.8. BS 5228 contains a number of example methodologies for identifying significant construction noise effects based on fixed thresholds or noise level changes. For

the purposes of this assessment the 'ABC' method will be adopted (Table 12-2). This will be clarified in consultation with the environmental health departments of the relevant local authorities in the area.

Table 12-2: Example threshold of potential significant effect at dwellings

Assessment category and threshold value period	Threshold value, in decibels (dB) ($L_{Aeq,T}$)		
	Category A	Category B	Category C
Night-time (23:00 – 07:00)	45	50	55
Evenings and weekends (19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays)	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75

12.7.9. Category A threshold values are to be used when ambient noise levels (when round to the nearest for 5dB) are less than these values. The same approach is taken for Category B and C.

12.7.10. Table 12-3 below reproduces Table 3.12 from DMRB LA 111 and sets out the LOAEL and SOAEL threshold noise levels.

Table 12-3: Construction noise LOAELs and SOAELs

Time period	LOAEL	SOAEL
Day (07:00 – 19:00 weekday and 07:00 – 13:00 Saturdays)	Baseline noise levels ($L_{Aeq,T}$)	Threshold level determined as per BS 5228-1 Section E3.2 and Table E.1 (Replicated as Table 11-2)
Night (23:00 – 07:00)	Baseline noise levels ($L_{Aeq,T}$)	Threshold level determined as per BS 5228-1 Section E3.2 and Table E.1 (Replicated as Table 11-2)
Evening and weekends (time periods not covered above)	Baseline noise levels ($L_{Aeq,T}$)	Threshold level determined as per BS 5228-1 Section E3.2 and Table E.1 (Replicated as Table 11-2)

12.7.11. Table 12-4 and Table 12-5 set out the relevant magnitudes of impact for construction noise and construction traffic noise levels respectively.

Table 12-4: Magnitude of impact, construction noise levels

Magnitude of impact	Construction noise level
Major	Above or equal to SOAEL +5dB
Moderate	Above or equal to SOAEL and below SOAEL +5
Minor	Above or equal to LOAEL and below SOAEL
Negligible	Below LOAEL

Table 12-5: Magnitude of impact, construction traffic noise levels

Magnitude of impact	Increase in BNL of closest public road used for construction traffic (dB)
Major	Greater than or equal to 5.0
Moderate	Greater than or equal to 3.0 and less than 5.0
Minor	Greater than or equal to 1.0 and less than 3.0
Negligible	Less than 1.0

12.7.12. Construction noise and construction traffic noise is determined to be a potential significant effect where a moderate or major magnitude of impact will occur for a duration exceeding:

- 10 or more days or nights in any 15 consecutive days or nights
- a total number of days exceeding 40 in any six consecutive months as per DMRB LA 111 section 3.19

Construction vibration

12.7.13. For construction vibration, LOAEL is given as 0.3mm/s peak particle velocity (PPV) and for SOAEL, 1.0mm/s PPV.

12.7.14. According to DMRB LA 111, construction vibration shall constitute a likely significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:

- 10 or more days or nights in any 15 consecutive days or nights
- a total number of days exceeding 40 in any consecutive months

12.7.15. Table 12-6 sets out the magnitude of impact for construction vibration.

Table 12-6: Magnitude of impact, construction vibration levels

Magnitude of impact	Construction Vibration Level
Major	Above or equal to 10mm/s PPV
Moderate	Above or equal to SOAEL and below 10mm/s
Minor	Above or equal to LOAEL and below SOAEL
Negligible	Below LOAEL

12.7.16. BS 7385 provides guidance on the levels of vibration that would be necessary to cause structural damage to different types of buildings. The standard indicates that continuous PPVs of more than about 7 mm/s would be required to cause structural damage to residential buildings. Potentially vulnerable buildings and appropriate mitigation will be identified. For residential buildings, limits will be placed based upon levels at which there is a likelihood of complaint, these being considerably lower than those at which building damage may occur.

Operational noise

- 12.7.17. The methodology within DMRB LA 111 will be adopted for the quantitative assessment of operational noise effects at sensitive receptors.
- 12.7.18. The level of road traffic noise from the road network will be predicted using the CRTN methodology (Department of Transport, 1988) from forecast traffic data provided in terms of 18-hour Annual Average Weekday Traffic (AAWT) flow between the hours of 06:00 to 24:00, along with speed pivoted vehicle speed and percentage of heavy goods vehicles. Calculations will determine road traffic noise levels using noise descriptors $L_{A10,18hr}$ and L_{night} . L_{night} values will be derived using Transport Research Laboratory (TRL) Method 3 in accordance with DMRB LA 111 Section A2.
- 12.7.19. Table 12-7 presents the operational noise LOAELs and SOAELs for all receptors in terms of absolute noise levels.

Table 12-7: Operational noise LOAELs and SOAELs

Time period	LOAEL	SOAEL
Day (06:00 – 24:00)	55dB $L_{A10,18hr}$ façade	68dB $L_{A10,18hr}$ façade
Night (23:00 – 07:00)	40dB $L_{night,outside}$ (free-field)	55dB $L_{night,outside}$ (free-field)

- 12.7.20. Noise change due to the proposed scheme will be determined at noise sensitive receptors within the study area for the following scenarios:
- short-term: do minimum opening year scenario (DMOY) compared against the do something opening year scenario (DSOY)
 - long-term: DMOY compared against the do something future year scenario (DSFY)
 - non-project noise change: do minimum future year (DMFY) scenario compared against the DMOY
- 12.7.21. In the above scenarios, 'do minimum' means traffic growth with committed development only. 'Do something' means committed growth with the proposed scheme.
- 12.7.22. The opening year is defined as the year the proposed scheme is open to the public. Similarly, the future assessment year is defined as the opening year +15 years.
- 12.7.23. DMRB LA 111 classifies the magnitude of noise level change as no change, negligible, minor, moderate or major and applies different criteria in the short-term and long-term. These changes may be beneficial (noise decrease) or

adverse (noise increase). These magnitudes of change are defined in Table 12-8 below.

Table 12-8: Magnitude of change, short term and long term

Magnitude of change	Noise change (dB L _{A10,18hr} or L _{night})	
	Short term	Long term
Major	Greater than or equal to 5.0	Greater than or equal to 10.0
Moderate	3.0 to 4.9	5.0 to 9.9
Minor	1.0 to 2.9	3.0 to 4.9
Negligible	Less than 1.0	Less than 3.0

12.7.24. The initial assessment of potential significant effect on noise sensitive buildings should be determined using Table 12-9.

Table 12-9 Initial assessment of operational noise significance

Significance	Short term magnitude of change
Significant	Major
Significant	Moderate
Not significant	Minor
Not significant	Negligible

12.7.25. In all cases where the magnitude of noise level change in the short-term is found to be minor, moderate or major additional factors described in DMRB LA 111 Table 3.60 are considered to determine the final significance. These factors include:

- the magnitude of change with respect to minor and moderate boundaries
- the magnitude of impact in the long term and short-term
- consideration of absolute noise levels with respect to the LOAEL and SOAEL
- location of noise sensitive parts of the receptor
- acoustic context
- perception of change

Assessment summary

12.7.26. Table 12-10 summarises proposed LOAEL and SOAEL values. For operational noise, where values already exceed SOAEL criteria, small increases of 1dB will be regarded as significant whether they occur in the long-term or short-term.

Table 12-10 Summary of potential noise and vibration effects

Phase	Period	Adverse effect Level	Noise / vibration level
Construction noise	Day (07:00-19:00 weekday and 07:00-12:00 Saturdays)	LOAEL	BNL $L_{Aeq,T}$
		SOAEL	Threshold determined as per BS 5228-1:2009+A1:2014
	Night (23:00-07:00)	LOAEL	BNL $L_{Aeq,T}$
		SOAEL	Threshold determined as per BS 5228-1:2009+A1:2014
	Evening and weekends (time periods not covered above)	LOAEL	BNL $L_{Aeq,T}$
		SOAEL	Threshold determined as per BS 5228-1:2009+A1:2014
Construction vibration	All time periods	LOAEL	0.3mm/s peak particle velocity
		SOAEL	1.0mm/s peak particle velocity
Construction traffic	All time periods	LOAEL	Increase in BNL greater than or equal to 1.0 and less than 3.0
		SOAEL	Increase in BNL greater than or equal to 3.0 and less than 5.0
Operational noise (absolute noise levels)	Day (07:00-23:00)	LOAEL	55dB $L_{A10,18hr}$ facade
	Night (23:00-07:00)	LOAEL	40dB $L_{A10,18hr}$ (free-field)
	Day (07:00-23:00)	SOAEL	68dB $L_{A10,18hr}$ facade
	Night (23:00-07:00)	SOAEL	55dB $L_{A10,18hr}$ (free-field)
Operational noise (noise change)	All time periods	Potentially significant	Greater than or equal to a minor noise increase (1.0 to 2.9 dB $L_{A10,18hr}$ in the short term or 3.0 to 4.9 dB $L_{A10,18hr}$ in the long term)

12.8. Assessment assumptions and limitations

12.8.1. The scoping assessment has been undertaken in the absence of the following finalised information:

- construction plan of works
- construction traffic movements
- construction compound location(s)
- forecast traffic flows, speeds and percentage heavy goods data

- 12.8.2. Where appropriate, and where updated information is not available this scoping assessment utilises the findings set out within the noise and vibration chapter of the PCF stage 2 EAR.
- 12.8.3. As the design progresses and updated information becomes available, it will be incorporated into the assessment.

12.9. Conclusion

- 12.9.1. Further assessment is proposed for both the construction and operation phases of the proposed scheme.
- 12.9.2. During construction, the proposed scheme has the potential to directly alter the noise and vibration baseline for numerous sensitive receptors for a temporary period. Impacts are likely to be restricted to the vicinity of the proposed scheme, although could extend along elements of the existing road network. Mitigation will be key to minimising adverse impacts. Significant effects will be minimised with an appropriate EMP, mitigation and monitoring in place where required. Nonetheless, further assessment for construction effects is proposed in the form of a quantitative construction noise and vibration assessment. The findings of which will inform the mitigation strategy.
- 12.9.3. Once the information is available, further analysis of appropriate traffic data and the construction works are proposed to determine whether a further, more detailed assessment of the potential environmental effects of either operational or construction noise is required. Appropriate mitigation and enhancement based on the assessment(s) would ensure that direct adverse effects are decreased and increase potential opportunities.

13. Population and human health

13.1. Introduction

- 13.1.1. This chapter has been prepared in accordance with the scoping process set out in DMRB LA 112 Population and Human Health Revision 1 (Highways England, 2020g) (hereafter referred to as DMRB LA 112).
- 13.1.2. DMRB LA 112 describes a methodology for assessing and reporting the effects from highway construction, operation and maintenance on population and health.

Legislation, policy and guidance

- 13.1.3. The following legislation policy and guidance have been considered as part of the assessment:
- The Countryside and Rights of Way Act (2000) (CRoW Act). The CRoW Act regulates PRoW and open access land and ensures access to them.
 - The Infrastructure Planning (Environmental Impact Assessment) Regulations (2017) requires the assessment of population and human health as part of the ES.
 - National Planning Statement for National Networks ((NPS NN) 2014). The NPS NN sets out the need for and the Government's policies to deliver development of Nationally Significant Infrastructure Projects on the national road network in England and also sets out the primary basis for making decisions of development consent for nationally significant infrastructure projects in England. In delivering new schemes, the Government expects applicants to avoid and mitigate the environmental and social impacts and there is an expectation that impacts on accessibility for non-motorised users should be mitigated. With regard to the promotion of sustainable transport, the Government expects applicants to use reasonable endeavours to address the needs of pedestrians and cyclists in the design of new schemes. Furthermore, it expects applicants to identify opportunities to invest in infrastructure in locations where the national network severs communities and acts as a barrier to cycling and walking.
 - Planning ahead for the SRN – developing the third RIS (2025 – 2030). The RIS recognises that different road user groups will have different needs and that people do not interact with the SRN solely as road users. It has set the objective of responding to the priorities of communities and places, to improve quality of life and to recognise the needs of users making shorter distance journeys on the SRN. As such, National Highways has set a vision for developing high-quality routes physically separated from motorised traffic on the SRN, that would make the journeys of cyclists, pedestrians and equestrians safer.

- Highways England Delivery Plan (2020 – 2025). The Highways England Delivery Plan sets out the long-term investment plans for the modernisation and renewal of the SRN over the five-year period 2020 to 2025. The Delivery Plan recognises the need for the network to be accessible to everyone, including the walkers, cyclists and horse-riders. As such, it commits to investment for targeted improvements at problem junctions where there are safety issues and at locations where walkers, cyclists and horse-riders need to use the SRN. By working collaboratively with local highway authorities and other providers, it aims to deliver and maintain high-quality, seamless connections between paths and routes. This could include connecting the major road network and local infrastructure, constructing dedicated cycle routes, upgrading crossings or building new ones.
- Coventry City Council Local Plan (2011 – 2031). The Local Plan for the City of Coventry sets out its blueprint and vision to help re-establish itself as one of the country's top 10 cities, enhance its position at the centre of the Coventry and Warwickshire Subregion and contribute towards the West Midlands engine for growth. This includes policies which seek to integrate any new development into existing walking and cycling routes whilst safeguarding the existing routes. The Local Plan also sets out their policy to support Health and Wellbeing within Coventry. The policy is supported by:
 - Coventry Joint Strategic Needs Assessment (2012)
 - Coventry Joint Health and Wellbeing Strategy (2013)
 - Indices of Multiple Deprivation (2012)
- Coventry is one of seven UK cities selected to become a 'Marmot City' participating in the UK Marmot Network. Coventry experiences high levels of inequality, therefore the recommendations of the Marmot Network have been adopted.
- The Local Plan details that Health Impact Assessments (HIA) are a tool to be used in planning applications where there are expected to be significant impacts on health and wellbeing. It details that this can be undertaken as part of an EIA. The Policy HW: Health Impact Assessments (HIA) states that the HIA should be undertaken in accordance with the Council's Supplementary Planning Document (SPD).
- Coventry Connected (Transport and Accessibility) SPD. The SPD provides more detailed and prescriptive guidance on the accessibility policies outlined in Coventry City Council's Local Plan. It provides developers with clear guidance on the application of the Local Plan which should result in the high quality applications which will deliver developments that support a high-quality transport network. Overall, the objective of this SPD is to ensure that forecast growth in Coventry can be achieved through a series of developments that support and enhance the city's transport network. This SPD also identifies requirements for cross-boundary planning and delivery with neighbouring local authorities to Coventry City Council.
- Coventry City Council Transport Strategy. The Strategy has been drawn up to help the city's residents, businesses and visitors travel safely, easily, and

sustainably over the coming years ensuring to support a thriving economy and a healthy population. The strategy sets out the Council's vision to ensure that all parts of the transport system are accessible to everyone with all forms of transport are covered, including walking and cycling. The main objectives with regard to walking and cycling are to further reduce the city's reliance on car travel, by significantly improving conditions to encourage more people to walk and cycle, as well as introducing new forms of micro-mobility. This will be done in an inclusive way, ensuring that areas are designed to be accessible to everyone. A separate, more detailed Local Cycling and Walking Infrastructure Plan (LCWIP) is currently being developed and will provide more details on how these objectives will be achieved. Local to the A46, work is already underway on the next generation of cycleways, which will initially connect the city centre to Coundon and to Binley but the aim is to introduce dedicated cycleways across the city, to make cycling safer and to ensure that cyclists do not have to share road space with car users on busy routes. Other objectives include pedestrianisation of areas of the City Centre; Liveable neighbourhoods and school streets; and Cycle hire and other forms of micro-mobility. Transport for West Midlands Local Transport Plan 4. The LTP4 covers the period up to 2026 and describes the West Midlands strategy and policy framework for transport. There are nine key objectives of the LTP4 which are:

- To support growth in wealth creation (GVA) and employment (jobs) in the West Midlands Metropolitan Area, as a prized national economic asset
- To support improved levels of economic well-being for people with low incomes in the West Midlands Metropolitan Area to help make it a successful, inclusive, European city region economy
- To help meet future housing needs, by supporting new housing development in locations deemed appropriate by local planning authorities, following their consideration of sustainable development criteria
- To significantly improve the quality of the local environment in the West Midlands Metropolitan Area
- To help tackle climate change by ensuring large decreases in greenhouse gas emissions from the West Midlands Metropolitan Area
- To significantly increase the amount of active travel in the West Midlands Metropolitan Area
- To significantly reduce the number and severity of road traffic casualties in the West Midlands Metropolitan Area
- To assist with the reduction of health inequalities in the West Midlands Metropolitan Area
- To improve the well-being of socially excluded people.
- Rugby Borough Council Local Plan 2011 – 2031. The Local Plan for Rugby Borough Council sets policies and proposals to support the development of the Borough through to 2031. It sets out the long-term spatial vision for how the town and villages in the Borough are planned to develop and change

and how this vision will be delivered through a strategy for promoting, distributing, and delivering sustainable development. The Plan includes policies which seek to ensure that any new developments are sustainable and integrate with existing networks and provides good connectivity within the development and to the surrounding areas including any existing walking and cycling routes. The Local Plan also sets out their policy to support healthy, safe and inclusive communities. Their policies are:

- HS1: Healthy, safe and inclusive communities
- HS2: Health Impact Assessments
- HS3: Protection and provision of local shops, community facilities and services
- HS4: Open space, sports facilities and recreation
- HS5: Traffic generation and air quality, noise and vibration
- Warwickshire Local Transport Plan 3 (2011 – 2026). The LTP3 covers the period up to 2026 and sets out Warwickshire's six main objectives for transport. These are as follows:
 1. To promote greater equality of opportunity for all citizens in order to promote a fairer, more inclusive society.
 2. To seek reliable and efficient transport networks which will help promote full employment and a strong, sustainable local and sub-regional economy.
 3. To reduce the impact of transport on people and the [built and natural] environment and improve the journey experience of transport users.
 4. To improve the safety, security, and health of people by reducing the risk of death, injury or illness arising from transport, and by promoting travel modes that are beneficial to health.
 5. To encourage integration of transport, both in terms of policy planning and the physical interchange of modes.
 6. To reduce transport's emissions of carbon dioxide and other greenhouse gasses; and address the need to adapt to climate change.
- Warwickshire are currently updating the LTP (known as LTP4) and are currently consulting on the four main themes which are Environment, Economy, Place and Wellbeing along with some of the key benefits and issues associated with each theme.
- Draft Warwickshire Local Cycling and Walking Infrastructure Plan 2022. This Draft Local Cycling and Walking Infrastructure Plan aims to provide the context and network planning to prioritise a list of walking and cycling routes that should be targeted for improvement in the future. Although there are no specific improvements outlined for the cycling and walking within the study area, the plan outlines that any improvements to infrastructure should provide the opportunity to create attractive environments and build in coherent, convenient, and safe links for walking and cycling.

- Health and Social Care Act (2012): The Act was introduced following the Health and Social Care Bill 2011 and outlines the Secretary of State's duty to promote and improve the National Health Service (NHS), in pursuit of a number of key aims, which include:
 - an improvement in the quality of services
 - a reduction in health inequalities
 - the promotion of autonomy for General Practitioners and health centres
 - improvements to the treatments and services offered to patients
- Office for Health Improvement and Disparities Public Health Outcomes Framework (data last updated in 2023): This framework sets out a vision for public health, desired outcomes and the indicators that would help us understand how well public health is being improved and protected. The framework concentrates on two high-level outcomes (healthy life expectancy, and the differences in life expectancy and healthy life expectancy between communities) to be achieved across the public health system, and groups further indicators into four 'domains' that cover the full spectrum of public health. The outcomes reflect a focus not only on how long people live, but on how well they live at all stages of life.
- IEMA, 'Effective Scoping of Human Health in Environmental Impact Assessment'
- IEMA, 'Determining Significance For Human Health In Environmental Impact Assessment'

13.2. Study area

Land-use and accessibility

- 13.2.1. The land use and accessibility assessment for both the construction and operational phases will be conducted within 500m of the proposed scheme extent.
- 13.2.2. The 500m study area has been determined using DMRB LA 112 and professional judgement. The study area is shown on figure 13.1 Appendix I.

Human health

- 13.2.3. The human health assessment for the construction and operational phases will be conducted within the following wards (refer to figure 13.1, (Appendix I)):
 - Revel and Binley Woods Ward
 - Henley Ward
 - Wyken Ward
- 13.2.4. Study areas relating to the other chapters that will inform this assessment (Chapter 6 Air quality, Chapter 8 Landscape and visual impact, Chapter 10

Geology and soils, Chapter 12 Noise and vibration) are described in the respective chapters of this ESR.

13.3. Baseline conditions

Data sources and survey

- 13.3.1. A range of publicly available data sources have been used to determine the population and human health baseline. These include statistics on demographics, health statistics from Office for Health Improvement and Disparities (OHID), and local authority data on land use and access.
- 13.3.2. The scoping for the walking, cycling and horse-riding (WCH) assessment has been informed by a site visit undertaken on 10th March 2023 and further site visits will be undertaken as required. In addition, the following desktop sources have been used:
- OS mapping
 - Google streetview
 - Coventry City Council interactive PRow mapping tool
 - Warwickshire County Council interactive PRow mapping tool
- 13.3.3. The baseline conditions are presented in accordance with DMRB LA 112 assessment requirements.
- 13.3.4. The WCH assessment will incorporate usage information from surveys proposed to be conducted at the locations shown on figure 13.1 in Appendix I and listed below. The surveys will be undertaken over an appropriate period in 2023:
- Clifford Bridge Road / B4082 roundabout
 - Clifford Bridge Road links to river side path network
 - Clifford Bridge Road / Tesco roundabout
 - Brinklow Road / Valencia Road junction

Land-use and accessibility

Private property and housing

- 13.3.5. There are approximately 4,227 residential properties within the study area. The majority of the residential properties within the study area are located in the city of Coventry located to the west of the proposed scheme. It is not anticipated that residential properties would be demolished to construct the proposed scheme.
- 13.3.6. The Coventry City Council Local Plan and interactive map show the location and extent of allocated residential development land in Coventry. There is a Housing Allocation (H2:3 Walsgrave Hill Farm) west of the proposed scheme. The

allocation is for 900 houses and includes retention and enhancement of the setting of listed buildings at Hungerley Hall Farm, incorporation of blue light access linking the A46 with the University Hospital, facilitation of works for highways proposals linked to grade separated junction at Clifford Bridge, and the provision of essential drainage and flood risk infrastructure. There are no existing residential units (other than Hungerley Hall Farm which will be retained) located within the allocation footprint.

Community land and assets

13.3.7. Within the study area, OS data shows there to be the following community assets:

- 20 medical facilities
- 15 educational facilities
- 1 emergency/ rescue service
- 2 leisure facilities

13.3.8. Google maps and MAGIC show there to be the following community land within the study area:

- Play park located approximately 300m north west of the southern scheme extent.
- Coombe Country Park, a 500-acre park open to the public with walking trails, lakes, a restaurant and craft studios is located adjacent to the southern scheme extent. This is described further in Chapter 8 of this ESR.

13.3.9. Google maps and MAGIC do not show there to be any other community land (including village greens or registered common land) within the study area.

Development land and businesses

13.3.10. Within the study area, OS data shows there to be the following commercial and business- related properties:

- 30 commercial/ retail properties
- 108 offices
- 42 industrial properties
- 8 areas of storage land
- 101 utility related properties

13.3.11. As described in paragraph 13.3.5, the Coventry City Local Plan and interactive map identifies development land allocated adjacent to the west of the scheme extent within the study area, for 900 houses and associated works.

- 13.3.12. There are a number of planning applications within the study area shown on the Coventry City Council Planning Register interactive map. These will be reviewed at the ES stage.

Agricultural land holdings

- 13.3.13. MAGIC shows there to be Grade 2, Grade 3a and Grade 3b agricultural land located adjacent to the east of the proposed scheme using the Post 1988 Agricultural Land Classification (ALC). MAGIC does not show there to be agricultural land classified by the Post 1988 Agricultural Land Classification to the west of the proposed scheme.
- 13.3.14. Based upon the provisional ALC on MAGIC, there is Grade 2 and Grade 3 agricultural land to the east of the proposed scheme and Grade 2, Grade 3 and urban land to the west of the proposed scheme.

Walkers, cyclists and horse-riders

Existing routes and facilities

- 13.3.15. The key WCH routes and facilities in the study area are as shown in figure 13.1 (Appendix I). These routes provide an important means of access for local people and visitors to community assets, leisure facilities and the wider study area as described below.
- 13.3.16. Footways are provided as part of the highway on both frontages of Clifford Bridge Road.
- 13.3.17. On the western frontage, a continuous footway is provided with uncontrolled crossings at junctions. The footway is typically 2m wide although a section adjacent to the B4082 link roundabout is locally widened. The footway adjacent to the Tesco roundabout is segregated from the carriageway by a wide verge before re-joining the carriageway edge further to the north. Between the two roundabouts, a link is provided to the leisure footpath that follows the River Sowe. An informal footpath has also been created by local residents which runs across the field towards Keswick Walk.
- 13.3.18. On the eastern frontage, a continuous footway is provided with uncontrolled crossings at junctions. The footway is typically 2m wide although a section between the two roundabouts is locally widened. To the north of the Tesco roundabout the footway is set back around 30m from the carriageway by a wooded area and continues as a footpath as far as Dorchester Way before returning to run alongside the carriageway as footway. Numerous other footpaths intersect this route providing links through the residential area to the east and to the crossing facilities provided on Clifford Bridge Road at its junction with Belgrave Road.

- 13.3.19. In addition to the sections of footway and footpath described above, Coventry City Council is currently constructing a new segregated cycleway known as the Binley Cycleway. Further details of the cycleway are provided below.
- 13.3.20. At the Tesco roundabout there is a footpath that runs along the southern side of the supermarket providing links to the adjacent residential area as well as connections to the footpath that runs alongside the River Sowe. The River Sowe leisure route passes under Clifford Bridge Road providing grade separated pedestrian access to the footway on the western frontage of the carriageway.
- 13.3.21. Two informal paths have been created by local residents in the vicinity of the B4082 link roundabout. These paths pass through the wooded area to the south east of the roundabout providing a linkage to a footpath which serves the adjacent residential area. This latter footpath facilitates access between Clifford Bridge Road and Brinklow Road as well as the residential area and the footway network immediately adjacent to this route.
- 13.3.22. A footway is provided along the northern frontage of Brinklow Road which links the residential areas around Clifford Bridge Road to Coombe Country Park. The footway is typically 1.5m wide from the point where it passes under the A46 up to the Country Park access some 1.9km to the east beyond which the footway ends. There is no footway on the southern frontage of Brinklow Road to the east of the A46 overbridge except for a small section leading to a private access. To the west of the A46 overbridge, footways are provided on both frontages of Brinklow Road that are typically 2m wide.
- 13.3.23. Bridleway 235, a PRoW, is shown on the Definitive Public Rights of Way Map to run from the city/county boundary (as a continuation of PRoW 156/R75x/1 in Warwickshire) in the east to Highbridge (namely the bridge crossing the River Sowe) in the west. The route follows a farm access track and is fronted by farmland. Although not recorded on the Definitive Map, the PRoW officer from Coventry City Council has confirmed that the section of the route between Highbridge and Farber Road is also a bridleway.
- 13.3.24. A claimed PRoW also follows the same route as PRoW 235. This claim has been applied under a Definitive Map Modification Order (DMMO), application CAP282, to convert the existing bridleway to a Byway Open to All Traffic (BOAT) and extend it between High Bridge and the end of Faber Road to the west.
- 13.3.25. As indicated, bridleway 156/R75x/1 runs as a continuation of PRoW 235 in Coventry from the county boundary in the west to the junction of PRoW 156/R75b/1 and PRoW 156/R75y/1 in the east. The route continues along the farm access track and is fronted by farmland. The bridleway is earmarked for

improvement in the emerging LCWIP for Warwickshire to make the route more suitable for cycling.

- 13.3.26. In addition to the above PRow, a permissive route is also provided between PRow 156/R75x/1 and Coombe Country Park.
- 13.3.27. The Centenary Way Long Distance walking trail is a 159km footpath originating in the Tame Valley and ending in the Ilmington Downs. The route passes close to several major local settlements, including Coventry, Warwick, and Leamington. The route passes through Coombe Country Park connecting with Bridleway 156 R75x/1 via the permissive route outlined above and continues east toward southern section of Ansty Business Park.
- 13.3.28. Numerous PRow are defined under The City of Coventry (Footpath 61A to 214) Modification Order 2003 which cover a series of footpaths that serve the properties in the Dorchester Way residential area.
- 13.3.29. The above footpath Order also covers a series of footpaths that serve the residential properties located to the east and west of Clifford Bridge Road south of the B4082 link roundabout.
- 13.3.30. There are further WCH facilities in the study area such as footway, cycle tracks and road crossings which will be identified in further detail in the ES if required.

Proposed routes and facilities

- 13.3.31. The following paragraphs provide details of proposed WCH routes and facilities that are either under construction or proposed that will likely form part of the future baseline networks.
- 13.3.32. The Binley Cycleway forms part of a 10km strategic east to west connection between the University hospital in the east and Coventry City Centre and further on to the Coundon Cycleway in the west. The segregated route will connect the city centre with major trip generators, such as Hospital and Binley Business Park, with the intention of making cycling a safe and attractive option for many journeys.
- 13.3.33. At the time of writing, the section of the cycleway on Clifford Bridge Road between the hospital and the Tesco roundabout was nearing completion and is expected to be open in Summer 2023. The section of the cycleway between the Tesco roundabout and the A4082/A428 junction to the south and west is still in consultation with the final design to be confirmed. However, it is understood that construction work is anticipated to start by 2024.

- 13.3.34. The cycleway will be a fully segregated two-way cycle track that will run on the eastern side of Clifford Bridge Road between the hospital and the Tesco roundabout. Just prior to the Tesco roundabout the cycleway will cross Clifford Bridge Road and continue on the western side to the south on to the A428 where it will link to other sections of the cycleway that are currently under construction.
- 13.3.35. There are further WCH facilities in the study area such as footway, cycle tracks and road crossings which will be identified in further detail in the ES if required.

Consultation

- 13.3.36. A consultation meeting was held on 29 March 2023 with officers responsible for Active Travel at Coventry City Council and Warwickshire County Council to discuss existing conditions for WCH in the vicinity of the proposed scheme, the evolving scheme and its potential impacts on WCH. Discussion was also had regarding WCH infrastructure that could potentially be provided by other developments being promoted close to the A46 corridor, however, it was confirmed that no details are currently available for the allocated housing site to the west. Land to the east identified for emerging employment use is not allocated for development in the current Rugby Borough Council local plan.
- 13.3.37. Coventry City Council provided an update on progress with implementation of the Binley Cycleway scheme and indicated that consideration was being given to promoting the Sowe Valley leisure route to PRoW status. Coventry City Council also indicated that surveys of the B4082 link had revealed some pedestrian and cyclist use of this road even though dedicated infrastructure for WCH is not provided. Coventry City Council was not aware of the informal routes around the B4082 link roundabout. Although the land in question was probably owned by a third party, it is probably maintained by Coventry City Council since the land adjacent is Coventry City Council parkland.
- 13.3.38. Warwickshire County Council confirmed that the PRoW bridleway which crosses the A46 to the north and the connecting permissive route are very well used for trips between the hospital and Coombe Country Park. Warwickshire County Council also provided an overview of LCWIP schemes to be delivered in Warwickshire.
- 13.3.39. Both Coventry City Council and Warwickshire County Council expressed the preference for any new WCH infrastructure to be installed as part of the proposed scheme. Also, WCH facilities to be provided at the proposed dumb-bell junction should be segregated provision to Local Transport Note 1/20 standard incorporating signalised crossings on all arms of the roundabouts. With regard to improving connectivity for WCH in the study area, Coventry City Council and

Warwickshire County Council identified the following opportunities for consideration as part of the proposed scheme:

- a link to the residential area close to Pearl Hyde Primary School
- links to the emerging employment area
- improved links to Coombe Country Park, although acknowledging that:
 - a connection would need to pass through third party land outside of the proposed scheme extent
 - a new link may affect the heronry/SSSI site
- re-use of the Hungerley Hall Farm accommodation bridge to provide a WCH crossing of the A46

13.3.40. The key points raised will be investigated as part of the design process. The design, mitigation and enhancement measures to be incorporated into the proposed scheme (as set out later in this chapter) are part of the WCH strategy.

Human health

Health profiles of affected communities

Population

13.3.41. There are approximately 6,407 people living in the Revel and Binley Woods Ward (town of Rugby) 21,195 in Henley Ward and 16,898 in Wyken Ward (Coventry City). Residential housing is located predominantly to the east of the proposed scheme.

Health indicators

13.3.42. Table 13-1 presents key health indicators for the wards located wholly or partially within the study area.

Table 13-1: Public health baseline data

Local health indicator	Walsgrave					England
	Wards			Town/ city		
	Revel and Binley Woods	Henley	Wyken	Rugby	Coventr y	
Census 2021*						
Population	6,407	21,195	16,898	114,366	345,328	59,597,546
Population aged under 16 (%)	14.4	24	20.2	18.4	19.8	185
Population aged 16-24 (%)	7.3	9.8	9.5	9	15.4	10.6
Population aged 65 and over (%)	29	14.9	17.9	18.2	14.6	18.6
General health - number of people with bad or very bad health	318 5%	1,378 6.5%	839 5%	4,891 4.3%	18,495 5.4%	3,127,013 (England and Wales) 5.2%
Office for Health Improvement and Disparities- Fingertips- Local Health**						
Emergency hospital admissions for Chronic Obstructive Pulmonary Disease (COPD), standardised admission ratio***	51 (per 100)	184.5 (per 100)	102.3 (per 100)	76.1 (per 100)	124.8 (per 100)	100 (per 100)
Deaths from respiratory disease (as percentage of deaths from all causes, all ages)	10.9%	12.9%	13.3%	11.1%	12.6%	12.9%
Deaths from all causes, all ages	468	868	791	5,030	14,407	2,561,603
Percentage of community with long term limiting illness or disability	18.6%	20.5%	16.6%	16.1%	17.7%	17.6%
Life expectancy (years) (males)	80.4	76.8	79.2	79.8	78.1	79.5
Life expectancy (years) (females)	83.6	82.1	83.3	83.6	82.1	83.2
Income deprivation (people living in income-deprived households as % of population)	6.1%	22.7%	10.6%	8.7%	15.4%	12.9%

* Source: Census 2021- Available at: <https://www.ons.gov.uk/census>

** Source: Office for Health Improvement and Disparities- Fingertips- Local Health- Available at: <https://fingertips.phe.org.uk/profile/local-health>

*** The source notes that there are concerns about the quality of the data.

13.3.43. The highest percentage of the population within the ward of Revel and Binley Woods are 65 and over, followed by under 16, with the lowest percentage of the population within age range 16-24. This is slightly different in Rugby, where the

highest percentage is under 16, followed by 65 and over, with the lowest percentage of the population within age range 16-24. The highest percentage of the population within the wards of Henley and Wyken are under 16, followed by 65 and over, with the lowest percentage of the population within age range 16-24. Coventry follows the same order. The national average follows the same order as Revel and Binley Woods.

- 13.3.44. In Revel and Binley Woods ward, the percentage of deaths from respiratory disease, the percentage of the population with bad or very bad health and the percentage of the population living in income deprived households is lower than the town and the national averages. The percentage of the community with long-term illness or disability is higher than the town and the national averages. Life expectancy for males is higher in Revel and Binley Woods ward than the town and the national average, it is higher for females compared to the national average, and the same as the town average for females.
- 13.3.45. In Henley ward, the percentage of deaths from respiratory disease is the same as the national average and higher than the city average, and the percentage of the population with bad or very bad health, the percentage of the population living in income deprived households and the percentage of the community with long-term illness or disability is higher than the city and national averages. Life expectancy for both males and females is lower in Henley ward than the national average.
- 13.3.46. In Wyken ward, the percentage of deaths from respiratory disease is higher than the city and the national averages. The percentage of the population with bad or very bad health, the percentage of the population living in income deprived households and the percentage of the community with long-term illness or disability is lower than the city and the national averages. Life expectancy for females is slightly higher than the national average and for males it is slightly lower than the national average, it is the same for females as the city average and lower than the national average.

Health determinants

- 13.3.47. The following health determinants will be included in the assessment, in line with DMRB LA 112.

Community, recreational and educational facilities

- 13.3.48. Within the wards of Revel and Binley Woods ward, Henley ward and Wyken ward, there are community, recreational and educational facilities. These facilities consist of schools, retail, and hotels and are shown on figure 13.1 in Appendix I.

Green/open space

13.3.49. Coombe Country Park, a 500-acre park open to the public with walking trails, lakes, a restaurant and craft studios is located adjacent to the south scheme extent. Google Maps and MAGIC do not show there to be any other community land (including village greens or registered common land) within the study area.

Healthcare facilities

13.3.50. OS data shows there to be 20 medical related properties within the study area. Healthcare facilities within the ward of Revel and Binley Woods include:

- The Revel Surgery: GP Surgery on Barr Lane (approximately 4.7km east of the proposed scheme)

13.3.51. There are healthcare facilities within the ward of Henley, including:

- University Hospital Coventry & Warwickshire: Hospital on Clifford Bridge Road, (approximately 430m west of the proposed scheme)
- Wood End Health Centre: GP Surgery on Deedmore Road (approximately 400m west of the proposed scheme)

13.3.52. There are healthcare facilities within the ward of Wyken, including:

- Forum Health Centre: GP Surgery on Farren Road (approximately 1.3km west of the proposed scheme)

13.3.53. It is not known whether communities experience existing severance or separation from these facilities, however the proposed scheme would not alter existing access to these facilities in operation.

Transport network

13.3.54. The main roads within the study area providing connectivity between communities are the A46, the M6, the M69 Ansty Road, the A444, the B4082 and the B4428. These roads provide connections for people travelling from within the study area to the north, east, south and west.

13.3.55. There are no bus stops within the proposed scheme extent. The closest bus stops to the proposed scheme are located on Ansty Road, to the west of the proposed scheme.

13.3.56. Coventry Arena train station is located to the north west of the proposed scheme and Coventry train station is located to the south west of the proposed scheme.

Air quality management

- 13.3.57. Chapter 6 Air quality of this ESR states that the A46 Walsgrave Junction is located on the boundary of the Coventry AQMA, which encompasses all land within Coventry's administrative boundary. The AQMA was declared due to historic exceedances to the annual mean NO₂ objective in the centre of Coventry.
- 13.3.58. Rugby Borough Council have declared a single AQMA in the borough, located across the urban area of Rugby, however this is located 8km to the east of the proposed scheme extent and is unlikely to be adversely affected by the proposed scheme.
- 13.3.59. Further information is detailed within Chapter 6 Air quality of this ESR.

Noise and vibration

- 13.3.60. Sensitive noise receptors include residential properties and businesses, in addition to other community assets. The proposed scheme does not lie within any NIAs, however, there are a number of NIAs located on surrounding roads. These include:
- three NIAs situated on the A4600 Antsy Road (IDs 324, 11796 and 14385);
 - two to the south-west on Brandon Road (ID 330) and Binley Road (ID 11800), and
 - one on the A46 at Binley Junction (ID 14307).
- 13.3.61. Further information is detailed within Chapter 12 Noise and vibration of this ESR.

Sources and pathways of potential pollution

- 13.3.62. The baseline conditions at Walsgrave Junction are summarised in the baseline of Chapter 10 Geology and soils, and Chapter 14, Road drainage and the water environment. Both of these environmental factors will consider the potential impact of pollution on human health at the assessment stage.

Landscape amenity

- 13.3.63. There are residential receptors and WCH routes within the study area. Views may be affected during construction and operation. Potential impacts are detailed further within Chapter 8 Landscape and visual of this ESR.

Safety

- 13.3.64. Improved safety is listed as one of the reasons the proposed scheme is required. A road safety audit will be undertaken which will estimate the improvement to accidents and collisions that is anticipated with the proposed scheme in place.

13.4. Potential impacts

- 13.4.1. Table 13-2 and Table 13-3 summarise the potential impacts identified for the proposed scheme during construction and operation.

Table 13-2: Potential construction impacts

Receptor	Potential impact
Land use and accessibility	
Residents, businesses and community assets	Temporary changes to access and increases in traffic from construction activities may impact the access to a number of residential properties, community assets and businesses in the study area. Construction may require temporary and permanent land take from Hungerley Hall Farm, however the listed building will be retained.
Businesses	Construction of the proposed scheme is anticipated to positively impact the local economy through contractors being introduced to the area and increased spending during the construction stage.
Agricultural Land Holdings	Construction of the proposed scheme will require temporary and permanent land take from agricultural land holdings (associated with Hungerley Hall Farm).
WCH	The construction works are unlikely to result in any impacts on existing WCH routes or facilities.
Human health	
Local community	Temporary changes to amenity within the local environment (increase of noise, air quality, and overall severance; changes to safety, disruption to the transport network and access to community assets and green/ open space) may impact the amenity, health and wellbeing of the local community.

Table 13-3: Potential operational impacts

Receptor	Potential impact
Land use and accessibility	
Residents, businesses and community assets	The proposed scheme has the potential to reduce severance for road users and non-motorised users in operation.
WCH	The proposed scheme has the potential to provide improvements to safety and to reduce severance for pedestrians and cyclists due to the provision of new and improved facilities.
Human health	
Local community	Operation of the proposed scheme may result in permanent changes to amenity within the local environment (changes to noise, air quality, and overall severance; changes to safety, the transport network and access to community assets and green/ open space); which may adversely and beneficially impact the amenity, health and wellbeing of the local community.

13.5. Design, mitigation and enhancement measures

13.5.1. Potential mitigation measures during construction include:

- use of appropriate mitigation measures through the implementation of the EMP to mitigate air quality, noise, traffic and visual effects
- liaison with stakeholders prior to the commencement of construction works, including local businesses, to understand mitigation requirements to ensure their continued operation
- mitigation to maintain access to all affected properties and businesses within a Traffic Management Plan (TMP)
- liaise with bus companies in advance of works so that they plan their services and advise passengers accordingly

13.5.2. Potential mitigation measures during operation include:

- new and improved pedestrian and cyclist facilities, to increase accessibility and safety for users
- improved amenity such as appropriate planting. Improvements to amenity will benefit the aesthetic of the area, and consequently benefit wellbeing

13.6. Description of the likely significant effects

Construction

Land-use and accessibility

13.6.1. The potential significant effects on land-use and accessibility in construction are as follows:

- for residents, users of local businesses and community assets access may be disrupted during construction, in relation to easy access to their properties and community resources. Diversion routes will be required which could result in journey length changes predominantly at night and during weekends due to closures of the A46 northbound and southbound carriageways
- there is expected to be some permanent and temporary loss of land as a result of construction of the proposed scheme. This will result in loss of land from Hungerley Hall Farm and loss of land from agricultural land holdings
- there are anticipated to be positive effects on local businesses during construction of the proposed scheme, due to increased spending from construction workers
- all land use and accessibility effects during construction mentioned above, are scoped in for further assessment

Human health

- 13.6.2. Temporary changes to the local environment (arising from a combination of noise, air quality, visual, and traffic effects) are likely to affect the amenity and/or health of communities, but with appropriate mitigation in place there are unlikely to be significant effects on human health in relation to potential traffic, noise and air quality.
- 13.6.3. Human health during construction is scoped in for further assessment.

Operation

Land-use and accessibility

- 13.6.4. The proposed scheme has the potential to improve safety and to support the smooth flow of traffic on the A46, with potentially significant beneficial effects in supporting the future economic growth aspirations of the region.
- 13.6.5. The proposed scheme would include the provision of new and improved pedestrian and cyclist facilities to improve connectivity by expanding the existing WCH networks. The new and improved facilities would have the potential to significantly reduce severance for cyclists, walkers and other vulnerable road users between the urban areas of Coventry and Coombe Country Park.
- 13.6.6. All land use and accessibility effects during operation mentioned above, are scoped in for further assessment.

Human health

- 13.6.7. The proposed scheme has the potential to reduce the number of accidents and collisions at the junction bringing potential significant beneficial health effects.
- 13.6.8. There is the potential for adverse and beneficial human health effects due to changes to amenity (arising from a combination of noise, air quality, visual, and traffic effects) as a result of the operation of the proposed scheme.
- 13.6.9. All human health effects during operation mentioned above, are scoped in for further assessment.

13.7. Assessment methodology

- 13.7.1. In accordance with DMRB LA 112, there are two different assessment methods, one for land-use and accessibility, and the other for human health. These are described in further detail in the following sections.

Land-use and accessibility

13.7.2. The assessment will focus on those impacts that are likely to have significant effects on land use and accessibility will be completed in accordance with the standard on population and human health impact assessment included in DMRB LA 112. Significance is determined by considering the sensitivity of the receptor, as well as the magnitude of the impact on those receptors.

Sensitivity

13.7.3. The sensitivity of land use and accessibility receptors will be determined using the criteria presented in Table 13-4. These criteria are derived from DMRB LA 112.

Table 13-4: Sensitivity of receptors

Receptor value (sensitivity)	Description
Very high	<p>Private property and housing:</p> <ol style="list-style-type: none"> Existing private property or land allocated for housing located in a local authority area where the number of households are expected to increase by >25% by 2041 (ONS data). Existing housing and land allocated for housing (e.g., strategic housing sites) covering >5ha and/or >150 houses. <p>Community land and assets where there is a combination of the following:</p> <ol style="list-style-type: none"> Complete severance between communities and their land / assets, with little / no accessibility provision Alternatives are only available outside the local planning authority area. The level of use is very frequent (daily). The land and assets are used by the majority ($\geq 50\%$) of the community. <p>Development land and businesses:</p> <ol style="list-style-type: none"> Existing employment sites (excluding agriculture) and land allocated for employment (e.g., strategic employment sites) covering >5ha. <p>Agricultural land holdings:</p> <ol style="list-style-type: none"> Areas of land in which the enterprise is wholly reliant on the spatial relationship of land to key agricultural infrastructure. Access between land and key agricultural infrastructure is required on a frequent basis (daily). <p>WCH:</p> <ol style="list-style-type: none"> National trails and routes likely to be used for both commuting and recreation that record frequent (daily) use. Such routes connect communities with employment

Receptor value (sensitivity)	Description
	<p>land uses and other services with a direct and convenient WCH route. Little / no potential for substitution.</p> <ol style="list-style-type: none"> 2) Routes regularly used by vulnerable travellers such as the elderly, school children and people with disabilities, who could be disproportionately affected by small changes in the baseline due to potentially different needs. 3) Rights of way for WCH crossing roads at-grade with >16,000 vehicles per day.
High	<p>Private property and housing:</p> <ol style="list-style-type: none"> 1) Private property or land allocated for housing located in a local planning authority area where the number of households are expected to increase by 16-25% by 2041 (ONS data). 2) Existing housing and land allocated for housing (e.g., strategic housing sites) covering >1-5ha and/or >30-150 houses. <p>Community land and assets where there is a combination of the following:</p> <ol style="list-style-type: none"> 1) There is substantial severance between community and assets, with limited accessibility provision. 2) Alternative facilities are only available in the wider local planning authority area. 3) The level of use is frequent (weekly). 4) The land and assets are used by the majority (>=50%) of the community. <p>Development land and businesses:</p> <ol style="list-style-type: none"> 1) Existing employment sites (excluding agriculture) and land allocated for employment (e.g., strategic employment sites) covering >1 - 5ha. <p>Agricultural land holdings:</p> <ol style="list-style-type: none"> 1) Areas of land in which the enterprise is dependent on the spatial relationship of land to key agricultural infrastructure. 2) Access between land and key agricultural infrastructure is required on a frequent basis (weekly). <p>WCH:</p> <ol style="list-style-type: none"> 1) Regional trails and routes (e.g., promoted circular walks) likely to be used for recreation and to a lesser extent commuting, that record frequent (daily) use. Limited potential for substitution. 2) Rights of way for WCH crossing roads at-grade with >8,000 - 16,000 vehicles per day.
Medium	<p>Private property and housing:</p> <ol style="list-style-type: none"> 1) Houses or land allocated for housing located in a local authority area where the number of households are expected to increase by >6-15% by 2041 (ONS data). 2) Existing housing and land allocated for housing (e.g., strategic housing sites) covering <1ha and / or <30 houses.

Receptor value (sensitivity)	Description
	<p>Community land and assets where there is a combination of the following:</p> <ol style="list-style-type: none"> 1) There is severance between communities and their land / assets but with existing accessibility provision. 2) Limited alternative facilities are available at a local level within adjacent communities. 3) The level of use is reasonably frequent (monthly). 4) The land and assets are used by the majority ($\geq 50\%$) of the community. <p>Development land and businesses:</p> <ol style="list-style-type: none"> 1) Existing employment sites (excluding agriculture) and land allocated for employment (e.g., strategic employment sites) covering <1 ha. <p>Agricultural land holdings:</p> <ol style="list-style-type: none"> 1) Areas of land in which the enterprise is partially dependent on the spatial relationship of land to key agricultural infrastructure. 2) Access between land and key agricultural infrastructure is required on a reasonably frequent basis (monthly). <p>WCH:</p> <ol style="list-style-type: none"> 1) PRoW and other routes close to communities which are used for recreational purposes (e.g., dog walking), but for which alternative routes can be taken. These routes are likely to link to a wider network of routes to provide options for longer, recreational journeys. 2) Rights of way for WCH crossing roads at-grade with $>4,000 - 8,000$ vehicles per day.
Low	<p>Private property and housing:</p> <ol style="list-style-type: none"> 1) Proposed development on unallocated sites providing housing with planning permission / in the planning process. <p>Community land and assets where there is a combination of the following:</p> <ol style="list-style-type: none"> 1) Limited existing severance between community and assets, with existing Equality Act 2010 compliant accessibility provision. 2) Alternative facilities are available at a local level within the wider community 3) The level of use is infrequent (monthly or less frequent). 4) The land and assets are used by the minority ($\geq 50\%$) of the community. <p>Development land and businesses:</p> <ol style="list-style-type: none"> 1) Proposed development on unallocated sites providing employment with planning permission / in the planning process. <p>Agricultural land holdings:</p>

Receptor value (sensitivity)	Description
	<ol style="list-style-type: none"> 1) Areas of land which the enterprise is not dependent on the spatial relationship of land to key agricultural infrastructure. 2) Access between land and key agricultural infrastructure is required on an infrequent basis (monthly or less frequent). <p>WCH:</p> <ol style="list-style-type: none"> 1) Routes which have fallen into disuse through past severance or which are scarcely used because they do not currently offer a meaningful route for either utility or recreational purposes. 2) Rights of way for WCH crossing roads at-grade with <4,000 vehicles per day.
Negligible	<p>Private property and housing:</p> <ol style="list-style-type: none"> 1) N/A. <p>Community land and assets where there is a combination of the following:</p> <ol style="list-style-type: none"> 1) No or limited severance or accessibility issues. 2) Alternative facilities are available within the same community. 3) The level of use is very infrequent (a few occasions yearly). 4) The land and assets are used by a minority ($\geq 50\%$) of the community. <p>Development land and businesses:</p> <ol style="list-style-type: none"> 1) N/A. <p>Agricultural land holdings:</p> <ol style="list-style-type: none"> 1) Areas of land which are infrequently used on a non-commercial basis. <p>WCH:</p> <ol style="list-style-type: none"> 1) N/A.

DMRB LA 112 Table 3.11 Environmental value (sensitivity) and descriptions.

Magnitude

13.7.4. The magnitude of impacts will be assessed following the principles in Table 13-5 which sets out the criteria that will be used to describe and assess the impact on land use and accessibility, as outlined in DMRB LA 112.

Table 13-5: Impact magnitude criteria for receptors

Magnitude of impact (change)	Typical description
Major	Private property and housing, community land and assets, development land and businesses and agricultural land holdings:

Magnitude of impact (change)	Typical description
	<ol style="list-style-type: none"> 1) Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements. e.g., direct acquisition and demolition of buildings and direct development of land to accommodate highway assets. 2) Introduction (adverse) or removal (beneficial) of complete severance with no/full accessibility provision. <p>WCH:</p> <ol style="list-style-type: none"> 1) >500m increase (adverse) / decrease (beneficial) in WCH journey length.
Moderate	<p>Private property and housing, community land and assets, development land and businesses and agricultural land holdings:</p> <ol style="list-style-type: none"> 1) Partial loss of / damage to key characteristics, features or elements, e.g., partial removal or substantial amendment to access or acquisition of land compromising viability of property, businesses, community assets or agricultural holdings. 2) Introduction (adverse) or removal (beneficial) of severe severance with limited / moderate accessibility provision. <p>WCH:</p> <ol style="list-style-type: none"> 1) >250m - 500m increase (adverse) or decrease (beneficial) in WCH journey length.
Minor	<p>Private property and housing, community land and assets, development land and businesses and agricultural land holdings:</p> <ol style="list-style-type: none"> 1) A discernible change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements, e.g., amendment to access or acquisition of land resulting in changes to operating conditions that do not compromise overall viability of property, businesses, community assets or agricultural holdings. 2) Introduction (adverse) or removal (beneficial) of severance with adequate accessibility provision. <p>WCH:</p> <ol style="list-style-type: none"> 1) >50m - 250m increase (adverse) or decrease (beneficial) in WCH journey length.
Negligible	<p>Private property and housing, community land and assets, development land and businesses and agricultural land holdings:</p> <ol style="list-style-type: none"> 1) Very minor loss or detrimental alteration to one or more characteristics, features or elements. e.g., acquisition of non-operational land or buildings not directly affecting the viability of property, businesses, community assets or agricultural holdings. 2) Very minor introduction (adverse) or removal (beneficial) of severance with ample accessibility provision. <p>WCH:</p> <ol style="list-style-type: none"> 1) <50m increase (adverse) or decrease (beneficial) in WCH journey length.
No change	<p>No loss or alteration of characteristics, features, elements or accessibility; no observable impact in either direction.</p>

Source: DMRB LA 112 Table 3.12 Magnitude of impact and typical descriptions

Significance of effect

- 13.7.5. The significance of effect for each element of the land use and accessibility sub-topic will be derived by combining the assigned value (sensitivity) of the receptor and the magnitude of the change (impact) arising from the proposed scheme. This is in accordance with the significance matrix set out in DMRB LA 104, Table 3.8.1 and reproduced in Chapter 5 Assessment methodology.
- 13.7.6. Effects can be positive, neutral, negative or uncertain, and temporary or permanent. Only effects that are moderate or greater are considered significant.

Human health

- 13.7.7. A qualitative assessment of human health will be undertaken in accordance with DMRB LA 112, with evidence provided to support conclusions. The geographical extent of the impacts considered within the qualitative assessment should be dependent upon the nature and characteristics of a project and sensitivity of receptors.
- 13.7.8. Once the health profile of communities has been established, the sensitivity of a community / population to change shall be identified (supported with evidence).
- 13.7.9. The sensitivity of a community / population from health point of view shall be reported as:
- low
 - medium
 - high
- 13.7.10. The likely health outcome(s) shall be identified in line with the categories in Table 13-6 below.

Table 13-6: Human health outcome categories

Health outcome category	Health outcome description
Positive	A beneficial health impact is identified
Neutral	No discernible health impact is identified
Negative	An adverse health impact is identified
Uncertain	Where uncertainty exists as to the overall health impact

DMRB LA 112 Table 3.32 Human health outcome categories

- 13.7.11. Although the assessment of human health effects will describe the likely qualitative health outcomes, it is not possible to quantify the severity or extent of the effects which give rise to these outcomes. The potential health outcomes

during construction and operation are based on broad categories for the qualitative impacts identified in accordance with Table 13-6.

13.8. Assessment assumptions and limitations

- 13.8.1. The assessment of the potential for significant effects has been carried out against a benchmark of current baseline conditions within the study area. As with any dataset, these may be subject to change over time, which may influence the findings of the assessment and could lead to the assessment being subject to statistical time lag.
- 13.8.2. It is assumed that the construction process would not render local properties unusable and there would be no displacement of local residents.
- 13.8.3. Surveys of usage of WCH routes and facilities are yet to be undertaken (proposed survey locations are shown on Figure 13-1 in Appendix I). The usage information from surveys proposed to be conducted over an appropriate weekly period in 2023 will be used in the environmental assessment. The usage surveys will also inform design decisions.
- 13.8.4. It is assumed that the construction compounds will require temporary land take, but the land will be reinstated.
- 13.8.5. The design of the proposed scheme has not been finalised, which means any further change might result in this section being updated iteratively.

14. Road drainage and water environment

14.1. Introduction

- 14.1.1. This chapter has been prepared in accordance with DMRB LA 113 Road Drainage and the Water Environment (Highways England, 2020h) (hereafter referred to as DMRB LA 113).
- 14.1.2. The topic includes surface water and groundwater, water resources and flood risk. It considers existing environmental baseline information and key impacts alongside the proposed scope of assessment and assessment methodologies.

Legislation, policy and guidance

- 14.1.3. A summary of the key legislation, policies and guidance relevant to the assessment of the proposed scheme's impacts on the water environment to meet the statutory and non-statutory requirements is provided below:
- National Policy Statement for National Networks (NPSNN) (DfT, 2014)
 - Infrastructure Planning (Environmental Impact Assessment) Regulations 2017
 - Water Environment (Water Framework Directive) (England and Wales) Regulations 2017
 - The Groundwater (Water Framework Directive) (England) Direction 2016
 - Land Drainage Act 1991 and 1994 (as amended)
 - Flood and Water Management Act (2010)
 - The Environment Act (2021)
 - The Water Act (2014)
 - The Water Resources Act (1991) (as amended)
 - Salmon and Freshwater Fisheries Act 1975 (as amended)
 - The Environmental Permitting (England and Wales) Regulations 2016
 - The Eels (England and Wales) Regulation 2009
 - The Control of Pollution (Oil Storage) (England) Regulations 2001
 - The Environment Agency's approach to groundwater protection Version 1.2 (2018)
 - Groundwater guidance covering requirements, permissions, risk assessments and controls (Environment Agency, 2023a)
 - Advice Note Eighteen: Water Framework Directive Guidance (Planning Inspectorate, 2017)

14.2. Study area

- 14.2.1. This assessment identifies surface water and groundwater features, groundwater conditions, surface water and groundwater flood risk within the study area. The study area comprises the proposed scheme and a 1km buffer around this. It has been extended where there are sensitive surface water or groundwater features that may be affected further downstream or down-hydraulic gradient respectively. The study area is based on professional judgement to ensure the effects of the proposed scheme are sufficiently identified.

14.3. Baseline conditions

- 14.3.1. Information to assist defining the existing baseline conditions has been obtained from the following sources:

- British Geological Survey (BGS) Geoindex (onshore) (BGS, 2023)
- Drainage Data Management System (DDMS) (National Highways, 2023)
- Department for Environment, Food and Rural Affairs (DEFRA) Magic Map (Defra, 2023a)
- Environment Agency water discharge consents database (Environment Agency, 2023b)
- Environment Agency catchment data explorer (Environment Agency, 2023c)
- Environment Agency flood map for planning (Environment Agency, 2023d)
- Environment Agency long term flood risk service (Environment Agency, 2023e)
- Environment Agency historic flood map (Environment Agency, 2023f)
- Environment Agency water quality archive (Environment Agency, 2023g)
- PCF stage 2 Environmental Assessment Report (AECOM, 2022)
- PCF stage 2 Environmental Scoping Report (AECOM, 2020)
- PCF stage 2 Preliminary Sources Study Report (including Groundsure report) (AECOM, 2021a)
- Natural England Designated Sites (Natural England, 2023a)
- Ordnance Survey Online Map (Ordnance Survey, 2023a)
- Ordnance Survey Open Rivers (Ordnance Survey, 2023b)

- 14.3.2. The information in Table 14-1 summarises the relevant groundwater bodies and surface waterbodies within the study area, together with any water dependent features that may be impacted by the proposed scheme. Figure 14.1 in Appendix J shows the surface water features, figure 14.2 in Appendix J shows

the groundwater features and figure 14.3 in Appendix J shows the potential for groundwater flooding within the study area. Surface water and groundwater features include WFD waterbodies, aquifer designations, licensed abstractions, flood risk features and protected areas.

Table 14-1: Summary of existing road drainage and the water environment baseline

Component	Summary description
Surface water features	<p>There are two main rivers located within the study area (see figure 14.1 in Appendix J):</p> <ul style="list-style-type: none"> • River Sowe is located to the west of the proposed scheme. It flows from the west then south adjacent to the proposed scheme, exiting the proposed scheme extent at the south west boundary. • Withey Brook is a tributary of the River Sowe. It flows in a southerly direction, crossing under the existing A46 before its confluence with the River Sowe. <p>Smite Brook, an ordinary watercourse, is located within the proposed scheme extent. It rises to the west, outside of the study area and flows westwards into Coombe Pool. It discharges at the west of Coombe Pool where it is culverted under the existing A46 and flows into the River Sowe. An unnamed watercourse, located north of the existing roundabout, flows in a westerly direction under the existing A46 via pipework to the River Sowe. Birchley Wood Brook, an ordinary watercourse located within the study area, is formed from a number of smaller ordinary watercourses originating to the south east of the proposed scheme extent, local to Birchley Wood. Birchley Wood Brook flows in a westerly direction to the south of Coombe Pool before its confluence with Smite Brook, to the east of the A46. Before it is culverted under the A46 a tributary feeds into it from the south. In addition to this, there are approximately five unnamed smaller ordinary watercourses located within the study area, outside of the proposed scheme extent (Ordnance Survey, 2023a).</p> <p>The nearest gauging station to the proposed scheme is located approximately 13.5km downstream on the River Sowe where the Q_{95} is $1.218\text{m}^3/\text{s}$ (National River Flow Archive, 2023). Areal scaling of this gauging station Q_{95} flows was undertaken to calculate the Q_{95} flows for Smite Brook and the River Sowe at the proposed scheme and was estimated to be $0.197\text{m}^3/\text{s}$ and $0.577\text{m}^3/\text{s}$, respectively. The Q_{95} for both these locations will be considered further during the environmental assessment.</p> <p>Coombe Pool reservoir is located within Coombe Country Park to the east of the proposed scheme.</p> <p>There are three ponds located within the study area, outside of the proposed scheme extent (see figure 14.1 in Appendix J), which are hydraulically connected to watercourses as they lie within Flood Zones 2 and 3. These include two to the south west of the study area, one within and one local to Stoke Floods Nature Reserve and one to the north of the study area. In addition to this there are 11 ponds within the study area which are hydraulically disconnected from watercourses.</p> <p>The proposed scheme extent does not lie within an Internal Drainage Board area.</p> <p>A Groundsure report (National Highways, 2021), undertaken in 2020, notes there is one active licenced abstraction for spray irrigation is located within the study area, 983m east of the proposed scheme. However, a data request will</p>

Component	Summary description
	<p>be submitted to the Environment Agency during the environmental assessment to confirm the current licensed abstractions.</p> <p>There is one consented discharge within the study area, south east of the proposed scheme, from a domestic property (multiple) (including farmhouse) (Environment Agency, 2023b). Due to the location it is presumed this consented discharge is to a watercourse. However, this will be confirmed during the ES.</p> <p>A data request will be submitted to Coventry City Council and Warwickshire County Council during the ES assessment to confirm the unlicensed abstractions and un-consented discharges within the study area.</p>
Water Framework Directive (surface water)	<p>The current Severn River Basin Management Plan (RBMP), as shown by the Environment Agency's catchment data explorer (Environment Agency, 2023c) indicates the proposed scheme sits within three WFD surface waterbody catchments:</p> <ul style="list-style-type: none"> • Withy Bk – source to conf R Sowe (WBID: GB109054044640) covers some of the northern section of the proposed scheme extent. The ecological status is limited to poor by biological quality elements (poor for macrophytes and phytobenthos combined) and physico-chemical quality elements (moderate for phosphate). The ecological status is expected to reach good by 2027, however there is low confidence in this. The chemical status is limited to fail by priority hazardous substances (fail for mercury and its compounds, perfluorooctane sulphonate (PFOS) and polybrominated diphenyl ethers (PBDE)). The chemical status is expected to reach good by 2063. Reasons for not achieving good (RNAG) include poor nutrient management. • Sowe – conf Withy Bk to conf R Avon (WBID: GB109054044540) covers some of the northern section of the proposed scheme extent. The ecological status is limited to moderate by biological quality elements (moderate for macrophytes and phytobenthos combined) and physico-chemical elements (poor for phosphate). The ecological status is expected to remain at moderate. The chemical status is limited to fail by priority hazardous substances (fail for benzo(g-h-i) perylene, mercury and its compounds, PFOS and PBDE). The chemical status is expected to reach good by 2063. The RNAG include poor livestock management, poor nutrient management and sewage discharge (intermittent). • Smite Bk – source to conf R Sowe (WBID: GB109054044630) covers the central and northern section of the proposed scheme extent. The ecological status is limited to poor by biological quality elements (moderate for fish and poor for macrophytes and phytobenthos combined) and physico-chemical quality elements (moderate for phosphate). The ecological status is not expected to exceed moderate. The chemical status is limited to fail by priority hazardous substances (fail for mercury and its compounds, PFOS and PBDE). The chemical status is expected to reach good by 2063. The RNAG includes poor livestock management. <p>Outside of the proposed scheme, the study area is located within three WFD waterbodies:</p> <ul style="list-style-type: none"> • Coombe Pool (WBID: GB30937926) is located to the east of the existing roundabout. The ecological status is limited to moderate by physico-chemical quality elements (poor for total nitrogen and bad for total phosphorus) and supporting elements (moderate for expert judgement). The ecological status is expected to reach good by 2027, however there is low confidence in this. The chemical status is limited to fail by priority hazardous substances (fail for mercury and its compounds, PFOS and PBDE). The chemical status is

Component	Summary description
	<p>expected to reach good by 2063. The RNAG includes poor livestock management, sewage discharge (continuous) and urban development.</p> <ul style="list-style-type: none"> • Sowe – conf Breach Bk to conf Withy Bk (WBID: GB109054044660) is located to the west of the proposed scheme. The ecological status is limited to poor by biological quality elements (moderate for fish and invertebrates, and poor for macrophytes and phytobenthos combined) and physico-chemical quality elements (poor for phosphate). The ecological status is expected to reach good by 2027, however there is low confidence in this. The chemical status is limited to fail by priority hazardous substances (fail for mercury and its compounds, PFOS and PBDE). The chemical status is expected to reach good by 2063. The RNAG includes urban development, poor livestock management and groundwater abstraction. • Avon – ClaycotonYelvertoft Bk to conf R Sowe (WBID: GB109054043920) is located at the southern extent of the study area but has been scoped out as this waterbody is hydraulically disconnected from the proposed scheme. <p>The Environment Agency water quality archive (Environment Agency, 2023g) notes there are three locations within the study that are part of routine monitoring:</p> <ul style="list-style-type: none"> • River Sowe Hungerley Hall Farm, located 300m north-west of the existing roundabout • Smite Brook confluence with River Sowe, located 350m east of the existing roundabout • Coombe Pool lake, located 150m east of the existing roundabout • Withy Brook - High Bridge, located 1.5km north of the existing roundabout <p>No assessment of pollution impacts from routine runoff to surface water has been undertaken using the Highways England Water Risk Assessment Tool (HEWRAT) within the PCF stage 2 Environmental Assessment Report (AECOM, 2022).</p>
Groundwater	<p>British Geological Survey (BGS) 1:50,000 mapping (BGS, 2023) indicates that the bedrock underlying the study area is the Mercia Mudstone Group (MMG), consisting of mudstones with subordinate siltstones and sandstones and potentially thin beds of gypsum and anhydrite. The MMG is underlain by the Helsby Sandstone Formation (HSF) of the Sherwood Sandstone Group (SSG), consisting of sandstones and conglomerates of fluvial origin with occasional thin lenticular beds of siltstone and mudstone. The MMG pinches out or is down-faulted against the underlying the HSF approximately 1 - 2km to the north-west and west respectively.</p> <p>The SSG is classed as a Principal aquifer, defined as providing significant quantities of water that can support water supply and / or baseflow to rivers, lakes and wetlands on a strategic scale. The MMG is classed as a Secondary B aquifer, defined as a lower permeability layer that may store and yield limited amounts of groundwater through characteristics such as cracks, openings and eroded layers (Defra, 2023a). Fissuring has been identified in the MMG, which is likely to be due to weathering (National Highways, 2021).</p> <p>To the east of the River Sowe, the HSF is confined by up to 80m of MMG, although the latter thins significantly towards the west and north-west. Within the study area, the true thickness of the MMG has not been confirmed, although borehole records indicate it to be at least 12.5m thick (National Highways, 2021). Less than 500m west of the proposed scheme, adjacent to the River Sowe, BGS borehole records such as Binley NO.2 SP37NE870 (437570</p>

Component	Summary description
	<p>279630) and Binley NO.5 SP37NE858 (437570 279500) indicate that the SSG is as shallow as 6.4m below ground level (mbgl) (BGS, 2023a).</p> <p>Superficial deposits overlie the MMG across most of the study area. Alluvium, comprising clay, silt, sand and gravel, is associated with the River Sowe and Smite Brook, while Quaternary River Terrace Deposits and Pleistocene Bagington Sand and Gravel Formation, both comprising sands and gravels with subsidiary clay and silt are associated with the earlier Proto-Soar River. Diamicton (glacial till) clays and silts of the Anglian Bosworth Clay Member and Thrussington Member are present to the north and east of the study area, although they also underlie the proposed scheme around Walsgrave Hill Farm. Areas of made ground are present towards the southern and northern extents of the proposed scheme.</p> <p>Sands and gravels associated with the Alluvium, River Terrace Deposits and Bagington Sand and Gravel Formation are classed as Secondary A aquifers, defined as permeable layers that can support local water supplies, and may form an important source of baseflow to rivers (Defra, 2023a).</p> <p>The Thrussington Member is classed as a secondary (undifferentiated) aquifer while the Bosworth Clay Member is classed as unproductive strata. Secondary undifferentiated aquifers are defined as having variable characteristics associated with either Secondary A aquifers (permeable layers that can support local water supplies) and Secondary B aquifers (mainly lower permeable layers that may store and yield limited amounts of groundwater). Unproductive strata are defined as having negligible significance for water supply or baseflow to rivers, lakes and wetlands.</p> <p>The permeable superficial deposits are between 0.15m and 5.2m thick (National Highways, 2021) and have a groundwater vulnerability classification of High, meaning that there is only limited protection against pollutants being transmitted to groundwater. Elsewhere, the vulnerability classification is Medium - High, except where the MMG is overlain by the Bosworth Clay Member to the east of the River Sowe where the groundwater vulnerability classification is Medium.</p> <p>It is likely that the permeable superficial deposits associated with the River Sowe, Smite Brook and Coombe Pool are in hydraulic continuity with surface water, although it is not known at present whether Coombe Pool is lined. BGS borehole records also indicate the presence of perched water (BGS, 2023a).</p> <p>There are no source protection zones (SPZs) within 2km of the proposed scheme. However, a SPZ 3 for boreholes that are likely to be abstracting from the SSG is located approximately 3km west and south-west of the proposed scheme (Defra, 2023a). One active, licensed groundwater abstraction within 1km of the proposed scheme was identified in the Groundsure report included in the PCF stage 2 PSSR (AECOM, 2021a) with the following details:</p> <ul style="list-style-type: none"> • Licence number 18/54/11/0141, Issue number 103, held by Brita Finish Ltd. NGR 437520 280320 (853m north-west of proposed scheme). Active abstraction of 50,000m³/year from sands and gravels beneath Bodmin Road for industrial and commercial processes.

Component	Summary description
	<p>Three further historical licensed abstractions were identified approximately 2km west of the proposed scheme, all with an abstraction rate of 200,000m³/year.</p>
<p>WFD (groundwater)</p>	<p>The proposed scheme is underlain by the Warwickshire Avon – Secondary Mudrocks groundwater body (WBID GB40902G990900). The Environment Agency’s Catchment Data Explorer website (Environment Agency, 2023c) indicates that the Cycle 3 (2019) overall status of this groundwater body is good with good quantitative status and good chemical status.</p> <p>The Warwickshire Avon - PT Sandstone Warwick/Avon Confined groundwater body (GB40901G300700) underlies the study area approximately 700m west of the proposed scheme. The overall status of this groundwater body is poor with a poor quantitative status and good chemical status.</p> <p>The proposed scheme lies within the Warwickshire Avon – Secondary Mudrocks Drinking Water Protected Area (DWPA), with the western extent of the study area also within the Warwickshire Avon – PT Sandstone Warwick/Avon Confined DWPA. The study area does not lie within a groundwater drinking water safeguard zone (DEFRA, 2023a).</p> <p>The study area is not located within a surface water drinking water safeguard zone or DWPA but is within the River Avon (to confluence with River Severn) surface water Nitrate Vulnerable Zone (NVZ) (Defra, 2023a).</p>
<p>Flood Risk</p>	<p><u>Surface water</u></p> <p>The River Sowe is not tidal and therefore tidal flooding has been scoped out of this assessment.</p> <p>The Environment Agency’s indicative flood map for planning (Environment Agency, 2023d) shows that the majority of the proposed scheme and study area is located within Flood Zone 1 (see figure 14.1 in Appendix J). Flood Zone 1 is associated with a low risk of flooding from fluvial and coastal sources (an annual probability of less than 1 in 1,000 of river and sea flooding). Land immediately surrounding the River Sowe, Smite Brook, Withey Brook, Birchley Wood Brook and its tributary are primarily designated as Flood Zone 2 and Flood Zone 3.</p> <p>Flood Zone 2 consists of land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding. Flood Zone 3 is split into two separate zones; 3a and 3b.</p> <ul style="list-style-type: none"> • Flood Zone 3a comprises of land assessed as having a 1 in 100 or greater annual probability of river flooding. • Flood Zone 3b comprises as land where water has to flow or be stored in times of flood. The functional floodplain will normally comprise:

Component	Summary description
	<ul style="list-style-type: none"> ○ land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or ○ land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability of flooding). ○ land identified by local planning authorities in their Strategic Flood Risk Assessments as areas of functional floodplain, in agreement with the Environment Agency. <p>A small area of the proposed scheme extent encroaches on Flood Zone 2 and Flood Zone 3 to the south of the existing roundabout and on the B4082. In addition to this, a small area of Flood Zone 2 associated with a tributary of Birchley Wood Brook encroaches the proposed scheme extent at Brinklow Road and at the northern most point of the proposed scheme extent.</p> <p>Hydraulic modelling of the existing flood risk was undertaken at the options selection stage and reported in the PCF stage 2 EAR (AECOM, 2022). The updated baseline model predicts a significant increase on peak flood levels and localised increases in flood extent. The most notable increases in flood extent occur upstream of the A46 on Smite Brook where the culvert and embankment provide significant flow restrictions. This baseline model was accepted by the Environment Agency and their online maps have been updated to reflect this.</p> <p>The proposed scheme lies between two LLFAs, Coventry City Council immediately to the west of the existing A46 carriageway and Warwickshire County Council to the east of this. Warwickshire County Council Strategic Flood Risk Assessment (SFRA) (2013) indicates Flood Zone 3 associated with Withy Brook, Smite Brook, the River Sowe, and Birchley Wood Brook and its tributary as being in Flood Zone 3a. However, Coventry County Council SFRA (Coventry County Council, 2015) indicates that these are either in Flood Zone 3b or its indicative extent.</p> <p>The Environment Agency's long term flood map (Environment Agency, 2023e) indicates the majority of the proposed scheme is at very low risk of flooding from pluvial sources (surface water), which indicates this area has a chance of flooding of less than 0.1% each year. However, there are isolated areas of low to high surface water flood risk. These are classified by the Environment Agency as:</p> <ul style="list-style-type: none"> • Low - each year, the area has between 1 in 1000 (0.1%) and 1 in 100 (1%) chance of flooding in any given year • Medium - each year, the area between 1 in 100 (1%) and 1 in 30 (3.3%) chance of pluvial flooding in any given year • High - each year, the area has greater than 1 in 30 (3.3%) chance of pluvial flooding in any given year <p>To the north of the existing roundabout, the northbound existing carriageway is at risk of low to high surface water flooding. This flow pathway originates in the carriageway from the north and flows south to the B4082. At the south of the proposed scheme extent there is an area on and to the side of the existing</p>

Component	Summary description
	<p>carriageway that is at low to high risk of surface water flooding. This appears to originate to the west and pool at the western side of the carriage way. The eastern area of surface water flood risk appears to be associated with the unnamed watercourse.</p> <p>Within the study area, outside of the scheme extent, there are a number of areas at risk of low to high surface water flooding, which are associated with the main rivers or watercourses local to it.</p> <p>DDMS (National Highways, 2023) indicates the existing A46 has experienced flooding at the roundabout, and to the immediate north and south of this. Seven flood events have occurred in this area, three of these being in the past three years due to overgrown channels and filter drains. The underlying cause remains unresolved. Other flood events have occurred on the remaining carriageway within the proposed scheme extent and study area but the cause underlying these events has been rectified.</p> <p>Warwickshire County Council SFRA (2013) shows no instances of sewer flooding in the area. However, Coventry County Council SFRA (Coventry County Council, 2015) indicates there have been two instances of sewer flooding within the CV3 2 postcode area, though the location of these are currently unknown.</p> <p>The Environment Agency's long term flood map (Environment Agency, 2023e) indicates in the event of Coombe Pool reservoir failing, part of the B4082 could be affected. However, when reservoir failure coincides with flooding from rivers the roundabout, the area to the immediate north, south and part of the B4082 is at risk.</p> <p><u>Groundwater</u></p> <p>There are few BGS Geoindex borehole records with groundwater level information for the superficial deposits and strata likely to be encountered by the proposed scheme within the study area (BGS, 2023). However, the record for the Brita Finish licensed abstraction borehole at NGR 437520 280320 (853m north-west of proposed scheme) indicates a groundwater level within granular superficial deposits of approximately 2.7m below ground level (bgl) prior to a pumping test in March 1995.</p> <p>GI boreholes records for the Coventry Eastern Bypass indicate water strikes in superficial deposits and MMG bedrock, although some GI boreholes was recorded as dry. A slow seepage was observed in granular superficial deposits at 1.7m bgl in BGS borehole reference SP37NE584 (NGR 438374 279207) in the vicinity of Smite Brook, south of the existing roundabout (AECOM, 2022).</p> <p>Due to potentially high groundwater levels within the study area, the proposed scheme is considered to be at risk from groundwater flooding. Both Warwickshire County Council (2013) and Coventry City Council (Coventry County Council, 2015) SFRAs have been taken into consideration during analysis of the baseline flood risk from groundwater as outlined in the PCF</p>

Component	Summary description
	<p>stage 2 Environmental Scoping Report (AECOM, 2020). The SFRAs indicate the susceptibility to groundwater flooding is between 25% and 75%.</p> <p>The BGS groundwater flooding map (BGS, 2023b) indicates that much of the proposed scheme either has the potential for groundwater flooding to occur at surface or the potential for groundwater flooding of property situated below ground level. Within the study area, permeable superficial deposits associated with the River Sowe and Smite Brook have potential for groundwater flooding to occur at surface, including where Smite Brook crosses the proposed scheme.</p> <p>The Groundsure report within the PCF stage 2 PSSR (AECOM, 2021a) indicates no reported incidents of groundwater flooding within the scheme extent at the time the report was prepared but does note there is a moderate – high risk due to the River Sowe intruding into the proposed scheme extent.</p> <p>DDMS (National Highways, 2023) also indicates a high potential for groundwater flooding to occur at the surface in the western section of the proposed scheme, particularly adjacent to the River Sowe, and below ground level in the southern section of the proposed scheme. There is limited to no risk of groundwater flooding further north.</p>
Drainage	<p>DDMS (National Highways, 2023) indicates that there are five outfalls within the proposed scheme extent:</p> <ul style="list-style-type: none"> • four moderate pollution risk status, three of which discharge to the River Sowe via ditches and one to Withy Brook via a ditch to the north of the proposed scheme • one not determined pollution risk status which discharges to Smite Brook at the A46 crossing <p>Within the study area there are an additional 20 outfalls:</p> <ul style="list-style-type: none"> • four very high pollution risk status outfall discharge to a tributary of Birchley Woods Brook south of Coombe Pool • 11 moderate pollution risk status: <ul style="list-style-type: none"> • one outfall discharges to the River Sowe downstream of its confluence with Withy Brook • three outfalls discharge to Smite Brook and one to the River Sowe to the west of the existing A46 roundabout • five outfalls discharge to a tributary of Birchley Woods Brook, south of Coombe Pool • one outfall discharges to a tributary of Birchley Woods Brook to the south of the proposed scheme extent • four low pollution risk status outfalls are located to the south of the proposed scheme at the A428 roundabout, however it is unclear which water body they discharge into

Component	Summary description
	<ul style="list-style-type: none"> one pollution risk addressed outfall is located south of the A428 roundabout, however it is unclear which water body they discharge into <p>The Environment Agency pollution records (Environment Agency, 2023h) indicates there have been no recorded environmental pollution incidents within the study area.</p> <p>DDMS indicates that the drainage network is predominantly piped with surface water runoff collected via catchpits and gullies. Surface and sub-surface filter drains are also present along the existing carriageway.</p> <p>DDMS (National Highways, 2023) indicates that there are no discharges of road runoff via soakaways to groundwater within the study area.</p>
Designated Water Dependent Sites	<p>Surface water dependent designated conservation sites within the study area include:</p> <ul style="list-style-type: none"> Coombe Pool SSSI is designated for its ornithological importance located on site and to the east of the construction area immediately adjacent to the proposed scheme extent. Designated features of Coombe Pool include its heronry, associated reed beds and ancient woodland. The site also supports wintering wildfowl and many rare breeding birds such as the kingfisher, tufted duck, water rail and shoveler. Downstream of Coombe Pool but within the SSSI, Smite Brook is likely to be in hydraulic continuity with groundwater in the permeable superficial deposits. It is not known at present whether Coombe Pool is lined, but it may also have at least a partial connection to groundwater within the superficial deposits. Stoke Floods LNR is located 300m south-west from the proposed scheme and is a similarly important site for wintering birds. There are a number of additional conservation sites situated south of the proposed scheme, but more than 1km from the proposed scheme. These include Herald Way Marsh SSSI / LNR, designated for its range of wetland habitats and assemblages of invertebrates, and Brandon Marsh SSSI, a diverse complex of flooded gravel pits, fen and scrub. The sites are considered to be potential groundwater dependent terrestrial ecosystems (GWDTE).
Hydromorphology	<p>A watercourse walkover was undertaken as part of the PCF stage 2 Environmental Assessment Report (AECOM, 2022), which assessed the hydromorphology of Birchley Wood Brook, Smite Brook and the River Sowe:</p> <p>Birchley Wood Brook upstream (east) of Coombe Pool, lies within a wide gently sloping floodplain surrounded predominantly by pastoral farmland. The watercourse has likely been modified historically for agricultural use with typically uniform flow conditions and channel profile. The watercourse was typically silty and the channel bed not visible.</p> <p>Further downstream where Birchley Wood Brook runs through woodland adjacent to Coombe Pool, the watercourse increased in flow diversity, with flow types ranging from pooled flows to gravelly run features. Gravel sediment deposits were also observed downstream of woody features. Birchley Wood Brook confluences with Smite Brook immediately upstream (east) of the A46.</p>

Component	Summary description
	<p>Smite Brook downstream of the A46 has also been historically modified, prior to this it was more sinuous. The watercourse was also straightened in the vicinity of the A46, the channel is also over-wide at this location given the establishment of in-channel vegetation acting to narrow the channel. The lateral connectivity of the watercourse to the floodplain is relatively good, a flow route over the right bank floodplain was observed during the site visit, which is possibly indicative of a previous channel course of the river. Local diverse range of flow conditions created by woody features in the channel. Riverbed is likely composed of gravel with a sinuous planform within the corridor of alluvium at this location.</p> <p>The River Sowe is a watercourse subject to a range of modifications (e.g., Mills, channelisation, and straightening) for farming. During the walkover, water levels were high, and the watercourse was very turbid, so the riverbed and bedforms were not visible. However, information via the Environment Agency suggests the presence of gravel features. The channel was very over-deep and disconnected from the floodplain, due to anthropogenic modification. Localised bank erosion was observed, likely due to straightening and over-deep nature of the channel creating relatively high flows.</p>
Recreation and Human Health	<p>Licensed groundwater abstractions within the area are used to provide process water for manufacturing and make up or top up water.</p> <p>The western half of Coombe Pool, closest to the A46, is reserved for angling.</p> <p>The River Sowe is used for recreation, navigation and angling.</p>
Climate Change	<p>The Met Office UK climate averages (Met Office, 2023) for Coventry indicate that:</p> <ul style="list-style-type: none"> • average monthly maximum temperatures range from 7.24 to 21.51°C and average monthly minimum temperatures range from 1.79 to 12.64 °C in the climate period 1991-2020. The average annual maximum temperature for the region is 14.17°C and average annual minimum temperature for the region is 6.62°C for the climate period 1991-2020 • average annual sunshine in the region is 1507.22 hours in the climate period 1991-2020 • average annual rainfall in the region is 698.30mm and there are an average 123.33 days of rainfall annually in the climate period 1991-2020 <p>As the proposed scheme is classed as 'essential infrastructure' and partly lies within Flood Zone 3b, the higher central climate change allowance applies (Environment Agency, 2022). This is to be confirmed during consultation at the preliminary design stage. The potential anticipated change in peak river flow in the Avon Warwickshire Rivers Management Catchment for the higher central is 12% for the 2020s (2015 to 2039), 14% for the 2050s (2040 to 2069) and 32% for the 2080s (2070 to 2115) (Defra, 2023b). The anticipated changes in peak rainfall intensity in the catchment for 2050s (2022 to 2060) is between 20% and 40%, and for 2070s (2061 to 2125) is between 25% and 40%, for the central and upper end allowances, respectively for the 1% annual exceedance rainfall event (Defra, 2023b).</p>

Component	Summary description
Major Accidents and / or Disasters (Events)	Warwickshire County Council SFRA (2013) and the Environment Agency historic flooding map (2023f) indicates there have been no historic events within the proposed scheme extent or the study area. However, Coventry County Council SFRA (Coventry County Council, 2015) indicates that there have been a number of flood incidents within the study area, outside of the proposed scheme extent, since 1990. Two to five incidents have occurred in one location to the south of the study area adjacent to the existing carriageway. The majority of the other incidents in the study area are associated with the River Sowe.

14.4. Potential impacts

- 14.4.1. Potential impacts on the water environment could arise from a number of direct and indirect sources during the construction and operational phases. This section summarises the potential impacts associated with the proposed scheme. These will be further developed in detail as part of the environmental assessment.

Construction

Surface water quality

- 14.4.2. During construction, there is the potential for mobilisation of sediment and contaminants from road construction activities such as earthworks, ground improvements, plant and vehicle washing. This could lead to degradation of surface water quality.
- 14.4.3. Construction activities, including any demolition, for the proposed scheme could increase the risk of a pollution incident from accidental spillages or leakage of fuels, oils, chemicals, wastewater, concrete or cement admixtures used. This could adversely impact protected sites local to the proposed scheme.
- 14.4.4. Construction works will have the greatest potential to impact on the surface water environment when they take place within, adjacent, over or close to surface water features, including the fluvial floodplain. There is also a higher risk where works will take place close to the existing highways drainage network, creating a pathway for pollutants to reach the watercourses.
- 14.4.5. There could be an increased pollution risk from sediments being mobilised in runoff which could reach watercourses and impact water quality. This could occur during earthworks (i.e., regrading and construction of new embankments), and the movement of heavy plant and runoff from stockpiles. There is high likelihood of silt being generated from construction activities associated with the proposed scheme which will be greater after rainfall events.

Hydromorphology

- 14.4.6. During construction, existing drainage channels and hydrological connectivity within the catchment may be altered, which may affect hydromorphological processes in downstream receptors. This could include altered flow velocities, altered discharge and sediment volumes. In addition to this, there could be a change in sediment transport regime which would alter erosion and deposition patterns, altering the bed and bank substrate distribution.
- 14.4.7. Any in-channel works has the potential to damage morphological features of watercourses. This could have a direct impact on the hydromorphology of the watercourse, altering longitudinal and lateral connectivity.
- 14.4.8. Any bankside works, including reprofiling, could increase bank erosion, fine sediment delivery and may be at risk of failure. In turn, this could alter the channel morphology and hydromorphological processes.

Groundwater

- 14.4.9. Risks to groundwater will depend upon the design and location of below ground structures, piling and excavations. Ground investigation, including groundwater level and quality monitoring, is planned as part of the current stage of the proposed scheme and this will inform the groundwater conceptual model and assessment of impacts on groundwater.
- 14.4.10. Given the shallow groundwater levels and likely hydraulic connection between surface water and groundwater, dewatering is likely to be required for excavations associated with, for example, the attenuation basins, bridge foundations and service trenches. Dewatering may reduce groundwater levels at, or groundwater flow to receptors such as surface water courses, GWDTE and abstraction boreholes. Discharges from dewatering activities may also impact on receiving surface water or groundwater.
- 14.4.11. Changes in groundwater levels and flow pathways may also affect groundwater quality at receptors.
- 14.4.12. Below ground structures or piles may create vertical pathways between aquifers or through confining layers such as the MMG, potentially allowing the potential migration of contaminants towards or into the underlying SSG Principal aquifer.
- 14.4.13. Lateral groundwater flow pathways through permeable superficial deposits or within more permeable horizons in the MMG may allow the migration of contaminants to groundwater receptors, particularly those within the proposed scheme such as Smite Brook. Potential contaminants entering watercourses, either from direct runoff or indirectly via groundwater pathways, may reach the

SSG principal aquifer to the south-west of the proposed scheme where the MMG is absent and the River Sowe flows through permeable superficial deposits overlying sandstone bedrock.

- 14.4.14. Potential contaminants may arise from the accidental spillage of fuels, lubricants, cements, hydraulic fluids or other harmful substances and runoff from stockpiles stored on site during the construction phase.
- 14.4.15. Demolition and ground disturbance associated with, for example, soil stripping, construction of foundations and piles and excavations for drainage and services, may generate groundwater turbidity. Turbidity may adversely affect groundwater receptors such as abstractions and watercourses.
- 14.4.16. The pollution risk to groundwater bodies, from the disturbance of contaminated ground specifically, is covered in Chapter 10 Geology and soils.
- 14.4.17. Interception of overland flows through the introduction of impervious structures, or compaction of soils, and the movement and storage of earth materials within the study area, could disrupt local groundwater recharge. Increases in areas of impermeable hardstanding, new structures and lined attenuation ponds may also reduce infiltration. Reduced recharge to the permeable superficial deposits may affect groundwater receptors receiving baseflow from the permeable superficial deposits such as surface watercourses, GWDTEs and abstractions through reduced groundwater flow and levels, and also potentially groundwater quality. Furthermore, reduced recharge to the permeable superficial deposits may adversely affect recharge to the SSG principal aquifer down-gradient of the study area, where the superficial and bedrock aquifers are in hydraulic continuity.

Flood Risk

- 14.4.18. During construction, works may lead to temporary changes in the surface water runoff regime by the alteration of ground elevations and overland flow pathways, or the construction of above ground structures acting as a barrier to flow. Due to this, there is an increased risk of flooding during and following extreme rainfall events, including those areas identified as at risk of surface water flooding. This could cause localised flooding to the proposed scheme and others due to changes in surface water flood flow pathways.
- 14.4.19. There will be an increase in new impermeable hardstanding areas, which includes the new carriageway and compounds. This could increase the volume and flow rate of runoff from the construction areas resulting in increased localised flooding to the proposed scheme and others.

- 14.4.20. The drainage network is currently unconfirmed, however, a new culvert may be required to carry flow under the proposed link road to maintain an existing drainage ditch. Any alterations to culverts, pipework and other structures conveying water could result in a temporary loss of capacity, and the potential blocking of drainage systems with construction debris could result in overflowing drains. This could result in an increased flood risk to the proposed scheme or others.
- 14.4.21. Construction works which take place within, adjacent, over or close to surface water features, including the fluvial floodplain, may impact existing storage or channel capacity. In turn, this may increase or divert flood risk to the proposed scheme or others.
- 14.4.22. Earthworks and below ground structures such as foundations, piles and lined attenuation ponds intercepting shallow groundwater may act as groundwater dams, increasing the risk of groundwater flooding up-gradient of the structure or diverting groundwater flow from receptors down-gradient of the structure. Earthworks may additionally compress the underlying ground, particularly if this is cohesive, reducing permeability and increasing the risk of groundwater flooding.
- 14.4.23. Depending on the drainage strategy during construction, potential dewatering discharges to ground could cause local groundwater mounding and increase the risk of groundwater flooding.

Operation

Surface water quality

- 14.4.24. There is a risk of pollution to surface water features resulting from accidental spillage or pollution incidents. This risk would increase with the increase in the volume of traffic as a result of the proposed scheme. Such accidental spillages could result in short term adverse impacts on water quality of receiving watercourses, aquatic ecology and adjacent designated sites.
- 14.4.25. There would be an increase in highway drainage area discharging to surface water, as a result of the proposed scheme. This coupled with the associated increase in traffic volumes could result in an increase in pollutant loads in highway runoff. This in turn could result in a long-term increase in diffuse pollution, adversely impacting on water quality of receiving watercourses, aquatic ecology and adjacent designated sites.
- 14.4.26. Data relating to environmental permits for water discharge activities have been obtained at this scoping stage. Data relating to abstraction licences has been taken from the Groundsure report (National Highways, 2021) and will be confirmed during the ES. Impacts upon existing environmental permits and

abstraction licences are not anticipated to be significant due to distance from the proposed scheme.

Hydromorphology

14.4.27. Potential impacts to hydromorphology during operation include changes to physical form, hydraulic processes and sediment dynamics, constriction of flows, loss of habitats in watercourses and their floodplains and an increase sediment in downstream reaches leading to degradation of the watercourse habitat. These impacts could result from:

- culverting works on a watercourse.
- earthworks when adjacent to watercourses.
- potential new drainage channels.
- new impermeable surfaces.

14.4.28. In the absence of the existing drainage network being confirmed there are potential for impacts resulting from modifications to existing outfall structures, new outfall structures if required and discharge from outfalls to a watercourses or main rivers. This could impact on channel stability, structural damage and an increase sediment in downstream watercourses leading to degradation of the watercourse habitat.

Groundwater

14.4.29. Permanent below ground structures such as attenuation basins, foundations and piles intercepting groundwater within the permeable superficial deposits may divert groundwater flow from receptors such as surface watercourses, GWDTEs and abstractions. Changes in groundwater flow pathways may also affect groundwater quality at receptors.

14.4.30. Attenuation basins are assumed to be lined. However, if they were to be unlined then lateral groundwater flow pathways through permeable superficial deposits or within more permeable horizons in the MMG may allow the migration of contaminants from routine runoff or accidental spillages to groundwater receptors.

14.4.31. As surface watercourses such as Smite Brook and the River Sowe are likely to be in hydraulic continuity with groundwater, permanent drainage discharging to surface water may also allow potential contaminants to migrate to groundwater receptors.

14.4.32. Potential contaminants entering watercourses, either from direct discharges from the permanent drainage or indirectly via groundwater pathways, may reach the

SSG principal aquifer to the south-west of the proposed scheme where the MMG is absent and the River Sowe flows through permeable superficial deposits overlying sandstone bedrock.

- 14.4.33. Below ground structures or piles may create vertical pathways between aquifers or through confining layers such as the MMG, potentially allowing the potential migration of contaminants towards or into the underlying SSG principal aquifer.
- 14.4.34. Increases in areas of impermeable hardstanding, new structures and lined attenuation ponds may reduce infiltration to groundwater, particularly where these are installed in permeable superficial deposits.
- 14.4.35. Furthermore, embankments would increase the underlying soil load, potentially reducing the permeability of compressible ground and restricting groundwater flow to receptors such as abstractions.
- 14.4.36. Changes in groundwater flow pathways may also affect groundwater quality at receptors.

Flood Risk

- 14.4.37. The proposed scheme could lead to a change in the surface water runoff regime by the alteration of ground elevations or overland flow pathways. This could result in the diversion of flood flow pathways, increased localised flooding next to the proposed scheme with potential increased flood risk to the proposed scheme and to others.
- 14.4.38. The creation of the new carriageway hardstanding areas would result in an increase in impermeable area which, could increase the peak flow rate of runoff as well as the volume from the carriageway. This could result in increased localised flooding to the proposed scheme and to others.
- 14.4.39. Although the proposed scheme and drainage design is currently unconfirmed, the options selection stage proposed scheme design does not encroach on Flood Zone 3 and the alignment would include an elevated profile preventing water from encroaching the proposed scheme. Therefore, flood risk impacts to the proposed scheme and to nearby receptors are considered to be minimal.
- 14.4.40. Below ground structures such as foundations, piles and lined attenuation ponds intercepting groundwater within the permeable superficial deposits may act as groundwater dams, increasing the risk of groundwater flooding up-gradient of the groundwater dam or diverting groundwater flow from receptors down-gradient. Earthworks may additionally compress the underlying ground, particularly if this is cohesive, reducing permeability and increasing the risk of groundwater flooding.

- 14.4.41. Depending on the permanent drainage strategy, potential dewatering discharges to ground could cause local groundwater mounding and increase the risk of groundwater flooding.

14.5. Design, mitigation and enhancement measures

- 14.5.1. To avoid impacts on the water environment as far as practically possible the following section will provide detail of mitigation measures and best practice techniques to be implemented. The avoidance of impacts will be considered as the design progresses.
- 14.5.2. The design will include embedded mitigation measures in order to avoid or prevent adverse environmental effects. They are generally incorporated into operation of the proposed scheme, as part of the design, and these will be outlined in the ES.
- 14.5.3. Enhancements will also be considered as the design progresses and these will be based around incorporating green solutions, soft engineering and following best design approaches where appropriate.

Construction

- 14.5.4. Mitigation during construction would be managed through the implementation of an EMP which is considered to be essential mitigation. The EMP will be prepared in alignment with DMRB LA 120: Environmental Management Plans (Highways England, 2020j) and include best practice measures to limit the risk of pollutants entering surface water and groundwater features. The first iteration of the EMP will detail the procedures and methods that should be followed to minimise the potential environmental effects of construction activities and this will be produced to support the environmental assessment.
- 14.5.5. For groundwater and surface water protection the EMP will be in accordance with CIRIA Guidelines (CIRIA C532, 2002; CIRIA C648, 2006a and C649, 2006b; and CIRIA C741, 2014). The EMP will also be in accordance with the Environment Agency's groundwater protection guidance (Environment Agency, 2023a).
- 14.5.6. Given the likely degree of hydraulic continuity between surface water and groundwater receptors and the potential requirement for excavation dewatering, the EMP is likely to include a groundwater monitoring plan, with groundwater level and quality monitoring before, during and after construction. Due to undertaking construction activities close to designated sites, main rivers and the floodplain, a surface water quality monitoring plan is also likely to be required with water quality monitoring to be undertaken prior to and during the construction phase. Any impact and mitigation of these activities will be

considered as the preliminary design progresses and the requirements are confirmed.

- 14.5.7. Groundwater and surface water monitoring plans would be implemented through the EMP. These would be produced at the detailed design stage and be based upon the detailed design. However, the monitoring plans would be considered dynamic and subject to change as proposed scheme construction progresses.
- 14.5.8. Potential dewatering requirements would be informed by a dewatering assessment. Dewatering activities would be undertaken in accordance with regulatory requirements.
- 14.5.9. Impacts from the interception of shallow groundwater would be mitigated through the proposed scheme design, which will be informed by a groundwater assessment.
- 14.5.10. The proposed scheme has the potential to create vertical pathways to aquifers during foundation works such as piling. Mitigation would be through the proposed scheme design, informed by groundwater assessment and piling risk assessment.
- 14.5.11. Where works will lead to temporary changes in the surface water runoff regime by the alteration of ground elevations and overland flow pathways, a temporary surface water drainage strategy would be developed for the proposed scheme and incorporated into the EMP to ensure that there will be no increase in runoff and flood risk during the construction phase. The temporary surface water drainage strategy would detail construction site and compound drainage, and drainage during construction of permanent drainage. It will also detail an appropriate treatment train to prevent runoff and accidental spillages reaching groundwater and surface watercourses, remove sediment and other contaminants as well as attenuating runoff. Sustainable Drainage Systems (SuDS) would be implemented where appropriate.
- 14.5.12. The creation of a new culvert, if required, would be kept to a minimal length and tied into the bed and banks to prevent bank instability. This should include respectively submerging the pipe beneath the bed substrate to prevent knickpoints and bed destabilisation up and downstream of the culvert connection and align any wingwalls with the banks to prevent outflanking. Natural channel morphology including bank profile and bed substrate material should be reinstated following the removal of temporary culverts.
- 14.5.13. Any construction activities, including any demolition, on or near a main river, or in the floodplain of a main river, would require a flood risk activity permit from the Environment Agency. Any construction activities, including any demolition, on or near an ordinary watercourse would require consent from the LLFA as

appropriate. The requirements for demolition are yet to be confirmed as part of the preliminary design.

Operation

- 14.5.14. A water quality assessment using the Highways England Water Risk Assessment Tool (HEWRAT) will be undertaken on all new and existing outfalls. The results of this assessment will detail the requirement for any mitigation measures to be included within the drainage design in order to avoid pollution from routine runoff and spillage pollution risks to the surface water environment.
- 14.5.15. The design of new permanent works affecting watercourses (e.g., new culverts) will be informed by appropriate hydromorphological and ecological surveys and assessments. Mitigation will be required for any additional culverting of a watercourse, if required, as part of the proposed scheme. This would involve constructing and reinstating bed and bank material in accordance with best practice design guidance to mimic natural conditions as close as possible. The design of such structures will be agreed with the Environment Agency and LLFA.
- 14.5.16. The proposed scheme design does not encroach on Flood Zone 3. However, loss of floodplain storage will be checked and confirmed as the design progresses.
- 14.5.17. The drainage strategy would be designed to collect all surface water runoff from the carriageway which would be attenuated to ensure no increase in surface water runoff peak flow rate or volume. Three attenuation ponds to be constructed to attenuate the increase in impermeable area, before discharging to the River Sowe to the west via new outfalls. The pond volumes will take into account relevant climate change allowances, to be agreed with the LLFA. A new culvert may be required to carry flow under the proposed link road to maintain an existing drainage ditch. Culverts should be designed in accordance with DMRB standards and where appropriate the Culvert, Screen and Outfall Manual (CIRIA, 2019). Culvert size will take into account relevant climate change allowances. Any additional mitigation may take the form of SuDS, where appropriate. SuDS features should be designed in accordance with DMRB standards and where appropriate the SuDS Manual (CIRIA, 2015).
- 14.5.18. Impacts from permanent earthworks and below ground structures intercepting shallow groundwater would be mitigated through the proposed scheme and earthworks design, informed by groundwater assessment.
- 14.5.19. Mitigation for the creation of long-term permeable pathways to the underlying principal aquifer would be through the proposed scheme design, informed by groundwater assessment and piling risk assessment.

- 14.5.20. Although the proposed scheme is partially underlain by permeable superficial deposits, infiltration features are unlikely to form part of the drainage strategy due to the likely shallow groundwater levels. HEWRAT assessments would be undertaken for any infiltration features, including unlined road drainage, to inform mitigation requirements to be included in the drainage strategy.
- 14.5.21. As the proposed scheme is partially underlain by permeable superficial deposits, the impact from reduced groundwater recharge is considered to be a risk. Mitigation would be informed by groundwater assessment.

14.6. Description of the likely significant effects

Construction

- 14.6.1. The implementation of a robust EMP, which will include supporting management plans, is likely to be sufficient to mitigate potential risks to a residual negligible or neutral effect during construction.
- 14.6.2. Due to the immediate proximity of works to Smite Brook and its floodplain, a potential residual risk may remain. However, this is likely to not be significant.

Operation

Surface water quality

- 14.6.3. The increase in hardstanding and traffic flow may lead to a deterioration in water quality to downstream receptors. However, the significance of effect to surface water quality of receiving waters cannot be determined at this time in the absence of existing drainage information and the proposed drainage design. Potential for any significant effects will be identified during the ES and mitigating measures will be included in the design, as required.

Hydromorphology

- 14.6.4. The significance of effect to hydromorphology is currently unknown, however, it is considered unlikely following the implementation of mitigation measures. Potential for any significant effects will be identified during the ES and mitigating measures will be included in the design, as required.

Groundwater

- 14.6.5. The likely significance of effect to groundwater levels, flow and quality cannot be determined at this time due to lack of GI and monitoring data, and temporary and permanent works design information, particularly relating to earthworks and drainage. The potential for any significant effects will be assessed during the environmental assessment and any mitigation identified as required. However,

with robust mitigation during construction and operation of the proposed scheme, residual effects are unlikely to be significant.

Flood risk

- 14.6.6. The significance of effect to flood risk is currently unknown. The nature and extent of mitigation required will be determined through the Flood Risk Assessment (FRA) and drainage strategy. Should mitigation be required, this will be incorporated where practicable to comply with NPSNN policy requirements and DMRB standards.

14.7. Assessment methodology

DMRB

- 14.7.1. DMRB LA 113 provides the methodologies for the assessment and management of the impacts that new construction, improvement, technology and maintenance projects may have on the water environment.

Surface water quality

- 14.7.2. A HEWRAT assessment would be undertaken to assess potential impacts routine runoff and accidental spillages on water quality in the receiving waterbodies. This assessment will also establish the requirements for mitigating measures to reduce the risk.
- 14.7.3. The following methods will be adopted:
- Simple assessment of pollution impacts from routine runoff to surface waters using HEWRAT. This will use updated drainage information and traffic data to establish potential impacts of pollutants in routine highway runoff and impacts from spillages for the proposed scheme on the receiving watercourses within the study area and inform the requirement for mitigation measures to adequately reduce the risk.
 - If required, and dependent on the results of the HEWRAT assessment and identification of outfall discharge location, a detailed assessment of pollution impacts from routine runoff may be required using the Metal – Bioavailability Assessment Tool (M-BAT) developed by the Water Framework Directive Technical Advisory Group (WFD-TAG, 2014).

Aquatic ecology

- 14.7.4. The environmental assessment will review potential impacts on water quality and status of the receiving surface water bodies. Any consequential impact on the aquatic ecology will be considered in the biodiversity assessment.

Water Environment (WFD) Regulations

- 14.7.5. The construction and operation stages could result in potential adverse effects on waterbodies classified under the Water Environment (WFD) Regulations. The preliminary design of the proposed scheme is ongoing; however, it is anticipated that a new culvert may be required to carry flow under the proposed link road to maintain an existing drainage ditch. This will be confirmed as the design progresses. The assessment will be carried out with due regard to the Planning Inspectorate advice note eighteen: Water Framework Directive Guidance (Planning Inspectorate, 2017) and Environment Agency guidance (Environment Agency, 2016).
- 14.7.6. A preliminary Water Environment (WFD) Regulations compliance assessment will be carried out using the methodology given in the Environment Agency's documents (Environment Agency, 2016), to screen if the proposed scheme has the potential to have an effect on the WFD status of the waterbodies within the study area. Any potential significant adverse impacts on these waterbodies will trigger the need for a detailed Water Environment (WFD) Regulations compliance assessment.
- 14.7.7. The detailed Water Environment (WFD) Regulations compliance assessment will include an assessment of effects on all quality elements, including hydromorphology and will identify mitigation. It may also identify opportunities for enhancement measures, where practicable, to assist with the implementation of any outstanding RBMP measures.
- 14.7.8. A hydromorphological (simple) assessment, as noted in DMRB LA 113 will also be undertaken as part of the environmental assessment. The methodology will be confirmed with the Environment Agency if a detailed assessment is required.

Flood risk and drainage

- 14.7.9. An FRA will assess the impact to and of the proposed scheme on all sources of flood risk with a focus on Flood Zone 3. The FRA will be undertaken in accordance with the requirements of the applicable government policy (such as NPSNN), and the Environment Agency's climate change allowances (Environment Agency, 2022e). A drainage strategy will also be undertaken. The proposed scope of work required for the FRA is as follows:
- undertake a desk-based review of existing flood risk information, including output from any existing hydraulic model for the Coventry area and the options selection stage.
 - surface water flood risk will be investigated to assess whether surface water overland flow will impact the proposed scheme.

- the Environment Agency accepted the baseline model undertaken at the options selection stage and this will be utilised as a basis to assess the fluvial flood risk impacts from the proposed scheme.
- the FRA will incorporate the findings and any mitigation proposed as part of the drainage strategy in line with DMRB LA 113.

Groundwater

14.7.10. A groundwater assessment will assess the impact to and of the proposed scheme on all sources of risk and will form an appendix to the ES. The groundwater assessment will include:

- Groundwater level, flow and quality assessment; to develop a conceptual model of the study area and identify all potential features that are susceptible to groundwater level, flow and quality impacts. This will also take into account key construction activities and design features that are likely to affect groundwater and will identify whether they have potential to have an impact, using a “source – pathway – receptor” approach. The assessment will be used to identify any mitigation requirements to be incorporated into the proposed scheme design. The assessment will also include preliminary dewatering calculations to inform the dewatering outline design and permitting requirements.
- GWDTE assessment; to identify potential linkages between the proposed scheme and identified GWDTEs, the importance of the GWDTEs, and the potential impacts and risk to the GWDTEs, plus any mitigation requirements to be incorporated into the proposed scheme design.
- Groundwater quality and runoff assessment; a simple assessment (including spillage assessment) would be undertaken if the road drainage design includes infiltration of routine runoff to ground, unlined road drainage, or discharge to a watercourse that dries up in most years or has a Q_{95} flow of one litre per second or less (i.e., the flow that is exceeded 95% of the time). The simple assessment will use the HEWRAT groundwater assessment to identify whether discharges to ground are acceptable, or whether further mitigation is required to be incorporated into the proposed drainage design. If required, and dependent on the results of the HEWRAT groundwater assessment, a detailed assessment may also be required. The scope of this will be developed in consultation with the Environment Agency.

Climate change

14.7.11. The impact of climate change and the occurrence of a Major Event or Disaster will be considered as part of the FRA and drainage strategy. It is considered that the occurrence of an extreme flooding event is the primary major natural event to impact the proposed scheme.

Assessment criteria

- 14.7.12. In accordance with DMRB LA 113, the value, criteria, including typical examples for estimating the importance of water environment attributes are defined Table 14-2.
- 14.7.13. Definitions for estimating the magnitude of impact including typical examples are given in Table 14-3 and are based on values set out in DMRB LA 113. The overall significance of effect is determined using the significance matrix in DMRB LA 104 and the significance definitions and examples provided in Table 14-4. Effects can be beneficial or adverse. Effects that are moderate, large, or very large, are considered significant effects. Effects that are slight or neutral are not significant.

Table 14-2: Criteria for estimating the importance of water environment attributes (adapted from DMRB LA 113)

Value	Criteria	Typical Example
Very High	Nationally significant attribute of high importance	<p>Surface Water: Watercourse having a WFD classification shown in a RBMP and $Q_{95} \geq 1.0 \text{ m}^3/\text{s}$. Site protected / designated under EC or UK legislation (SAC, SPA, SSSI, Ramsar site, salmonid water) / Species protected by EC legislation Ecology and Nature Conservation. The watercourse is free from any modification or human influence and is in natural equilibrium exhibiting a range of morphological features.</p> <p>Groundwater: Principal aquifer providing a regionally important resource and / or supporting a site protected under EC and UK legislation Ecology and Nature Conservation. Groundwater locally supports GWDTE. SPZ1.</p> <p>Flood Risk: Essential infrastructure or highly vulnerable development.</p>
High	Locally significant attribute of high importance	<p>Surface Water: Watercourse having a WFD classification shown in a RBMP and $Q_{95} < 1.0 \text{ m}^3/\text{s}$. Species protected under EC or UK legislation Ecology and Nature Conservation. The watercourse shows very limited signs of modification or other human influence on morphology.</p> <p>Groundwater: Principal aquifer providing locally important resource or supporting a river ecosystem. Groundwater supports a GWDTE. SPZ2.</p> <p>Flood Risk: More vulnerable development.</p>
Medium	Of moderate quality and rarity	<p>Surface Water: Watercourses not having a WFD classification shown in a RBMP and $Q_{95} > 0.001 \text{ m}^3/\text{s}$. Limited range of morphological diversity and features, the watercourse shows signs of modification changed by channel modification or other human pressures.</p> <p>Groundwater: Aquifer providing water for agricultural or industrial use with limited connection to surface water. SPZ3.</p> <p>Flood Risk: Less vulnerable development.</p>
Low	Lower quality	<p>Surface Water: Watercourses not having a WFD classification shown in a RBMP and $Q_{95} \leq 0.001 \text{ m}^3/\text{s}$. No morphological</p>

Value	Criteria	Typical Example
		<p>diversity, the watercourse is highly modified changed by channel modification or other human pressures.</p> <p>Groundwater: Unproductive strata.</p> <p>Flood Risk: Water compatible development.</p>

Table 14-3: Estimating the magnitude of an impact on an attribute (adapted from DMRB LA 113)

Magnitude	Criteria	Example
Major adverse	Results in loss of attribute and / or quality and integrity of attribute	<p>Surface water</p> <p>Failure of both acute-soluble and chronic-sediment related pollutants in HEWRAT and compliance failure with EQS values. Calculated risk of pollution from a spillage $\geq 2\%$ annually (spillage assessment). Loss of regionally important public water supply. Loss or extensive change to a designated nature conservation site. Reduction in water body WFD classification. Extensive change to or replacement of natural bed and bank with artificial interventions.</p> <p>Groundwater</p> <p>Loss of, or extensive change to, an aquifer. Loss of regionally important water supply. Potential high risk of pollution to groundwater from routine runoff - risk score > 250 (Groundwater quality and runoff assessment). Calculated risk of pollution from spillages $\geq 2\%$ annually (Spillage assessment). Loss of, or extensive change to GWDTE or baseflow contribution to protected surface water bodies. Reduction in water body WFD classification. Loss or significant damage to major structures through subsidence or similar effects.</p> <p>Flood risk</p> <p>Increase in peak flood level ($> 100\text{mm}$).</p>
Moderate adverse	Results in effect on integrity of attribute, or loss of part of attribute	<p>Surface water</p> <p>Failure of both acute-soluble and chronic-sediment related pollutants in HEWRAT but compliance with EQS values. Calculated risk of pollution from spillages $\geq 1\%$ annually and $< 2\%$ annually. Degradation of regionally important public water supply or loss of major commercial / industrial / agricultural supplies. Contribution to reduction in water body WFD classification. Considerable change to or replacement of natural bed and bank with artificial interventions.</p> <p>Groundwater</p> <p>Partial loss or change to an aquifer. Degradation of regionally important public water supply or loss of significant commercial / industrial / agricultural supplies. Potential medium risk of pollution to groundwater from routine runoff - risk score 150-250. Calculated risk of pollution from spillages $\geq 1\%$ annually and $< 2\%$ annually. Partial loss of the integrity of GWDTE. Contribution to reduction in water body WFD classification. Damage to major structures through subsidence or similar effects or loss of minor structures.</p> <p>Flood risk</p> <p>Increase in peak flood level ($> 50\text{mm}$).</p>
Minor adverse	Results in some measurable change in	<p>Surface water</p> <p>Failure of either acute soluble or chronic sediment related pollutants in HEWRAT. Calculated risk of pollution from spillages $\geq 0.5\%$ annually and $< 1\%$ annually. Minor effects on water supplies. Slight change from the</p>

Magnitude	Criteria	Example
	attribute's quality or vulnerability	<p>baseline of channel bed and banks though changes to or replacement of natural bed and bank with artificial intervention.</p> <p>Groundwater</p> <p>Potential low risk of pollution to groundwater from routine runoff - risk score <150. Calculated risk of pollution from spillages ≥0.5% annually and <1% annually. Minor effects on an aquifer, GWDTEs, abstractions and structures.</p> <p>Flood risk</p> <p>Increase in peak flood level (> 10mm).</p>
Negligible	Results in effect on attribute, but of insufficient magnitude to affect the use or integrity	<p>The proposed project is unlikely to affect the integrity of the water environment.</p> <p>Surface water</p> <p>No risk identified by HEWRAT (pass both acute-soluble and chronic-sediment related pollutants). Risk of pollution from spillages <0.5%. No change from the baseline of channel bed and banks.</p> <p>Groundwater</p> <p>No measurable impact upon an aquifer and / or groundwater receptors and risk of pollution from spillages <0.5%.</p> <p>Flood risk</p> <p>Negligible change to peak flood level (≤ + / - 10mm).</p>
Minor beneficial	Results in some beneficial effect on attribute or a reduced risk of negative effect occurring	<p>Surface water</p> <p>HEWRAT assessment of either acute soluble or chronic-sediment related pollutants becomes pass from an existing site where the baseline was a fail condition. Calculated reduction in existing spillage risk by 50% or more (when existing spillage risk is <1% annually). Slight change from the baseline of channel bed and banks through changes to or replacement of artificial bed and bank with natural interventions.</p> <p>Groundwater</p> <p>Calculated reduction in existing spillage risk by 50% or more to an aquifer (when existing spillage risk <1% annually). Reduction of groundwater hazards to existing structures. Reductions in waterlogging and groundwater flooding.</p> <p>Flood risk</p> <p>Creation of flood storage and decrease in peak flood level (> 10mm).</p>
Moderate beneficial	Results in moderate improvement of attribute quality	<p>Surface water</p> <p>HEWRAT assessment of both acute-soluble and chronic-sediment related pollutants becomes pass from an existing site where the baseline was a fail condition. Calculated reduction in existing spillage by 50% or more (when existing spillage risk >1% annually). Contribution to improvement in water body WFD classification. Considerable change to or replacement of artificial bed and bank with natural interventions to include a range of morphological features.</p> <p>Groundwater</p> <p>Calculated reduction in existing spillage risk by 50% or more (when existing spillage risk is >1% annually). Contribution to improvement in water body WFD classification. Improvement in water body catchment abstraction management Strategy (CAMS) (or equivalent) classification. Support to significant improvements in damaged GWDTE.</p> <p>Flood risk</p> <p>Creation of flood storage and decrease in peak flood level1 (> 50mm).</p>

Magnitude	Criteria	Example
Major beneficial	Results in major improvement of attribute quality	<p>Surface water Removal of existing polluting discharge or removing the likelihood of polluting discharges occurring to a watercourse. Improvement in water body WFD classification. Extensive change to or replacement of artificial bed and bank with natural interventions to include a range of morphological features.</p> <p>Groundwater Removal of existing polluting discharge to an aquifer or removing the likelihood of polluting discharges occurring. Recharge of an aquifer. Improvement in water body WFD classification.</p> <p>Flood risk Creation of flood storage and decrease in peak flood level (> 100mm).</p>
No change		No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Table 14-4: Significance categories and typical descriptions

Significance	Examples
Very large	Effects at this level are material in the decision-making process.
Large	Effects at this level are likely to be material in the decision-making process.
Moderate	Effects at this level can be considered to be material decision-making factors.
Slight	Effects at this level are not material in the decision-making process.
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

14.8. Assessment assumptions and limitations

- 14.8.1. This report has been prepared using publicly available information and reports produced at the options selection stage. The assessment presented within this report is based on a desk-based study only. No flood modelling has been carried out for this assessment but was undertaken as part of the option selection stage. No surface water or groundwater quality data, or sediment sampling data were available at the time of writing, and available groundwater level data was limited.
- 14.8.2. It has been assumed that the available surface water and groundwater information is representative of the general conditions. Considering the current stage of the proposed scheme, for the purposes of this scoping exercise it is not considered that the data limitations lead to any significant uncertainties.
- 14.8.3. The drainage design is currently under development and it is assumed this will be informed by a drainage survey. However, it is assumed the proposed scheme will drain to existing and new outfall locations and runoff arising from additional impermeable areas introduced as part of the proposed scheme would be

attenuated within attenuation ponds and discharged at the greenfield runoff rate into the surrounding watercourses.

- 14.8.4. A new culvert may be required to carry flow under the proposed link road to maintain an existing drainage ditch. This will be confirmed as the design progresses.
- 14.8.5. It is predicted that the proposed scheme would not significantly impact on the ability of licence holders to abstract surface water as any additional runoff from the proposed scheme, in terms of volume and pollutant load, is likely to remain unchanged through mitigation. This assumption will be reviewed once further information has been received.
- 14.8.6. It is considered that the proposed scheme would not result in an impact on the dilution of existing consented discharges. Any additional runoff from the proposed scheme, in terms of volume and pollutant load, is likely to remain unchanged through standard mitigation practice.

15. Climate

15.1. Introduction

- 15.1.1. This chapter addresses the potential impacts on climate from the proposed scheme and the impacts of future climate change on the resilience of the proposed scheme. To align with the requirements of the EIA Regulations 2017 (as amended) and guidance from DMRB LA 114: Climate (Highways England, 2021) (hereafter referred to as DMRB LA 114), consideration of climate effects is divided into two aspects:
- Greenhouse gas (GHG) impact assessment – considers the impact on the climate of GHG emissions arising from the proposed scheme during its lifetime, including how the project will affect the ability of Government to meet its carbon reduction plan targets
 - Climate change resilience assessment – considers the resilience of the proposed scheme to climate change impacts, including how the proposed scheme design will take account of the projected impacts of climate change
- 15.1.2. The effects on climate relate to the impact the proposed scheme has on climate change through GHG emissions which are also described as “carbon emissions” as carbon dioxide is the predominant GHG. For the purpose of this scoping assessment they are considered analogous.

Legislation, policy and guidance

National policy and legislation

Climate Change Act 2008

- 15.1.3. The Climate Change Act 2008 is central to the UK Government’s plan to reduce carbon emissions, committing the UK to a reduction of 80% against 1990 levels by 2050. On 1 May 2019, the UK Government declared a climate emergency, leading to updating the commitments in the 2008 Act to target net zero carbon emissions by 2050 under the Climate Change Act (2050 Target Amendment) Order 2019. A revision of the target has been produced and states that “the minimum percentage by which the net UK carbon account for the year 2050 must be lower than the 1990 baseline is increased from 80% to 100%.”¹⁵
- 15.1.4. A key provision of the Act with respect to climate change mitigation is a requirement for the government to set legally binding carbon budgets limiting the amount of carbon emitted in the UK over a five-year period. These budgets currently cover the period to 2037 and were issued prior to the revision to the 2050 target in the Climate Change Act. The Sixth Carbon Budget enshrined in

¹⁵ Explanatory note of the Order 2019 of the Climate Change Act 2009 (2050 Target Amendment) - [The Climate Change Act 2008 \(2050 Target Amendment\) Order 2019 \(legislation.gov.uk\)](https://www.legislation.gov.uk/ukpga/2009/27/section-10/notes)

law in June 2021 is the first budget to take account of the UK Government's 2050 net zero target.

15.1.5. Key provisions of the Act with respect to climate change adaptation include:

- a requirement for the government to report, at least every six years, on climate change risks to the UK, and to publish a programme setting out how these will be addressed
- an Adaptation Sub-Committee of the Committee on Climate Change, to both advise and critically review the government's adaptation work.

National Policy Statement for National Networks (2014)

15.1.6. The NPS NN covers delivery of NSIPs and contains a section on climate change adaptation (paragraph 4.40) which sets out how the effects of climate change should be considered when developing infrastructure, a section on the assessment of carbon emissions (paragraph 5.17) and a section on climate change mitigation of carbon emissions (paragraph 5.19).

15.1.7. NPS NN includes relevant guidance, stating that the latest UK climate projections should be used to assess the potential impacts of climate change and to influence adaptation measures, covering the estimated lifetime of the new infrastructure. The current UK climate projections, produced by the Met Office, are referred to as UKCP18, which were updated in 2022 (v4.0).

15.1.8. Regarding climate change mitigation, the NPS NN notes that carbon emissions should be considered as part of an application for a DCO and assessed against the Government's carbon budgets (paragraph 5.17) stating "*it is very unlikely that the impact of a road project will, in isolation, affect the ability of Government to meet its carbon reduction plan targets*". It notes that "*any increase in carbon emissions is not a reason to refuse development consent, unless the increase in carbon emissions resulting from the proposed scheme are so significant that it would have a material impact on the ability of Government to meet its carbon reduction targets*" (paragraph 5.18), although a definition of 'material impact' is not given. It subsequently requires evidence of any mitigation efforts (e.g., use of materials or value engineering) be presented (paragraph 5.19).

15.1.9. It is worth noting that the NPS NN may be outdated with respects to climate having been written prior to the Government's commitment to Net Zero. However, an update to this is currently out for consultation and is expected prior to the end of 2023.

Decarbonising Transport: A Better, Greener Britain (2021)

15.1.10. The UK Transport Decarbonisation Plan (A Better, Greener Britain) outlines plans to meet the medium-term carbon reduction targets to 2035 in the transport

system and deliver net zero by 2050. Mitigation actions comprise (but not exclusively) the electrification of the road transport, encourage active travel and the use of public transport, and manage carbon in transport infrastructure. A Better, Greener Britain states the following:

“Alongside this plan, the Department for Transport (DfT) has initiated a Carbon Management Programme to embed an integrated system for managing whole life carbon of infrastructure projects at a portfolio level. The framework will include capital carbon, i.e., emissions associated with the creation or major modification of an infrastructure asset and be guided by the principles of PAS 2080 – the foremost industry-wide standard for carbon management.”

15.1.11. The climate chapter will be prepared following guidance provided in National Highways Major Projects’ Instructions ‘Environmental Impact Assessment: Implementing the Requirements of 2011/92/EU as amended by 2014/52/EU (EIA Directive)’ (MPI-57-052017). In addition, the following guidance documents have been used to inform the assessment:

- IEMA Environmental Impact Assessment guide to Climate Change Resilience and Adaptation (IEMA, 2020)
- IEMA's Guidance on Assessing Greenhouse Gas Emissions and Evaluating their Significance (IEMA, 2022)
- PAS 2080:2023 Carbon Management in Buildings and Infrastructure
- DMRB LA 114 – Climate (2021)

Local policy

West Midlands Combined Authority Five Year Plan

15.1.12. The West Midlands Combined Authority Five Year Plan (2021-2026)¹⁶ states the following:

“Under a highly ambitious ‘Accelerated’ scenario, goals in domestic, commercial, industrial, transport and land use sectors could deliver a 33% reduction by 2026 (against 2016 baseline) and net zero by 2041.”

Coventry Local Plan

15.1.13. The Coventry Local Plan¹⁷ states the following:

“The built environment remains the largest single contributor of carbon dioxide at 40% of the city’s total with homes and transport having emissions of 36% and 24% respectively. It will be the case that the strategic sites designated on the Policies Map will have a major role to play in achieving an increase in the level of

¹⁶ [wm-net-zero-fyp-summary-tech-report.pdf \(wmca.org.uk\)](https://www.wmca.org.uk/wp-content/uploads/2021/06/wm-net-zero-fyp-summary-tech-report.pdf)

¹⁷ [final-local-plan-december-2017 \(coventry.gov.uk\)](https://www.coventry.gov.uk/media/1548221/final-local-plan-december-2017.pdf)

*decentralised low and zero carbon energy supplies that can be made available.
[...]*

Proposals for the installation of renewable and low carbon energy technologies, including both building-integrated and standalone schemes will be promoted and encouraged, provided that:

- any significant adverse impacts can be mitigated*
- where biofuels are to be utilised, they should be obtained from sustainable sources and transportation distances are minimised*
- any energy centre is suitably located and designed to a high quality such that it is sympathetically integrated with its surroundings*
- all proposals are consistent with any relevant Policies in this Plan*

15.1.14. Under the “General Masterplan Principles” section, the Coventry Local Plan also states that any major development proposal should adhere to the following:

“Identify appropriate highway infrastructure along with sustainable transport corridors that include the provision for integrated public transport, cycling and walking which provides excellent connectivity and linkages to within the site itself, the city centre and with the surrounding area and existing networks.”

15.2. Study area

15.2.1. The study area for the GHG assessment includes:

- all direct GHG emissions arising as a result of construction, maintenance and operational activity within the scheme extent. This includes the embodied carbon in materials used for construction and maintenance as a result of raw material extraction, processing and manufacture and their associated transport to site
- road user emissions arising from the Affected Road Network (ARN)

15.2.2. The study area for the resilience assessment will be:

- the area of temporary and completed works within the proposed scheme extent
- affected receptors identified within other environmental factors ‘scoped in’ to the assessment

Spatial scope

15.2.3. The assessment will identify the key climate change impacts on the proposed scheme design elements such as structures or technological assets, as well as environmental receptors identified within this Scoping Report that may be affected by the proposed scheme.

Temporal scope

- 15.2.4. The assessment of resilience to climate change will consider construction and operational impacts. Climate change impacts on construction have the potential to be scoped out depending on the construction duration. The operation assessment will be informed by the design life of key elements of the proposed scheme and availability of UK climate projections.

15.3. Baseline conditions

Climate change (GHG) impact assessment

- 15.3.1. At this stage it is not possible to include the proposed scheme specific operational baseline carbon emissions as this relies on detailed information yet to be determined, particularly from the traffic model. The construction carbon assessment conducted at the preliminary design stage will be compared against the carbon baseline produced at the options selection stage.
- 15.3.2. The following baseline information is based on national and county-wide data because carbon emissions do not have a local receptor as, once they are emitted, they are not limited to geographic boundaries.
- 15.3.3. In 2020, UK net emissions were estimated at 326MtCO₂e, a decrease of 11% in comparison to 2019 levels. During 2020, 29% of UK carbon emissions were from the transport sector which is a 20% reduction in comparison to 2019. It must be noted that the Covid-19 pandemic and resulting restrictions is likely to have had a significant impact on the emissions throughout the UK over 2020 and will be accountable for a proportion of this reduction.
- 15.3.4. The proposed scheme falls within the Coventry Local Authority area where the emissions total for 2020 was 1,280 ktCO₂e, of which 8% (106 ktCO₂e) is accountable to transport on A roads.
- 15.3.5. For 2018 carbon emissions from manufacturing and construction in the UK were estimated at 66 MtCO₂. Although the data accounts for manufacturing in addition to construction, this gives the best indication of the proportion of UK emissions associated with construction. Data is not available for the UK construction sector alone, but the World Green Building Council has found that building materials and construction were responsible for around 11% of global energy related GHG emissions in 2018.
- 15.3.6. The projections from the Department for Business, Energy & Industrial Strategy (referred to as the BEIS projections) show a decline in total emissions to 2040 (emissions are projected to fall by 24% from 2019 levels). In 2018, 97% of transport final energy consumption was from oil-based fossil fuels but by 2040

this is projected to fall to 89% due to an increase in electric vehicles and increasing biofuels use.

- 15.3.7. The UK government, as part of the Climate Change Act 2008, has set legally binding carbon budgets capping the amount of carbon that can be emitted in the UK over a 5-year period, as shown in Table 15-1.

Table 15-1: UK Government carbon budgets

Carbon budget	Carbon budget level	Reduction below 1990 levels
Fourth Carbon Budget (2023-2027)	1,950 MtCO ₂ e	51% by 2025
Fifth Carbon Budget (2028-2032)	1,725 MtCO ₂ e	57% by 2030
Sixth Carbon Budget (2033-2037)	965 MtCO ₂ e	78% by 2035

- 15.3.8. The projections show shortfalls for the Fourth Carbon Budget and Fifth Carbon Budget of 188 MtCO₂e and 253 MtCO₂e respectively. Meanwhile, the Committee on Climate Change (CCC) have stated that emissions will need to fall more rapidly than these targets. As such an ambitious Sixth Carbon Budget has been proposed by the CCC and accepted by the UK Government to allow the UK to meet net-zero carbon by 2050, with a commitment to a reduction of almost 80% by 2035 compared to 1990 levels.
- 15.3.9. The CCC has also determined a balanced net-zero pathway for construction and manufacturing that includes a reduction of 43% by 2030, 75% by 2035 and 90% by 2040 to achieve the 97% reduction by 2050. This pathway considers a proportion of the reduction will come from improved resource efficiency in production and material substitution. Therefore, significant effort is required to ensure that all contributing emissions are reduced as far as possible through the design, construction, and operation of all schemes.

Climate change resilience assessment

- 15.3.10. A current climate baseline for the wider region has been compiled using Met Office (2016) regional climate data. High-level climate observations over a 30-year averaging period (1981-2010) are presented in Table 15-2 for West Midlands, which comprises Birmingham, Coventry, Dudley, Sandwell, Solihull, Walsall and Wolverhampton¹⁸. This information has been used as a baseline against which, the potential vulnerability of the proposed scheme, when subjected to the climate change projected by the Met Office, will be determined.

¹⁸ [*midlands -climate---met-office.pdf \(metoffice.gov.uk\)](https://www.metoffice.gov.uk/publications/midlands-climate---met-office.pdf)

Table 15-2 : Historic climate baseline for Midlands (1981-2010)

Climate variables	Climate observations
Temperature	Mean daily minimum temperatures can range from 0°C to 1.5°C in winter, whilst summer daily maximum temperatures can exceed 22°C.
Rainfall	Rainfall is generally well-distributed through the year, but the wettest month varies across the region. In the wetter upland areas of the north and west, there is a pronounced winter maximum when the Atlantic depressions are at their most vigorous. Over much of the Midlands, the number of days with rainfall totals of 1 mm or more ('wet days') tends to follow a pattern similar to the monthly rainfall totals. In the higher parts of the west and north in winter (December - February), 40 to 45 days is the norm but this decreases to near 30 days in summer (June - August).
Wind	The Midlands area is one of the more sheltered parts of the UK, the windiest areas being in western and northern Britain, closer to the Atlantic. The strongest winds are associated with the passage of deep areas of low pressure close to or across the UK. The frequency and strength of these depressions is greatest in the winter half of the year, especially from December to February, and this is when mean speeds and gusts (short duration peak values) are strongest.
Air Frost	The average number of days with air frost in the Midlands varies from about 40 a year in the lower Severn valley to over 60 a year in the Peak District and sheltered areas of the Welsh Marches. Ground frost occurs on average on about 100 to 125 days per year, with a similar distribution to air frost.

15.3.11. The future baseline is obtained from the UK Climate Projections developed by the Met Office Hadley Centre which include regional climate projection data, for which the proposed scheme is included in the West Midlands region.

15.3.12. The UK Climate Projections (UKCP18, published November 2018¹⁹) provide regional climate projection information within the West Midlands Administrative Region (where the proposed scheme is located). The West Midlands region is predicted to experience changes in temperature, rainfall, and increase in frequency of extreme weather events as a consequence of climate change. These changes are predicted to occur under all emissions scenarios (low, medium and high levels of carbon emissions), which are incorporated into the climate change models used by the IPCC. The general trend for the region is warmer, drier summers and milder, wetter winters.

15.3.13. Under the highest emissions scenario (RCP8.5) for the 2080s (2080-2099), estimated changes in climatic conditions are as outlined in Table 15-3.

Table 15-3 : Future climate projections for Midlands (2080s; RCP8.5)

Climate variables	Climate observations
Temperature	The average annual temperature modelled to occur within 2080s, under the RCP8.5 scenario at the 50th percentile, is an increase of approximately 4-5°C. Summer temperature is projected to increase by 5-6°C under the central

¹⁹ <https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/summaries/climate-change-projections-over-land>

Climate variables	Climate observations
	estimate, which represents 'as likely as not' probability of change (50th percentile). Average winter temperature is estimated to increase by 3-4°C (50th percentile)
Rainfall	The average annual rainfall rate predicted to occur between 2080 and 2099, under the RCP8.5 scenario at the 50th percentile, is an increase in precipitation anomaly between 0 - 10%. The average summer rainfall rate is projected to decrease by 30-40%, whereas the average winter rainfall rate is estimated to increase by 20-30% (in the 50th percentile or central estimate for both).

15.4. Potential impacts

Climate change (GHG) impact assessment

- 15.4.1. The key anticipated GHG emission sources during the construction and operation phase are set out in Table 15-4. This approach is consistent with the principles set out in the DMRB standard, BS EN 15804 (British Standards Institution, 2012), PAS 2080 (British Standards Institution, 2023) and IEMA guidance (IEMA, 2022).
- 15.4.2. DMRB LA 114 (section 3.3) states that during the scoping exercise, consideration should be given to the following questions to understand the need to undertake further GHG assessment:
- are construction GHG emissions (or GHG-emitting activity), compared to the baseline scenario (i.e., when compared to GHG emissions and energy use associated with existing maintenance activities), increasing by >1%?
 - during operation, will roads meet or exceed any of the following criteria?
 - a change of more than 10% in annual average daily traffic (AADT)
 - a change of more than 10% to the number of heavy-duty vehicles; and
 - a change in daily average speed of more than 20 km/hr
- 15.4.3. It is considered likely that during construction, GHG emissions will increase by more than 1% compared to baseline of maintaining the existing road network in the area. Further assessment will therefore be undertaken for the proposed scheme.
- 15.4.4. Information presented in Table 15.3 is 'scoped in' to the lifecycle GHG impact assessment according to DMRB LA 114. The lifecycle stages (or modules) have been based on BS EN 17472:2022, the same standard given in the PAS 2080:2023 Guidance Document. It is worth noting that emissions associated with decommissioning have been scoped out of the assessment as it is anticipated the proposed scheme will be in use beyond the design life of the road infrastructure. Any future decommissioning would require a separate planning submission.

Table 15-4 : Impact of the proposed scheme on climate

Lifecycle stage	Lifecycle module	Potential impacts to be assessed in EIA
Capital GHG emissions	A1-A5	<ul style="list-style-type: none"> - GHG emissions associated with raw material extraction and manufacturing of products required for the proposed scheme - GHG emissions associated with the construction process - GHG emissions associated with the transport of construction materials (where not included in embodied GHG emissions), on-site construction activity, transport of construction workers, and disposal of any waste/ water generated by the construction processes
Operational GHG emissions	B1-B5	<ul style="list-style-type: none"> - GHG emissions associated with the operation of associated road and signalling, any energy use, and maintenance (including re-surfacing)
Use GHG emissions	B8	<ul style="list-style-type: none"> - GHG emissions associated with vehicle journeys

Climate change resilience assessment

15.4.5. Due to the short period anticipated for construction and considering the effects of risks from climate change are felt over a much greater period, it is unlikely that climate change will be experienced during construction of the proposed scheme. As such this aspect has been scoped out.

15.4.6. The potential risks associated with climate change that could occur through operation are identified as:

- Pavements may be affected by climate change due to:
 - Increased winter precipitation which could increase sub-surface moisture and induce premature pavement failure
 - changes in the future precipitation regime (varying from drought conditions to heavy rainfall) causing pavements to heave
 - summer temperature which could result in surface failure, rutting and warping
 - extreme weather events, including heavy rainfall, snow and ice build-up, which may reduce perceived and actual skid resistance
- Structures may be affected due to increased temperature and precipitation which could result in greater risk of joint, bearing or surface failure
- Drainage may be affected due to increased precipitation increasing standing water, build-up of particulates in road surface, and flood risk
- Earthworks may be affected due to changes in the future precipitation regime increasing the risk to earthworks stability
- Signs and lightweight structures may be affected due to frequency of extreme wind events
- Road markings may be affected due to increased temperature accelerating the weathering

- Electronical equipment may be affected due to temperatures which may be greater than the tolerance for the equipment as such resulting in failure
- Maintenance activities may be affected due to:
 - safety concerns associated with extreme weather which may result in reduced likelihood of maintenance
 - longer vegetation growing season leading to increased need for maintenance (due to warmer winters and wetter summers)
- Mitigation planting may be affected due to increased temperature, increased likelihood of disease, and changing precipitation patterns

15.5. Design, mitigation and enhancement measures

Climate change (GHG) impact assessment

- 15.5.1. All construction and operational activities and materials associated with the proposed scheme will result in GHG emissions contributing to a negative impact on the climate. Residual impacts will arise as it is not currently feasible to fully eliminate emissions resulting from the production of road building materials, construction activities and energy use during scheme operation.
- 15.5.2. As specified in the Design and Mitigation section of DMRB LA 114, where residual (non-significant) climate impacts have been identified in the environmental assessment, measures to manage the ongoing risks shall be identified.
- 15.5.3. Furthermore, limitations exist in terms of feasible design alternatives for the proposed scheme due to legal requirements for quality and safety considerations in UK road schemes.
- 15.5.4. In an attempt to reduce GHG emissions the following measures will be applied as advised by the carbon emissions reduction hierarchy of PAS2080:2023:
- Avoid: the design will seek to increase potential for re-using and/ or refurbishing existing assets to reduce the extent of new construction required, or explore alternative lower carbon options to deliver the project objectives
 - Switch: apply low carbon solutions (including technologies, materials and products) to minimise resource consumption during the construction, operation, user's use of the project, and at end-of-life; and construct efficiently: use techniques that reduce resource consumption over the life cycle of the project
 - Improve: after addressing steps 1 and 2 projects, will identify, assess and integrate measures to further reduce carbon through on or off-site offsetting or sequestration

- 15.5.5. The final selection of the most appropriate mitigation measures will be detailed as part of the lifecycle GHG impact assessment in the full environmental impact assessment for the proposed scheme. This will include GHG emission mitigation measures concerning construction and operation of the proposed scheme.
- 15.5.6. A carbon management plan will be produced, and emissions associated with the construction and operation of the asset will be appraised and monitored as recommended by PAS2080:2023.

Climate change resilience assessment

- 15.5.7. A number of general mitigation and adaptation measures will be considered to address potential risks, many of which will have been identified by other technical assessments and the proposed scheme design. The assessment will identify and take into account the existing resilience measures for each climate risk either already in place or in development for infrastructure and assets.

15.6. Description of the likely significant effects

Climate change (GHG) impact assessment

- 15.6.1. The assessment of significance associated with the estimated emissions, as advised by IEMA (2022) guidance, will consider proposed mitigation and the development's ability to meet regional and national policy requirements e.g., those listed in the WMCA Five Year Plan²⁰, the Coventry Local Plan²¹ and Climate Change (UK) Act 2008 (2050 Target Amendment) Order 2019. As informed by DMRB LA 114, the significance will be determined on the level of impact the proposed scheme's GHG emissions has on Government's ability to meet its carbon reduction targets. The Carbon Impact Assessment will include opportunities for mitigation to be considered in the design of the proposed development in line with design hierarchy of 'build less, build clever, build efficiently' as set out in IEMA guidance (IEMA, 2022) and PAS 2080.

Climate change resilience assessment

- 15.6.2. Significance of effects will be determined in accordance with DMRB LA 114 standard. This involves using a matrix comparing the likelihood of climate hazards, leading to an in-combination impact, with the consequence of in-combination impacts. The likelihood of climate hazards leading to an in-combination impact will be defined using an assessment of the regional climatic data, derived from the UKCP18 Climate Projections, combined with professional judgement. The consequence of in-combination impacts will be based on the

²⁰ West Midlands Combined Authority Five Year Plan (2021-2026) - [wm-net-zero-fyp-summary-tech-report.pdf \(wmca.org.uk\)](https://www.wmca.org.uk/reports/wm-net-zero-fyp-summary-tech-report.pdf)

²¹ Coventry Local Plan (2011-2031) - [Coventry Local Plan \(2011-2031\) – Coventry City Council](#)

change to the significance of the effect of the proposed scheme on the resource or receptor for each relevant environmental discipline, given existing mitigation measures.

15.7. Assessment methodology

Climate change (GHG) impact assessment

- 15.7.1. DMRB LA 114 (section 3.5.1) provides questions on the quantity of data in the required timescales to accurately assess GHG emissions. It is believed that sufficient quantitative data will be available to assess GHG to allow the impact on climate for GHG emissions to be assessed.
- 15.7.2. At this stage all aspects noted will be considered to determine the carbon footprint of the proposed scheme, despite some aspects being likely to have a relatively small proportion of total emissions. However, it may be determined at a later stage that some of the lifecycle stages can be scoped out due to either lack of data availability or if the emissions are likely to be negligible in comparison to the other lifecycle stages. Where data is lacking appropriate assumptions will be made to ensure a robust assessment.

Assessment of construction impacts

- 15.7.3. The assessment of the construction effects on climate will be in accordance with DMRB LA 114 and will include:
- assessment of the carbon emitted during construction using recognised calculation methodologies and tools outlined below:
 - the National Highways Carbon Tool
 - the Royal Institution of Chartered Surveyors (RICS) guidance and assumptions on the transport of materials to site
 - Environmental Product Declarations detailing the emissions for certain design aspects where appropriate for bespoke items
 - the Woodland Carbon Code (WCC) for the soil carbon change unless an alternative site-specific methodology is determined

Assessment of operational impacts

- 15.7.4. The assessment of the operational effects on climate will include:
- Assessment of carbon emitted during user utilisation over the 60-year assessment period for the proposed scheme through an appraisal of carbon for the proposed scheme opening year and forecast year to derive the change in emissions assessed in accordance with DMRB LA 114. The use of WebTAG and the TAG database allows the implementation of the study area,

and assessment of change in carbon emissions, as defined by DMRB LA 114.

- The Emission Factor Toolkit (EFT), published by the Department for Environment, Food and Rural Affairs (Defra) will be used to estimate the change in carbon emissions from end-users over the design life of the proposed scheme. The final output will be entered into the TAG Assessment sheet to obtain monetary data.
- Assessment of the emissions associated with electricity requirements for the operation of the proposed scheme. This will utilise the data determined through design and publicly available emission factors for grid electricity. Future grid decarbonisation trajectories from the BEIS Green Book will be used.
- Assessment of the emissions associated with known upkeep for the proposed scheme through the assessment period (e.g., resurfacing of pavement) will be in line with the methodology for construction detailed above. This will include a sensitivity analysis of these emissions to consider the projected improvements in reduction techniques for construction.

Significance of effect

15.7.5. For the purpose of the proposed scheme, the assessment of significance will follow DMRB LA 114 because this is most relevant to a National Highways scheme on the strategic road network. Furthermore, as there is no globally agreed methodology to date, DMRB LA 114 provides a clear methodology to be used.

15.7.6. DMRB LA 114 states that “projects shall only report significant effects where increases in GHG emissions will have a material impact on the ability of Government to meet its carbon reduction targets”. It also notes that National Planning Policy Statement states that “It is very unlikely that the impact of a road project will, in isolation, affect the ability of Government to meet its carbon reduction plan targets” and that in this context “it is considered unlikely that projects will in isolation conclude significant effects on climate”.

The assessment will include a comparison of estimated carbon emissions arising from the proposed scheme with UK carbon budgets, and the associated reduction targets, in line with DMRB LA 114. The results of this comparison will be presented as shown in Table 3.18 of DMRB LA 114.

Climate change resilience assessment

15.7.7. The climate change resilience assessment will follow the method detailed in the DMRB LA 114 standard. This will be completed in liaison with the project design team and the other EIA technical disciplines by considering the UKCP18 projections for the geographical location and timeframe of the proposed scheme (from construction through to operation).

- 15.7.8. The DMRB LA 114 standard details how to assess the relevance of potential impacts during operations, significance criteria, evaluation of significance and when further design and mitigation measures are required. During the construction phase, impacts will be assessed qualitatively. Once climate hazards have been identified the likelihood and consequences will be assessed according to Table 15-5 and Table 15-6.

Table 15-5 : Likelihood categories

Likelihood	Description (probability and frequency of occurrence)
Very high	The event occurs multiple times during the lifetime of the project (60 years) e.g., approximately annually, typically 60 events
High	The event occurs several times during the lifetime of the project (60 years) e.g., approximately once every five years, typically 12 events.
Medium	The event occurs limited times during the lifetime of the project (60 years) e.g., approximately once every 15 years, typically 4 events.
Low	The event occurs during the lifetime of the project (60 years) e.g., once in 60 years.
Very Low	The event can occur once during the lifetime of the project (60 years).

Table 15-6 : Description of consequences

Consequence of impact	Description
Very large adverse	Operation - national level (or greater) disruption to strategic route(s) lasting more than 1 week.
Large adverse	Operation - national level disruption to strategic route(s) lasting more than 1 day but less than 1 week or regional level disruption to strategic route(s) lasting more than 1 week.
Moderate adverse	Operation - regional level disruption to strategic route(s) lasting more than 1 day but less than 1 week.
Minor adverse	Operation - regional level disruption to strategic route(s) lasting less than 1 day.
Negligible	Operation - disruption to an isolated section of a strategic route lasting less than 1 day.

- 15.7.9. The significance of each impact will then be evaluated through a matrix as detailed in Table 15-7. Any significant conclusions will be based on and incorporate confirmed design and mitigation measures, as described by LA 114. Any further design and mitigation measures will then be incorporated, and then residual risks will be reassessed until a non-significant acceptable level is achieved.

Table 15-7 : Significance matrix ('S' significant, 'NS' not significant)

		Measure of Likelihood				
		Very Low	Low	Medium	High	Very High
Measure of consequence	Very Large	NS	S	S	S	S
	Large	NS	NS	S	S	S
	Moderate	NS	NS	S	S	S
	Minor	NS	NS	NS	NS	NS
	Negligible	NS	NS	NS	NS	NS

15.7.10. A statement will be provided within the climate assessment of the environmental assessment report to describe how the proposed scheme will be designed and monitored to improve its resilience to future climatic conditions.

15.8. Assessment assumptions and limitations

- 15.8.1. While the climate projections (as presented in section 15.1 of this chapter) represent anticipated average weather conditions, they do not capture the full range of possible future severe weather events (i.e., droughts, heatwaves and prolonged heavy rainfall).
- 15.8.2. The operational assessment will be based upon the traffic data produced from a traffic model for the proposed scheme. The assumptions and limitations of this model will be detailed within the environmental assessment.
- 15.8.3. Assessments made in relation to the likelihood and severity of potential risks and impacts will rely on professional judgement and evidence gathered through other environmental assessment topics.
- 15.8.4. Where possible, GHG calculations will be based on the available data. Where specific data is absent, calculations will be transparently based on specified assumptions and proxies.
- 15.8.5. All assumptions, limitations and exclusions (including exclusion criteria applied to input and output data) will be documented as part of the assessment

16. Assessment of cumulative effects

16.1. Cumulative assessment methodology

16.1.1. Combined and cumulative effects result from multiple actions on receptors over time and are generally additive or interactive (synergistic) in nature. They can also be considered as effects resulting from incremental changes caused by other past, present or reasonably foreseeable actions together with the project, identified as:

- combined effects from a single project (e.g., numerous different effects impacting a single receptor)
- cumulative effects from different projects (with the project being assessed)

16.1.2. DMRB LA 104 – Environmental assessment and monitoring (Highways England, 2020b; herein referred to as ‘DMRB LA 104’) states that, in general, cumulative assessment will be most successful when the assessment of all other environmental effects of the project is complete. The previous sections presented within this ESR have identified that further assessment is required for a number of environmental topics, which will be undertaken during the preliminary design stage environmental assessment. As a result, no assessment of cumulative effects has currently been made within this preliminary design stage ESR. Instead, this section provides an overview of the baseline, potential effects, and proposed methodology for the assessment of combined and cumulative effects to be completed in the preliminary design stage.

Combined effects methodology

16.1.3. In line with DMRB LA 104, the assessment methodology for combined effects involves the identification of effect interactions associated with the proposed scheme upon a receptor or group of receptors, to better understand the overall environmental effect of the proposed scheme.

16.1.4. The significance of construction and operational phase environmental effects will be brought forward from the preceding technical sections of the environmental assessment into matrices, providing an overview of the potential effects on individual receptors. The assessment will consider residual effects, after mitigation has been taken into account. The significance of combined effects upon each environmental receptor or group of receptors would then be made based upon the balance of scores and using professional judgement.

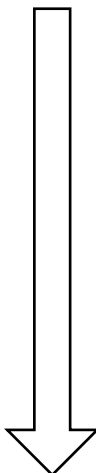
Cumulative effects methodology

- 16.1.5. The assessment methodology for cumulative effects will involve the identification of incremental changes likely to be caused by potential 'other developments' together with the proposed scheme.
- 16.1.6. The assessment of cumulative effects will broadly follow Advice Note Seventeen: Cumulative Effects Assessment (Planning Inspectorate, 2019) with the four stages of assessment as follows:
- Stage 1: Establish the NSIP's Zone of Influence (ZoI) and identify a long list of 'other developments'
 - Stage 2: Identify shortlist of 'other developments' for the cumulative effects assessment
 - Stage 3: Information gathering
 - Stage 4: Assessment
- 16.1.7. To establish the long list of 'other developments', the Uncertainty Log produced for the traffic assessment and agreed with the Highway Authority will be used. A search of the National Infrastructure Planning, Coventry City Council and Rugby Borough Council planning portals will be undertaken, to identify developments within the ZoI that currently have a screening letter, scoping report or ES on the planning portal. Review of the Coventry City Council and Rugby Borough Council Local Plans will be undertaken to identify any committed planned developments within the ZoI. Consultation with both councils will be carried out to agree the long list.
- 16.1.8. For the purposes of the assessment, the following criteria, based on the type and scale of potential effects generated by a proposed development, will be applied to the long list, to reduce to a short list. This criterion is based on the Screening Criteria contained within the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (UK Government, 2017b):
- The development includes more than 1ha of urban development which is not dwelling house development
 - The development includes more than 150 dwelling houses
 - The area of the development exceeds 5ha
- 16.1.9. It is important to note that proposed developments that are close to the threshold limits but have characteristics likely to give rise to significant cumulative effects, or for which could give rise to a cumulative effect by virtue of its proximity to the proposed scheme, would also be considered in the assessment, as recommended by Planning Inspectorate for Nationally Significant Schemes

‘Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects’.

- 16.1.10. The ‘other developments’ are grouped into tiers, reflecting the likely degree of certainty attached to each development, with Tier 1 being the most certain, as shown in Table 16-1. ‘Other development’ falling into Tier 3 is least certain and most likely to have limited publicly available information to inform assessments. Tiers will be informed by the Uncertainty Log and publicly available information.

Table 16-1: Likely degree of certainty assigned to each tier

Tier	Likely degree of certainty	Decreasing level of detail likely to be available
Tier 1	<ul style="list-style-type: none"> Under construction*. Permitted application(s), whether under the Planning Act 2008 or other regimes, but not yet implemented. Submitted application(s) whether under the Planning Act 2008 or other regimes but not yet determined. 	
Tier 2	<ul style="list-style-type: none"> Projects on the Planning Inspectorate's Programme of Projects where a Scoping Report has been submitted. 	
Tier 3	<ul style="list-style-type: none"> Projects on the Planning Inspectorate's Programme of Projects where a Scoping Report has not been submitted. Identified in the relevant Development Plan (and emerging Development Plans – with appropriate weight being given as the move closer to adoption) recognising that much information on any relevant proposals will be limited. Identified in other plans and programmes (as appropriate) which set the framework for future development consents / approvals, where such development is reasonably likely to come forward. 	

Advice Note Seventeen: Cumulative Effects Assessment relevant to nationally significant infrastructure projects (The Planning Inspectorate, 2019).

*Where other projects are expected to be completed before construction of the proposed NSIP and the effects of those projects are fully determined, effects arising from them should be considered as part of the baseline and may be considered as part of both the construction and operational assessment.

- 16.1.11. In accordance with the Infrastructure Planning EIA Regulations 2017 (UK Government, 2017a), the assessment of cumulative effects should include ‘effects with other ‘existing and/or approved developments’. However, taking the precautionary principle into account, and given the information provided in Table 16-1 above, the assessment of cumulative effects would also consider submitted applications which have not yet been determined (Tier 1), as well as those which meet the criteria in paragraph 16.1.8 and where a Scoping Report has been submitted (Tier 2).

- 16.1.12. Rather than reporting every interaction, the methodology for the assessment of cumulative effects concentrates on the main significant effects, and will aim to

differentiate between permanent, temporary, direct, indirect, and secondary effects, adverse or beneficial.

- 16.1.13. Where significant cumulative effects, beyond those identified as residual effects from the proposed scheme in isolation have been identified, additional mitigation measures would be developed.
- 16.1.14. The significance of cumulative effects upon each environmental receptor or group of receptors would then be made based on the balance of scores and using professional judgement. An on-balance approach would be taken when identifying the overall cumulative effect for the proposed scheme in conjunction with the other proposed major developments.

Significance criteria

- 16.1.15. The assessment of the significance of the combined and cumulative effects arising from the proposed scheme with other existing and/or approved developments within the short list would be based upon the definitions within Table 16-2. The significance of effects would be reported as 'Significant Adverse/Beneficial', 'Not Significant Adverse/Beneficial', or 'Neutral'. Where an effect is Moderate or above (Adverse or Beneficial), it is deemed to be significant.
- 16.1.16. For the purposes of the assessment, the value of a receptor or group of receptors, and magnitude of impact would be determined according to the criteria set within the preceding chapters of the ESR. The significance of effect is then carried forward from preceding chapters to enable an on-balance assessment of combined significance upon receptors, as well as to identify the significance of cumulative effects with other developments. Typical descriptors of cumulative significance are included within Table 16-2, which reflects this on-balance approach. Overall significance is determined with mitigation included, as shown in Table 16-2.
- 16.1.17. Significance descriptors have also been aligned with the considerations included within Planning Inspectorate Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects. Accordingly, where effects are likely to be temporary, the overall significance of effect is considered to be reduced from a permanent effect on a receptor of the same value. Equally, localised and infrequent effects are likely to be of lower magnitude than those that cover a greater geographical scale and/or regularly occur, resulting in a reduced significance of effect. Effects can be additive (such as the loss of two pieces of woodland of 1ha, resulting in 2ha cumulative woodland loss) or synergistic (two discharges combining to have an effect on a species not affected by discharges in isolation).

Table 16-2: Combined and cumulative significance criteria

Significance		Definition
Significant Adverse or Beneficial	Very Large (Adverse or Beneficial)	Where the combined effects of the proposed scheme or cumulative effects of the proposed scheme in association with other existing or more than likely / near certain future major development upon an individual or collection of environmental receptors would be highly significant.
	Large (Adverse or Beneficial)	Where the combined effects of the proposed scheme or cumulative effects of the proposed scheme in association with other existing or more than likely / near certain major future developments upon an individual or collection of environmental receptors would be significant.
	Moderate (Adverse or Beneficial)	Where the combined effects of the proposed scheme or cumulative effects of the proposed scheme in association with other existing or more than likely / near certain major development upon an individual or collection of environmental receptors would be noteworthy but not significant.
Not Significant Adverse or Beneficial	Slight (Adverse or Beneficial)	Where the combined effects of the proposed scheme or cumulative effects of the proposed scheme in association with other existing or more than likely / near certain future major developments upon an individual or collection of environmental receptors would be slight.
Neutral	Neutral	Where the combined effects of the proposed scheme or the cumulative effects of the proposed scheme in association with other existing or more than likely / near certain future major developments would balance.

Based on DMRB LA 104: Environmental assessment and monitoring and professional judgment

Study areas

Combined effects

16.1.18. The study area for the assessment of combined effects, for both construction and operation, would be defined by the study areas identified within the relevant environment topic sections of this ESR, ranging from 200m (for Air quality) to 2km (for Biodiversity).

Cumulative effects

16.1.19. To identify the 'other developments' to be included in the long list of cumulative effects, a Zone of Influence 'Zol' has been established which applies to each environmental discipline, of 1km from the proposed scheme extent.

Assumptions and limitations

16.1.20. At this stage of assessment, the proposed major other developments within the study area have not been identified. A search of the Planning Inspectorate website identified no Nationally Significant Infrastructure Projects within 1km of the proposed scheme extents. A full list of the local proposed developments will be identified as part of the uncertainty log and review of the National

Infrastructure Planning, Coventry City Council and Rugby Borough Council planning portals to be incorporated into the preliminary design stage environmental assessment. Therefore, the environmental effects that would result from other developments have not been identified. The assessment of potential effects is therefore limited at this stage and has focused on some of the main receptors that could be affected as a result of both combined and cumulative effects. The likely residual effects and proposed mitigation for each of the other developments would be identified and incorporated into the cumulative effects assessment.

Guidance and best practice

16.1.21. This section and future assessment will draw upon the following guidance:

- The Planning Inspectorate's 'Advice Note Seventeen: Cumulative Effects Assessment'
- DMRB LA 104 – Environmental assessment and monitoring

16.2. Assessment of combined effects

- 16.2.1. During construction, there is the potential for combined effects on receptors relating to the following environmental disciplines (but not limited to) air quality, noise and vibration, landscape and visual, cultural heritage, population and human health, biodiversity, climate and material resources and waste, as a result of the proposed scheme due to the potential effects reported within the preceding Chapters 6 to 15. However, during construction, effects would be temporary in nature and best practice mitigation measures included in the Second Iteration of the EMP would ensure that combined effects are reduced as far as possible.
- 16.2.2. During operation, there is the potential for combined effects on receptors relating to the following environmental disciplines (but not limited to) road drainage and the water environment, landscape and visual effects, cultural heritage, population and human health, biodiversity, climate and material assets and waste, as a result of the proposed scheme due to the potential effects reported within the preceding sections.
- 16.2.3. Therefore, combined effects have been scoped in for further assessment.

16.3. Assessment of cumulative effects

- 16.3.1. During construction, there would be the potential for cumulative effects on all receptors, as a result of the proposed scheme with any of the other developments, for which the construction stages overlap. The potential cumulative effects during construction will be reported in the preliminary design

stage environmental assessment once the list of long list and short list of 'other developments' has been established.

- 16.3.2. Once operational there would be the potential for cumulative effects on receptors as a result of the proposed scheme. The potential cumulative effects during operation will be reported in the preliminary design stage environmental assessment once the long list and short list of 'other developments' has been established.
- 16.3.3. The likely residual effects and proposed mitigation for each of the other developments would be identified and incorporated into the cumulative effects assessment of the environmental assessment to be produced at the preliminary design stage.
- 16.3.4. Therefore, cumulative effects have been scoped in for further assessment.

17. Summary

Summary of assessment scope

- 17.1.1. This preliminary design stage ESR has set out the scope for further assessment of individual topics. Where required, further assessment will be completed during the preliminary design stage and presented within an ES.
- 17.1.2. Table 17-1 provides a summary of the scoping assessment for the proposed scheme and identifies whether further environmental assessment is required for each environmental factor.

Table 17-1: Summary of scoping assessment for environmental factors and requirement for further assessment

Environmental factor	Scoped in	Scoped out	Justification for scoping out where applicable
Air quality	Operation Construction dust impacts	Construction	<p>The proposed scheme construction period is expected to less than two years. Therefore, with reference to DMRB LA 105, the impact of construction activities on vehicle emissions and local air quality can be scoped out of the assessment.</p> <p>Changes in vehicle emissions associated with traffic flow impacts during the construction phase are scoped out, given that construction is expected to last for under two years. This is in line with DMRB LA 105, which states “...if the construction activities are less than 2 years it is unlikely that the construction activities would constitute a significant air quality effect...”</p>
Cultural heritage	Construction and operation	n/a	n/a
Landscape and visual effects	Construction and operation	Visual receptors – hospital receptors	Hospital users have a low value/sensitivity as an indoor place of work and temporary or short-term nature of patient stays (day/night) i.e., not residential use. As such no significant effects on hospital receptors have been identified and as such are scoped out from any further assessment.
Biodiversity	Construction and operation	Herald Way Marsh SSSI Herald Way Marsh LNR Piles Coppice LWS, Claybrookes Marsh LWS, Binley Little Wood, Old Pools Wood LWS, New Close Wood LWS, Binley Common Farm LWS, Big Rough (ungraded ecosite) Ecosite/ungraded Ancient woodland GCN	<p>Herald Way Marsh SSSI, Herald Way LNR and Piles Coppice LWS, Claybrookes Marsh LWS, Binley Little Wood, Old Pools Wood LWS, New Close Wood LWS, Binley Common Farm LWS, Big Rough (ungraded ecosite) Ecosite/ungraded - A substantial distance from the proposed scheme extent with no hydrological connection.</p> <p>Ancient woodland - There are no parcels of ancient woodland within 500m of the proposed scheme.</p> <p>GCN - Single waterbody with GCN presence confirmed is within 500m of in-carriageway works only. GCN confirmed likely absent from other waterbodies within study area. Should the design of the proposed scheme change, GCN may be scoped in.</p>
Geology and soils	Construction and operation	Designated geological sites	No statutory or non-statutory geological sites recorded within the proposed scheme extent.

Environmental factor	Scoped in	Scoped out	Justification for scoping out where applicable
		Introduction of significant sources of contamination	No significant sources of contamination are likely to be introduced as part of the proposed scheme's construction or operation.
Material assets and waste	n/a	Construction and operation	<p>It is concluded that all potential impacts associated with material assets and waste during construction and operational stages of the proposed scheme should be scoped out of further assessment.</p> <p>Construction</p> <p>Recover / re-use of materials:</p> <p>Throughout the design process, a number of embedded mitigation features would be included with the potential to reduce consumption of natural resources. Essential mitigation measures may include, amongst others:</p> <ul style="list-style-type: none"> proposed scheme designed to optimise a cut/fill balance with minimal materials requiring import application of the 'Principles of Designing Out Waste' to reduce the demand for resources prioritising the use of site-won resources in accordance with the relevant legislation, standards and specification for the proposed scheme an EMP and where applicable, MLP, SWMP and MMP would be prepared and implemented <p>Through implementation of 'good practice' during construction and the local and regional availability of waste processing, treatment and recovery facilities, it is predicted that the Government's 70% target for the recovery or recycling of CDW (either on or off the proposed scheme or both) would be adopted, where technically appropriate and economically feasible.</p> <p>Recycled or secondary materials:</p> <p>Throughout the design process, a number of embedded mitigation features would be included with the potential to reduce consumption of natural resources. Essential mitigation measures may include, amongst others:</p>

Environmental factor	Scoped in	Scoped out	Justification for scoping out where applicable
			<ul style="list-style-type: none"> proposed scheme designed to optimise a cut/fill balance to minimise the quantity of materials requiring import to the proposed scheme application of the 'Principles of Designing Out Waste' to reduce the demand for resources prioritising the use of secondary, recycled or site-won resources in accordance with the relevant legislation, standards and specification for the proposed scheme implementing the principles of local and responsible sourcing of key resources an EMP and where applicable, an MLP, SWMP and MMP would be prepared and implemented <p>Through achieving 'good practice' during construction and the local availability of secondary and recycled aggregates or earthworks materials from other development schemes within the locality, it is predicted that the regional guideline target of 27% relating to the use of secondary and recycled aggregates could be achieved where technically appropriate and economically feasible.</p> <p>Sterilise peat resources: Available mapping shows no peat is present within the area of the proposed scheme. The works would be undertaken in consideration of best practice mitigation. If encountered any peat excavated would be recovered as a commodity so there would be no needless sterilisation.</p> <p>Sterilise mineral sites: Whilst the proposed scheme falls within a MSA, there are no existing or allocated mineral sites within the proposed scheme extents.</p> <p>The works would be undertaken in consideration of best practice mitigation and if encountered, any minerals excavated would be recovered as a commodity so there would be no needless sterilisation.</p>

Environmental factor	Scoped in	Scoped out	Justification for scoping out where applicable
			<p>Generate large quantities of waste or have an affect on the ability of waste infrastructure within the region to continue to accommodate waste from other sources:</p> <p>Throughout the design process, a number of embedded mitigation features would be included with the potential to reduce waste generation. Essential mitigation measures may include, amongst others:</p> <ul style="list-style-type: none"> • scheme designed optimised to maximise a cut-fill balance with minimal materials requiring disposal • applying the principles of the waste hierarchy to the management of waste. • the 'Principles of Designing Out Waste' will be implemented • where CDW and excavation arisings generated by the proposed scheme cannot be re-used on the proposed scheme opportunities will be sought to re-use them on other construction projects. Where this is not possible they will be diverted from landfill to another off-site development or sent to an appropriately licenced recovery, treatment and recycling facility • compliance with all relevant waste legislation relating to waste handling, storage, transport and disposal. • an EMP and where applicable MLP, SWMP and MMP will be prepared and implemented <p>The proposed scheme is unlikely to generate large quantities of waste relative to regional landfill capacities or affect the ability of regional waste infrastructure to accommodate waste from other sources.</p>
Noise and vibration	Construction and operation	Operational vibration	<p>DMRB LA 111 section 1.4 notes that "operational vibration is scoped out of the assessment methodology as a maintained road surface will be free of irregularities as part of project design and under general maintenance, so operational vibration will not have the potential to lead to significant adverse effects". Operational vibration is therefore scoped out from further assessment.</p>

Environmental factor	Scoped in	Scoped out	Justification for scoping out where applicable
Population and human health	Construction and operation	n/a	n/a
Road drainage and the water environment	Construction and operation	River Avon Tidal flooding	<p>The following have been scoped out:</p> <ul style="list-style-type: none"> • Avon – ClaycotonYelvertoft Bk to conf R Sowe (WBID: GB109054043920) is located at the southern extent of the study area but has been scoped out as this waterbody is hydraulically disconnected from the proposed scheme. • The River Sowe is not tidal and therefore tidal flooding has been scoped out of this assessment.
Climate	<p>Climate change resilience during operation.</p> <p>Climate change (GHG) impact during construction and operation.</p>	Climate change resilience during construction	<p>Due to the short period anticipated for construction and considering the effects of risks from climate change are felt over a much greater period, it is unlikely that climate change will be experienced during construction of the proposed scheme. As such this aspect has been scoped out.</p>

18. Acronyms & glossary

18.1. Acronyms

Table 18-1: Acronym list

Acronym	Meaning	First used in
AADT	Annual average daily traffic	Chapter 6
AAWT	Annual Average Weekday Traffic	Chapter 12
AOD	Above Ordnance Datum	Chapter 8
AQAP	Air Quality Action Plan	Chapter 6
AQMA	Air Quality Management Areas	Chapter 2
ARN	Affected road network	Chapter 6
AURN	Automatic Urban and Rural National	Chapter 6
BAP	Biodiversity Action Plan	Chapter 9
BEIS	Business, Energy & Industrial Strategy	Chapter 15
BGS	British Geological Society	Chapter 9
BNG	Biodiversity Net Gain	Chapter 9
BNL	Baseline Noise Level	Chapter 11
BOAT	Byway Open to All Traffic	Chapter 13
BoCC	Birds of Conservation Concern	Chapter 9
BPM	Best Practicable Means	Chapter 12
BS	British Standard	Chapter 10
c	circa	Chapter 7
C	Century	Chapter 7
CAZs	Clean Air Zones	Chapter 6
CCC	Committee on Climate Change	Chapter 15
CDW	Construction Demolition Waste	Chapter 11
CE	Current era	Chapter 7
CEMP	Construction Environmental Management Plan	Chapter 9
CIEEM	Chartered Institute of Ecology and Environmental Management	Chapter 9
CoP	Code of Practice	Chapter 11
COPD	Chronic Obstructive Pulmonary Disease	Chapter 13
CP	Crossing Point	Chapter 9
CRTN	Calculation of Road Traffic Noise	Chapter 12
cSACs	Candidate Special Area of Conservation	Chapter 9
CWS	County Wildlife Site	Chapter 9
DCO	Development Consent Order	Chapter 1
DDMS	Drainage Data Management System	Chapter 14
Defra	Department for Environment, Food and Rural Affairs	Chapter 5
DfT	Department for Transport	Chapter 15
DMFY	Do Minimum Future Year	Chapter 12
DMMO	Definitive Map Modification Order	Chapter 13
DMOY	Do Minimum Opening Year	Chapter 12
DMRB	Design Manual for Roads and Bridges	Chapter 1

Acronym	Meaning	First used in
DoW	Definition of Waste	Chapter 11
DSFY	Do Something Future Year	Chapter 12
DSOY	Do Something Opening Year	Chapter 12
DWPA	Drinking Water Protected Area	Chapter 14
EclA	Ecological Impact Assessment	Chapter 9
eDNA	Environmental DNA	Chapter 9
EFT	Emission Factor Toolkit	Chapter 15
EIA	Environmental Impact Assessment	Chapter 1
END	Environmental Noise Directive	Chapter 12
EMP	Environmental Management Plan	Chapter 5
EQS	Environmental Quality Standards	Chapter 14
ERT	Emergency Roadside Telephone	Chapter 2
ES	Environmental Statement	Chapter 1
ESR	Environmental Scoping Report	Chapter 1
FRA	Flood Risk Assessment	Chapter 14
GCN	Great Crested Newt	Chapter 5
GHG	Greenhouse Gas	Chapter 15
GI	Ground investigation	Chapter 2
GVA	Gross Value Added	Chapter 13
GWDTE	Groundwater dependent terrestrial ecosystems	Chapter 14
HDV	Heavy duty vehicle	Chapter 6
HER	Historic Environment Record	Chapter 7
HEWRAT	Highways England Water Risk Assessment Tool	Chapter 14
HIA	Health Impact Assessment	Chapter 13
HLC	Historic Landscape Characterisation	Chapter 7
HSF	Helsby Sandstone Formation	Chapter 14
IEMA	Institute of Environmental Management and Assessment	Chapter 5
JNCC	Joint Nature Conservation Committee	Chapter 9
LAA	Local Aggregates Assessment	Chapter 11
LAQM	Local Air Quality Management	Chapter 6
LCWIP	Local Cycling and Walking Infrastructure Plan	Chapter 13
LLFA	Lead Local Flood Authority	Chapter 2
LNCS	Local Nature Conservation Sites	Chapter 9
LNR	Local Nature Reserve	Chapter 2
LOAEL	Lowest Observed Adverse Effect Level	Chapter 11
LoW	List of Waste	Chapter 11
LPA	Local Planning Authority	Chapter 7
LVIA	Landscape and Visual Impact Assessment	Chapter 8
LWS	Local Wildlife Site	Chapter 2
MAGIC	Multi-Agency Geographic Information for the Countryside	Chapter 9
M-BAT	Metal – Bioavailability Assessment Tool	Chapter 14
MCZs	Marine Conservation Zones	Chapter 9
MLP	Materials Logistics Plan	Chapter 11

Acronym	Meaning	First used in
MMG	Mercia Mudstone Group	Chapter 14
MMP	Material Management Plan	Chapter 11
MPAs	Marine Protected Areas	Chapter 9
MSA	Mineral Safeguarding Area	Chapter 11
NCA	National Character Area	Chapter 8
NERC	Natural Environment and Rural Communities	Chapter 9
NH ₃	Ammonia	Chapter 6
NHLE	National Heritage List for England	Chapter 7
NHS	National Health Service	Chapter 13
NIA	Noise Important Area	Chapter 2
NNR	National Nature Reserve	Chapter 9
NO ₂	Nitrogen Dioxide	Chapter 2
NO _x	Oxides of nitrogen	Chapter 6
NPPF	National Planning Policy Framework	Chapter 12
NPSE	Noise Policy Statement for England	Chapter 12
NPSNN	National Policy Statement for National Networks	Chapter 5
NSIP	Nationally Significant Infrastructure Project	Chapter 1
NTS	Non-technical summary	Chapter 5
NVZ	Nitrate Vulnerable Zone	Chapter 14
OHID	UK Health Security Agency and the Office for Health Improvement and Disparities	Chapter 4
OFT	Open for traffic	Chapter 2
OS	Ordnance Survey	Chapter 13
PBDE	Polybrominated diphenyl ethers	Chapter 14
PCF	Project Control Framework	Chapter 3
PCM	Pollution Climate Mapping	Chapter 6
PEA	Preliminary Ecological Appraisal	Chapter 9
PEIR	Preliminary Environmental Information Report	Chapter 4
PFOS	Perfluorooctane sulphonate	Chapter 14
PPG	Planning Practice Guidance	Chapter 11
PPV	Peak Particle Velocity	Chapter 12
PRA	Preferred Route Announcement	Chapter 3
PRoW	Public Rights of Way	Chapter 2
pSACs	Possible Special Area of Conservation	Chapter 9
pSPAs	Possible Special Protection Area	Chapter 9
PSSR	Preliminary Sources Study Report	Chapter 10
RBMP	River Basin Management Plan	Chapter 14
RCP	Representative Concentration Pathway	Chapter 15
REAC	Register of environmental commitments	Chapter 5
RICS	Royal Institution of Chartered Surveyors	Chapter 15
RIS	Road Investment Strategy	Chapter 3
RIS2	Road Investment Strategy 2	Chapter 2
RNAG	Reasons for not achieving good	Chapter 14

Acronym	Meaning	First used in
SAC	Special Area of Conservation	Chapter 2
SCI	Sites of Community Importance	Chapter 9
SFRA	Strategic Flood Risk Assessment	Chapter 14
SINC	Site of Importance for Nature Conservation	Chapter 9
SLNCI	Site of Local Nature Conservation Importance	Chapter 9
SNCIs	Sites of Nature Conservation Importance	Chapter 9
SNRHW	Stable non-reactive hazardous waste	Chapter 11
SOAEL	Significant Observed Adverse Effect Level	Chapter 12
SoCC	Statement of Community Consultation	Chapter 4
SoS	Secretary of State	Chapter 2
SoW	Start of Works	Chapter 2
SPA	Special Protection Area	Chapter 2
SPD	Supplementary Planning Document	Chapter 13
SPZ	Source Protection Zones	Chapter 14
SRN	Strategic Road Network	Chapter 1
SSG	Sherwood Sandstone Group	Chapter 14
SSSI	Site of Special Scientific Interest	Chapter 2
SuDS	Sustainable Urban Drainage Systems	Chapter 14
SWMP	Site Waste Management Plan	Chapter 11
TAG	Transport Appraisal Guidance	Chapter 7
TAR	Technical Appraisal Report	Chapter 3
TMP	Traffic Management Plan	Chapter 13
TPOs	Tree Preservation Orders	Chapter 9
TRL	Transport Research Laboratory	Chapter 12
UKCP18	UK Climate Projections	Chapter 15
UXO	Unexploded Ordnance	Chapter 10
VMS	Variable Message Signs	Chapter 2
WCC	Woodland Carbon Code	Chapter 15
WCH	Walking, cycling and horse-riding	Chapter 2
WFD	Water Framework Directive	Chapter 2
WFD	Waste Framework Directive	Chapter 11
WFD-TAG	Water Framework Directive Technical Advisory Group	Chapter 14
ZoI	Zone of Influence	Chapter 16
ZTV	Zone of Theoretical Visibility	Chapter 7
ZVI	Zone of Visual Influence	Chapter 7

18.2. Glossary

Table 18-2: Glossary

Glossary term	Definition
Authorities likely to be concerned by a project	Authorities or organisations (statutory or non-statutory) that have environmental responsibilities or local and regional competences (as defined by the relevant consenting regime).
Baseline scenario	A description of the current state of the environment without implementation of the project
Competent authority	An authority that is legally responsible for discharging the requirements of the EIA Directive 2014/52/EU via the development consenting process
Cumulative effects	Impacts that result from incremental changes caused by other present or reasonably foreseeable actions together with the project. NOTE: For the purposes of this guidance, a cumulative impact can arise as the result of: a) the combined impact of a number of different environmental factors- specific impacts from a single project on a single receptor/resource; and/or b) the combined impact of a number of different projects within the vicinity (in combination with the environmental impact assessment project) on a single receptor/resource
Detailed assessment	Detailed field surveys and/or quantified modelling techniques to understand complex environmental effects
Effect	Term used to express the consequence of an impact (expressed as the 'significance of effect').
Elements	Parts of factors NOTE: For example, protected species are part of biodiversity
Enhancement	A measure that is over and above what is required to mitigate the adverse effects of a project.
Environmental assessment	A process by which information about environmental effects is collected, assessed and used to inform decision-making. NOTE: This includes Environmental Impact Assessment and non-statutory environmental assessment.
Environmental factors	1) Population and human health 2) Biodiversity 3) Land, soil, water, air and climate 4) Material assets, cultural heritage, and landscape 5) The interaction between the factors listed above
Environmental Impact Assessment	Statutory process consisting of: 1) preparation of an Environmental Statement 2) consultation 3) examination by the competent authority of the information contained within the Environmental Statement 4) the reasoned (justified or evidenced) conclusion by the competent authority on the significant effects of the project on the environment 5) the reasoned (justified or evidenced) decision by the competent authority to grant or refuse development consent
Environmental Statement	A statutory report produced by the developer including:

Glossary term	Definition
	<ul style="list-style-type: none"> 1) a description of the project 2) a description of the likely significant effects of the project on the environment 3) a description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment 4) a description of the reasonable alternatives 5) a non-technical summary 6) any additional information relevant to the characteristics of a project
Embedded mitigation	Design measures which are integrated into a project for the purpose of minimising environmental effects.
Essential mitigation	Mitigation critical for the delivery of a project which can be acquired through statutory powers.
Flood zone types	<p>Flood zones 2 and 3 are shown on Environment Agency flood maps, with Flood Zone 1 being all the land falling outside Zones 2 and 3. These flood zones refer to the probability of sea and river flooding only, ignoring the presence of existing defences.</p> <p>“areas at risk of flooding” means land within Flood Zones 2 and 3; or land within Flood Zone 1 which has critical drainage problems and which has been notified to the local planning authority by the Environment Agency</p>
Future baseline scenario	An outline of the likely evolution of the current state of the environment without implementation of the project.
Project	Construction works, installations, schemes, or interventions (in the natural surroundings and landscape) including those involving the extraction of mineral resources.
Proposed scheme	The plan put forward by the Applicant as described in Chapter 2.
Proposed scheme extent	The geographical area which is required to construct, operate and maintain the proposed scheme
Q ⁹⁵	The flow equalled or exceeded in a watercourse 95% of the time.
Reasonable alternatives	Different project design, technology, location, size and scale solutions considered by the developer.
Scoping	The process of considering the information required for reaching a (reasoned) conclusion on the likely significant effects of a project on the environment.
Simple assessment	The collection and assessment of data and information that is readily available to reach an understanding of the likely environmental effects of a project. NOTE: This informs the final design or need for further 'detailed assessment'.

19. References

- AECOM for Highways England (2022) A46 Coventry Junction Upgrade (Walsgrave Junction) Environmental Assessment Report – PCF Stage 2
- AECOM for Highways England (2021a) A46 Coventry Junctions Upgrade (Walsgrave Junction). Preliminary Sources Study Report. PCF Stage 2
- AECOM for Highways England (2021b) A46 Coventry Junction Upgrade (Walsgrave Junction) Habitats Regulations Assessment No Significant Effects Report - PCF Stage 2
- AECOM for Highways England (2021c) A46 Coventry Junctions Upgrade (Walsgrave Junction). Ground Investigation Scope Report
- AECOM for Highways England (2020) A46 Coventry Junction Upgrade (Walsgrave Junction) Environmental Scoping Report PCF Stage 2
- AECOM for Highways England (2018) A46 Coventry Junction (Walsgrave Junction) Extended Phase 1 Habitat Update Survey Report PCF Stage 2
- BGS (2023a). British Geological Survey Geoindex (onshore). [online]. available at: <https://www.bgs.ac.uk/map-viewers/geoindex-onshore> Accessed April 2023
- BGS (2023b). British Geological Survey Groundwater Flooding. [online] available at: <https://www.bgs.ac.uk/datasets/groundwater-flooding>. Accessed April 2023
- BGS (1994) Solid with Drift Geology. 1:50 000. [online] available at: <https://largeimages.bgs.ac.uk/iip/mapsportal.html?id=1003288> Accessed April 2023
- British Standard. (2022). *BS EN 17472:2022 - Sustainability of construction works. Sustainability assessment of civil engineering works. Calculation methods*
- British Standard. (2017). *BS 10175:2011+A2:2017 Investigation of Potentially Contaminated Sites. Code of Practice*
- Centre for Ecology and Hydrology. National River Flow Archive (2023) 54004 - Sowe at Stoneleigh available at: <https://nrfa.ceh.ac.uk/data/station/meanflow/54004> Accessed June 2023
- Chartered Institute for Archaeologists (2020), Standards and Guidance. [online] available at: <https://www.archaeologists.net/codes/cifa> Accessed April 2023
- CIEEM (2017). Guidelines for Preliminary Ecological Appraisal. [online] available at: <https://cieem.net/resource/guidance-on-preliminary-ecological-appraisal-gpea/> Accessed April 2023
- CIEEM (2019). Advice Note on the Lifespan of Ecological Reports and Surveys. [online] available at: <https://cieem.net/resource/advice-note-on-the-lifespan-of-ecological-reports-and-surveys> Accessed April 2023
- CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland. [online] available at: <https://cieem.net/wp-content/uploads/2019/02/Combined-EcIA-guidelines-2018-compressed.pdf> Accessed April 2023
- CIEEM (2021). Good practice Guidance for Habitats and Species. [online] available at: <https://cieem.net/wp-content/uploads/2021/05/Good-Practice-Guide-April-2021-v6.pdf> Accessed April 2023

CIRIA (2019) Culvert, screen and outfall manual (C786F)

CIRIA (2015) The SuDS Manual (C753). [online] available at:

https://www.ciria.org/CIRIA/Resources/Resources_overview.aspx?hkey=a80608d2-a045-4d72-8bb9-5ecf23f8d761 Accessed April 2023

CIRIA (2014) Environmental good practice on site guide (fourth edition) (C741).

[online] available at:

https://www.ciria.org/CIRIA/Resources/Resources_overview.aspx?hkey=a80608d2-a045-4d72-8bb9-5ecf23f8d761 Accessed April 2023

CIRIA (2006a) Control of water pollution from linear construction projects. Site guide (C649b). [online] available at:

https://www.ciria.org/CIRIA/Resources/Resources_overview.aspx?hkey=a80608d2-a045-4d72-8bb9-5ecf23f8d761 Accessed April 2023

CIRIA (2006b) Control of water pollution from linear construction projects: technical guidance (C648). [online] available at:

https://www.ciria.org/CIRIA/Resources/Resources_overview.aspx?hkey=a80608d2-a045-4d72-8bb9-5ecf23f8d761 Accessed April 2023

CIRIA (2002) Control of water pollution from construction sites. Guidance for consultants and contractors (C532). [online] available at:

https://www.ciria.org/CIRIA/Resources/Resources_overview.aspx?hkey=a80608d2-a045-4d72-8bb9-5ecf23f8d761 Accessed April 2023

CIRIA (2001). C532 Control of Water Pollution from Construction Sites. [online] available at:

https://www.ciria.org/CIRIA/Resources/Resources_overview.aspx?hkey=a80608d2-a045-4d72-8bb9-5ecf23f8d761 Accessed April 2023

CIRIA (2001b). Contaminated Land Risk Assessment – A Guide to Good Practice C552

CL:AIRE (2011) Development Industry: Definition of Waste Code of Practice (DoW CoP), Version 2, 2011. [online] available at: <https://www.claire.co.uk/projects-and-initiatives/dow-cop> Accessed April 2023

Construction Leadership Council. (2023). Guidance document for PAS 2080:2023 - Practical actions and examples to accelerate the decarbonisation of buildings and infrastructure

Countryside and Rights of Way Act (CROW Act). (2000). [online] available at:

<https://www.legislation.gov.uk/ukpga/2000/37/contents> Accessed March 2023

Coventry City Council (2023) Coventry City Council Local Plan Mapping. [online] available at:

<https://maps.coventry.gov.uk/connect/analyst/mobile/#/main?mapcfg=localplan>

Accessed April 2023

Coventry City Council (2020). Annual Status Report. [online]. available at:

<https://www.coventry.gov.uk/downloads/file/38378/asr-coventry-2021> Accessed April 2023

Coventry City Council (2017) Coventry City Council Local Plan 2011-2031. [online]

available at: <https://www.coventry.gov.uk/downloads/file/25899/final-local-plan-december-2017> Accessed March 2023

Coventry County Council (2015) Strategic Flood Risk Assessment. [online] available at: https://www.coventry.gov.uk/downloads/download/680/evidence_base_-_strategic_flood_risk_assessment_2015 Accessed March 2023

Coventry City Council (2014) The New Coventry Local Development Plan (2011-2031). [online] available at: https://www.warwickdc.gov.uk/download/downloads/id/2560/exam_6_-_the_new_coventry_local_development_plan.pdf Accessed March 2023

Coventry City Council. (2018). Coventry Connected (Transport and Accessibility) Supplementary Planning Document. [online] available at: <https://www.coventry.gov.uk/downloads/file/27653/coventry-connected-spd> Accessed April 2023

Coventry City Council. (2023). Transport Strategy. [online] available at: <https://www.coventry.gov.uk/transport-strategy-2> Accessed April 2023

Coventry City Council. (2023). Online Planning Map. [online] available at: <https://www.coventry.gov.uk/planning-2/online-planning-map> Accessed April 2023

Coventry City Council (2023). Historic Environment Record (HER), data obtained 14/04/2023

Coventry & Warwickshire Local Enterprise Partnership (2016) Coventry & Warwickshire updated strategic economic plan [online] available at: <https://www.lepnetwork.net/media/1106/coventry-and-warwickshire-sep.pdf> Accessed April 2023

Defra. (2023a) MAGIC Map. [online] available at: <https://magic.defra.gov.uk/MagicMap.aspx> Accessed March 2023

Defra (2023b) Climate change allowances for peak river flow in England. Accessed March 2023. <https://environment.data.gov.uk/hydrology/climate-change-allowances/river-flow?mgmtcatid=3007> Accessed April 2023

Defra (2023c) Climate change allowances for peak river flow in England. Accessed April 2023. <https://environment.data.gov.uk/hydrology/climate-change-allowances/rainfall?mgmtcatid=3007> Accessed April 2023

Defra (2023d) Environment Improvement Plan 2023, Section 10(6)

Defra (2022a) 2018 Based NO_x, NO₂, PM₁₀ and PM_{2.5} Background Maps. Accessed March 2023: <https://uk-air.defra.gov.uk/data/laqm-background-home> Accessed April 2023

Defra (2022b) Local Air Quality Management, Technical Guidance (LAQM.TG(12))

Defra (2021) Air Quality Strategy for England, Scotland, Wales and Northern Ireland

Department for Transport (2021). Planning ahead for the Strategic Road Network. [online] available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1045938/planning-ahead-for-the-strategic-road-network-developing-the-third-road-investment-strategy.pdf Accessed March 2023

Department for Transport (2020) Road Investment Strategy 2: 2020 – 2025. [online] available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/911111/road-investment-strategy-2-2020-to-2025.pdf

[nt_data/file/951100/road-investment-strategy-2-2020-2025.pdf](#) Accessed April 2023
Accessed March 2023

Department for Transport (2015) Highways England: Licence. [online] available at:
<https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachme>
[nt_data/file/431389/strategic-highways-licence.pdf](#) Accessed March 2023

Department for Transport (2014). National Policy Statement for National Networks.
[online] available at [National policy statement for national networks - GOV.UK](#)
(www.gov.uk) Accessed April 2023

Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008
on ambient air quality and cleaner air for Europe. available at: <https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32008L0050> Accessed April 2023

Environment Agency (2023a) Groundwater protection: groundwater protection guides
covering requirements, permissions, risk assessments and controls (previously
covered in GP3). [online] available at:
<https://www.gov.uk/government/collections/groundwater-protection>. Accessed March
2023

Environment Agency (2023b) Water discharge consents database. [online] available
at: [https://environment.data.gov.uk/public-register/view/search-water-discharge-](https://environment.data.gov.uk/public-register/view/search-water-discharge-consents)
[consents](#) Accessed April 2023

Environment Agency (2023c) Catchment data explorer. [online] available at:
<https://environment.data.gov.uk/catchment-planning/> Accessed March 2023

Environment Agency (2023d) Flood map for planning. [online] available at:
<https://flood-map-for-planning.service.gov.uk>. Accessed March 2023

Environment Agency (2023e) Long term flood risk service. [online] available at:
<https://check-long-term-flood-risk.service.gov.uk/map>. Accessed March 2023

Environment Agency (2023f) Historic flood map. [online] available at:
[https://environment.data.gov.uk/DefraDataDownload/?mapService=EA/HistoricFloodM](https://environment.data.gov.uk/DefraDataDownload/?mapService=EA/HistoricFloodMap&Mode=spatial)
[ap&Mode=spatial](#) Accessed April 2023

Environment Agency (2023g) Water quality archive. [online] available at:
<https://environment.data.gov.uk/water-quality/view/landing> Accessed April 2023

Environment Agency (2022) Flood risk assessments: climate change allowances.
[online] available at: [https://www.gov.uk/guidance/flood-risk-assessments-climate-](https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances)
[change-allowances](#) Accessed April 2023

Environment Agency (2020) Land Contamination Risk management (LCRM). [online]
available at [https://www.gov.uk/government/publications/land-contamination-risk-](https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm)
[management-lcrm](#) Accessed March 2023

Environment Agency (2018) The Environment Agency's approach to groundwater
protection. Version 1.2

Environment Agency (2017) Protect groundwater and prevent groundwater pollution

Environment Agency (2016) Water Framework Directive risk assessment. [online]
available at:

<https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachme>
[nt_data/file/522426/LIT_10445.pdf](#) Accessed April 2023

GSB Prospection. 2006. Geophysical Survey Report 2006/77; EDP 209 Walsgrave, Coventry

Her Majesty's Government (UK) (2023) The Environmental Targets (Fine Particulate Matter) (England) Regulations. available at:

<https://www.legislation.gov.uk/ukdsi/2022/9780348242959> Accessed March 2023

Her Majesty's Government (UK) (2021) Environment Act. [online] available at:

<https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted> Accessed March 2023

Her Majesty's Government (UK) (2020). The Environment (Miscellaneous Amendments) (EU Exit) Regulations. available at:

<https://www.legislation.gov.uk/uksi/2020/1313/contents/made> Accessed March 2023

Her Majesty's Government (UK) (2019). The Environment (Legislative Functions from Directives) (EU Exit) Regulations. available at:

<https://www.legislation.gov.uk/ukdsi/2019/9780111187555/contents> Accessed March 2023

Her Majesty's Government (UK). (2019). The Climate Change Act 2008 (2050 Target Amendment) Order 2019

Her Majesty's Government (UK) (2017). The Infrastructure Planning (Environmental Impact Assessment) Regulations. [online] available at:

<https://www.legislation.gov.uk/uksi/2017/572/contents/made> Accessed March 2023

Her Majesty's Government (UK) (2017) Town and Country Planning (Environmental Impact Assessment) Regulations. [online] available at:

<https://www.legislation.gov.uk/uksi/2017/571/contents/made> Accessed March 2023

Her Majesty's Government (UK) (2017) Water Environment (Water Framework Directive) (England and Wales) Regulations. available at:

<https://www.legislation.gov.uk/uksi/2017/407/contents> Accessed March 2023

Her Majesty's Government (UK) (2016). The Environmental Permitting (England and Wales) Regulations. available at:

<https://www.legislation.gov.uk/uksi/2016/1154/contents/made> Accessed March 2023

Her Majesty's Government (UK) (2014). The Water Act. available at:

<https://www.legislation.gov.uk/ukpga/2014/21/contents> Accessed March 2023

Her Majesty's Government (UK) (2012). Health and Social Care Act. [online] available at: <https://www.legislation.gov.uk/ukpga/2012/7/contents/enacted> Accessed March 2023

Her Majesty's Government (UK) (2010). The Air Quality Standards Regulations.

available at: <https://www.legislation.gov.uk/uksi/2010/1001/contents/made> Accessed March 2023

Her Majesty's Government (UK) (2010). Flood and Water Management Act 2010.

[online] available at: <https://www.legislation.gov.uk/ukpga/2010/29/contents> Accessed March 2023

Her Majesty's Government (UK) (2009). The Eels (England and Wales) Regulation.

available at: [legislation.gov.uk/uksi/2009/3344/contents/made](https://www.legislation.gov.uk/uksi/2009/3344/contents/made) Accessed March 2023

Her Majesty's Government (UK) (2008) Planning Act 2008. available online at:

<https://www.legislation.gov.uk/ukpga/2008/29/section/22> Accessed March 2023

- Her Majesty's Government (UK). (2008). The Climate Change Act 2008
- Her Majesty's Government (UK) (2007) Highways (Environmental Impact Assessment) Regulations (2007). [online] available at:
<https://www.legislation.gov.uk/ukxi/2007/1062/made> Accessed March 2023
- Her Majesty's Government (UK) (2001). The Control of Pollution (Oil Storage) (England) Regulations. available at:
<https://www.legislation.gov.uk/ukxi/2001/2954/contents/made> Accessed March 2023
- Her Majesty's Government (UK) (2000). The Air Quality (England) Regulations (2000) available at: <https://www.legislation.gov.uk/ukxi/2000/928/contents/made> Accessed March 2023
- Her Majesty's Government (UK) (1995). Environment Act (1995) Part IV – Air Quality. available at: <https://www.legislation.gov.uk/ukpga/1995/25/part/IV> Accessed March 2023
- Her Majesty's Government (UK) (1994). Land Drainage Act (1994) c. 25. available at: <https://www.legislation.gov.uk/ukxi/2017/407/contents> Accessed March 2023
- Her Majesty's Government (UK) (1991). Water Resources Act (1991) c. 57. available at: <https://www.legislation.gov.uk/ukpga/1991/57/contents> Accessed March 2023
- Her Majesty's Government (UK) (1991). Land Drainage Act (1991) c. 59 available at: <https://www.legislation.gov.uk/ukpga/1991/59/contents> Accessed March 2023
- Her Majesty's Government (UK) (1990) Environmental Protection Act 1990. [online] available at: <https://www.legislation.gov.uk/ukpga/1990/43/contents> Accessed March 2023
- Her Majesty's Government (UK) (1990) Planning (Listed Buildings and Conservation Areas) Act 1990. [online] available at:
<https://www.legislation.gov.uk/ukpga/1990/9/contents> Accessed March 2023
- Her Majesty's Government (UK) (1979). Ancient Monuments and Archaeological Areas Act 1979. [online] available at: Accessed March 2023
- Her Majesty's Government (UK) (1975). Salmon and Freshwater Fisheries Act (1975) available at: <https://www.legislation.gov.uk/ukpga/1975/51> Accessed March 2023
- Heritage Gateway (2021), [online] available at:
<https://www.heritagegateway.org.uk/Gateway/> Accessed March 2023
- Highways Agency (2014) South Midlands Route Strategy Evidence Report. [online] available at:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/365288/South_Midlands.pdf Accessed March 2023
- Highways England (2021) DMRB LA 114: Climate Revision 0 [online] available at:
[online] available at:
https://www.standardsforhighways.co.uk/dmr/b/search?discipline=SUSTAINABILITY_AND_ENVIRONMENT Accessed March 2023
- Highways England (2020a) DMRB LA 103: Scoping projects for environmental assessment Revision 1 [online] available at:
https://www.standardsforhighways.co.uk/dmr/b/search?discipline=SUSTAINABILITY_AND_ENVIRONMENT Accessed March 2023

Highways England (2020b) DMRB LA 104: Environmental assessment and monitoring Revision 1 [online] available at:
https://www.standardsforhighways.co.uk/dmr/search?discipline=SUSTAINABILITY_AND_ENVIRONMENT Accessed March 2023

Highways England (2020c) DMRB LA 106: Cultural heritage assessment Revision 1 [online] available at: [online] available at:
https://www.standardsforhighways.co.uk/dmr/search?discipline=SUSTAINABILITY_AND_ENVIRONMENT Accessed March 2023

Highways England (2020d) DMRB LA 107: Landscape and Visual Effects Revision 2 [online] available at:
https://www.standardsforhighways.co.uk/dmr/search?discipline=SUSTAINABILITY_AND_ENVIRONMENT Accessed March 2023

Highways England (2020e) DMRB LA 108: Biodiversity Revision 1 [online] available at: [online] available at:
https://www.standardsforhighways.co.uk/dmr/search?discipline=SUSTAINABILITY_AND_ENVIRONMENT Accessed March 2023

Highways England (2020f) DMRB LA 111: Noise and vibration Revision 2 [online] available at: [online] available at:
https://www.standardsforhighways.co.uk/dmr/search?discipline=SUSTAINABILITY_AND_ENVIRONMENT Accessed March 2023

Highways England (2020g) DMRB LA 112: Population and human health Revision 1 [online] available at: [online] available at:
https://www.standardsforhighways.co.uk/dmr/search?discipline=SUSTAINABILITY_AND_ENVIRONMENT Accessed March 2023

Highways England (2020h) DMRB LA 113: Road drainage and the water environment Revision 1 [online] available at: [online] available at:
https://www.standardsforhighways.co.uk/dmr/search?discipline=SUSTAINABILITY_AND_ENVIRONMENT Accessed March 2023

Highways England (2020i) DMRB LA 117 Landscape Design [online] available at: [online] available at: <https://www.standardsforhighways.co.uk/search/82073bde-ec0c-4d4f-8eeb-afe0ace3c639> Accessed March 2023

Highways England (2020j) DMRB LA 120: Environmental management plans Revision 1 [online] available at:
https://www.standardsforhighways.co.uk/dmr/search?discipline=SUSTAINABILITY_AND_ENVIRONMENT Accessed March 2023

Highways England (2020k) Delivery Plan: 2020-2025. [online] available at:
<https://nationalhighways.co.uk/media/vh0byhfl/5-year-delivery-plan-2020-2025-final.pdf> Accessed March 2023

Highways England (2020l) Strategic Business Plan: 2020-2025. [online] available at:
<https://nationalhighways.co.uk/media/3i5c454q/strategic-business-plan-2020-25.pdf> Accessed March 2023

Highways England (2019a) DMRB LA 101: Introduction to environmental assessment Revision 0 [online] available at:

https://www.standardsforhighways.co.uk/dmrb/search?discipline=SUSTAINABILITY_AND_ENVIRONMENT Accessed March 2023

Highways England, (2019b) DMRB LA 102: Screening projects for environmental impact assessment Revision 0 [online] available at:

https://www.standardsforhighways.co.uk/dmrb/search?discipline=SUSTAINABILITY_AND_ENVIRONMENT Accessed March 2023

Highways England (2019c) LA 105: Air quality Revision 0 [online] available at:

https://www.standardsforhighways.co.uk/dmrb/search?discipline=SUSTAINABILITY_AND_ENVIRONMENT Accessed March 2023

Highways England (2019d) DMRB LA 109: Geology & Soils Revision 0 [online] available at:

https://www.standardsforhighways.co.uk/dmrb/search?discipline=SUSTAINABILITY_AND_ENVIRONMENT Accessed March 2023

Highways England (2019e) DMRB LA 110: Material assets and waste Revision 0 [online] available at:

https://www.standardsforhighways.co.uk/dmrb/search?discipline=SUSTAINABILITY_AND_ENVIRONMENT Accessed March 2023

Highways England (2017) DMRB LA 118: Biodiversity Design Revision 0 [online] available at: <https://www.standardsforhighways.co.uk/tse/attachments/9317652b-4cb8-4aaf-be57-b96d324c8965> Accessed March 2023

Highways England (2014) Route Strategic Options Report – A46 Coventry to M6 J2 Study

Historic England (2021) National Heritage List for England. [online] available at:

<https://historicengland.org.uk/listing/the-list> Accessed March 2023

Historic England (2017), Good Practice Advice in Planning Note 3: The Setting of Heritage Assets. [online] available at: <https://historicengland.org.uk/images-books/publications/gpa3-setting-of-heritage-assets/>

Accessed March 2023

Historic England (2015) Good Practice Advice in Planning Note 2: Managing Significance in the Decision-Making Process. [online] available at:

<https://historicengland.org.uk/images-books/publications/gpa2-managing-significance-in-decision-taking/> Accessed March 2023

Historic England (2008), Conservation Principles. [online] available at:

<https://historicengland.org.uk/advice/constructive-conservation/conservation-principles/> Accessed March 2023

Historic England (2023). National Heritage List for England data obtained 10/05/2023

HEMA. (2022). Assessing Greenhouse Gas Emissions and Evaluating their Significance

HEMA. (2022). Effective Scoping of Human Health in Environmental Impact Assessment. [online] available at:

<https://www.HEMA.net/resources/blog/2022/11/17/launch-of-the-eia-guidance-for-considering-impacts-on-human-health> Accessed March 2023

HEMA. (2022). Determining Significance for Human Health In Environmental Impact Assessment'. [online] available at:

<https://www.iema.net/resources/blog/2022/11/17/launch-of-the-eia-guidance-for-considering-impacts-on-human-health> Accessed March 2023

IEMA. (2020). Environmental Impact Assessment Guide to: Climate Change Resilience & Adaptation

IEMA. (2014). Guidelines for Environmental Noise Impact Assessment

Landscape Institute (2019) Visual Representation of Development Proposals Technical Guidance Note 06/19. [online] available at:
https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/09/LI_TGN-06-19_Visual_Representation.pdf Accessed March 2023

Landscape Institute and Institute of Environmental Management and Assessment. (2013). *Guidelines for Landscape and Visual Impact Assessment (GLVIA3)*, Third edition, London: Routledge

Ministry and Agriculture, Food and Fisheries (1988) Agricultural Land Classification of England and Wales. Revised guidelines and criteria for grading the quality of agricultural land

Ministry of Housing, Communities & Local Government (2022) Flood risk and coastal change. [online] available at: <https://www.gov.uk/guidance/flood-risk-and-coastal-change> Accessed March 2023

Ministry of Housing, Communities & Local Government (2021) National Policy Planning Framework [online] available at:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf Accessed March 2023

Ministry of Housing, Communities and Local Government (2019) National Planning Practice Guidance for Air Quality

Ministry of Housing, Communities & Local Government (2019). National Planning Policy Framework. [online] available at [National Planning Policy Framework - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/81162/National_Planning_Policy_Framework_-_2019.pdf) Accessed March 2023

National Highways (2015). Biodiversity Plan. [online] available at: [biodiversity-plan.pdf \(nationalhighways.co.uk\)](https://www.nationalhighways.co.uk/biodiversity-plan) Accessed March 2023

National Highways. (2017). Environmental Impact Assessment: Implementing the Requirements of 2011/92/EU as amended by 2014/52/EU (EIA Directive).

National Highways (2023) Drainage Data Management System. [online] available at: <https://www.haddms.co.uk/> Accessed March 2023

National Highways (2022a) DMRB CG 501 Design of highways drainage systems. [online] available at: <https://www.standardsforhighways.co.uk/search/6355ee38-413a-4a11-989b-0f33af89c4ed> Accessed March 2023

National Highways (2022b). Highways Agency Drainage Data Management System. [online] available at: <https://www.haddms.co.uk/index.cfm?fuseaction=home.main> Accessed March 2023

National Highways (2021) DMRB GG 101 Introduction to the Design Manual for Roads and Bridges. [online] available at:
<https://www.standardsforhighways.co.uk/search/25cefcd4-3464-4e41-8e4f-fffc155723ea> Accessed March 2023

Natural England (2023) Designated Site View. [online] available at:
<https://designatedsites.naturalengland.org.uk/> Accessed March 2023

Natural England (2021) England's Peatland - carbon storage and greenhouse gases (NE257) (last updated 24 August 2021). [online] available at:
<https://www.arcgis.com/home/item.html?id=294240636b094b25808ad3eb417e9b7f>
Accessed March 2023

Natural England (2013) NCA Profile: 96 Dunsmore and Feldon. [online] available at:
<https://publications.naturalengland.org.uk/publication/4878893332824064?category=587130>
Accessed March 2023

Natural England (2012) NCA Profile: 97 Arden . [online] available at:
<https://publications.naturalengland.org.uk/publication/1819400?category=587130>
Accessed March 2023

Network Archaeology. (2021). A46 Coventry Junctions Upgrade Binley. Archive report for; Archaeological trial trench evaluation

Office for National Statistics. (2023). General Health, England and Wales: Census 2021. [online] available at:
<https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthandwellbeing/bulletins/generalhealthenglandandwales/census2021#:~:text=The%20census%20data%20on%20general,%2C%2026.4%20million%2C%20in%202011>)
Accessed March 2023

Office for National Statistics. (2022). Population and household estimates, England and Wales: Census 2021. [online] available at:
<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/populationandhouseholdestimatesenglandandwales/census2021>
Accessed March 2023

Ordnance Survey (2023a) Ordnance Survey – Online Map. [online] available at:
<https://osmaps.ordnancesurvey.co.uk/> Accessed March 2023

Ordnance Survey (2023b) Ordnance Survey – Open Rivers. [online] available at:
<https://beta.ordnancesurvey.co.uk/products/os-open-rivers> Accessed March 2023

Planning Inspectorate (2020) Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements. [online] available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-seven-environmental-impact-assessment-process-preliminary-environmental-information-and-environmental-statements/> Accessed March 2023

Planning Inspectorate (2019) Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects. [online] available at:
<https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-17/> Accessed March 2023

Planning Inspectorate (2018) Advice Note Nine: Rochdale Envelope. [online] available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-nine-rochdale-envelope/> Accessed March 2023

Planning Inspectorate (2017) Advice Note Eighteen: The Water Framework Directive. available at:

https://infrastructure.planninginspectorate.gov.uk/wpcontent/uploads/2017/06/advice_note_18.pdf, Accessed May 2023

Powell-Smith, A. 2023. available at: <https://opendomesday.org> Accessed May 2023

Office for Health Improvement and Disparities. (2023). Public Health Outcomes Framework. [online] available at: <https://www.gov.uk/government/collections/public-health-outcomes-framework> Accessed March 2023

Office for Health Improvement and Disparities. (2023). Local Health- Small Area Public Health Data. [online] available at: <https://fingertips.phe.org.uk/profile/local-health> Accessed March 2023

Rugby Borough Council (2020) Annual Status Report. [online] available at: https://www.rugby.gov.uk/download/downloads/id/3199/draft_air_quality_annual_status_report_2021.pdf Accessed March 2023

Rugby Borough Council (2019) Rugby Borough Council Local Plan 2011-2031. [online] available at: https://www.rugby.gov.uk/info/20004/planning_strategy/348/local_plan_2011-2031 Accessed March 2023

Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., . . . Win, I. (2021). Birds of Conservation Concern 5: the population status of birds in the UK, Channel Islands and Isle of Man British Birds. 108, 708-746

Sustrans. The National Cycle Network. [online] available at: <https://www.sustrans.org.uk/national-cycle-network> Accessed March 2023

Warwickshire County Council. (2023). Public Rights of Way Map. [online] available at: <https://rowreporting.warwickshire.gov.uk/CAMSWeb/standardmap.aspx> Accessed March 2023

Warwickshire County Council (2023). Historic Environment Record (HER), data obtained 27/04/2023

Warwickshire County Council. (2022). Draft Local Cycling and Walking Infrastructure Plan. [online] available at: <https://www.warwickshire.gov.uk/cycling/developing-warwickshires-cycle-network/3#:~:text=Draft%20Warwickshire%20Walking%20and%20Cycling%20Infrastructure%20Plan&text=Producing%20an%20LCWIP%20will%20enable,to%20walking%20and%20cycling%20infrastructure>. Accessed March 2023

Warwickshire County Council (2013) Strategic Flood Risk Assessment. Accessed March 2013. <https://www.warwickshire.gov.uk/directory-record/2159/strategic-flood-risk-assessment> Accessed March 2023

Warwickshire County Council. (2011). Local Transport Plan. [online] available at: <https://www.warwickshire.gov.uk/directory-record/2149/local-transport-plan-2011-2026> Accessed March 2023

Warwickshire County Council (1993) Warwickshire Landscape Guidelines - Dunsmore Landscape Guidelines. [online] available at: <https://apps.warwickshire.gov.uk/api/documents/WCCC-863-859> Accessed March 2023

Warwickshire County Council and Rugby Borough Council (2006) Landscape Assessment of the Borough of Rugby Sensitivity and Condition Study. [online] available at:
https://www.rugby.gov.uk/download/downloads/id/1370/lp_34_landscape_assessment_april_2006.pdf Accessed March 2023

Warwickshire, Coventry and Solihull (2013). Green Infrastructure Strategy. [online] available at: [Sub Regional Green Infrastructure Strategy – Warwickshire County Council](#) Accessed March 2023

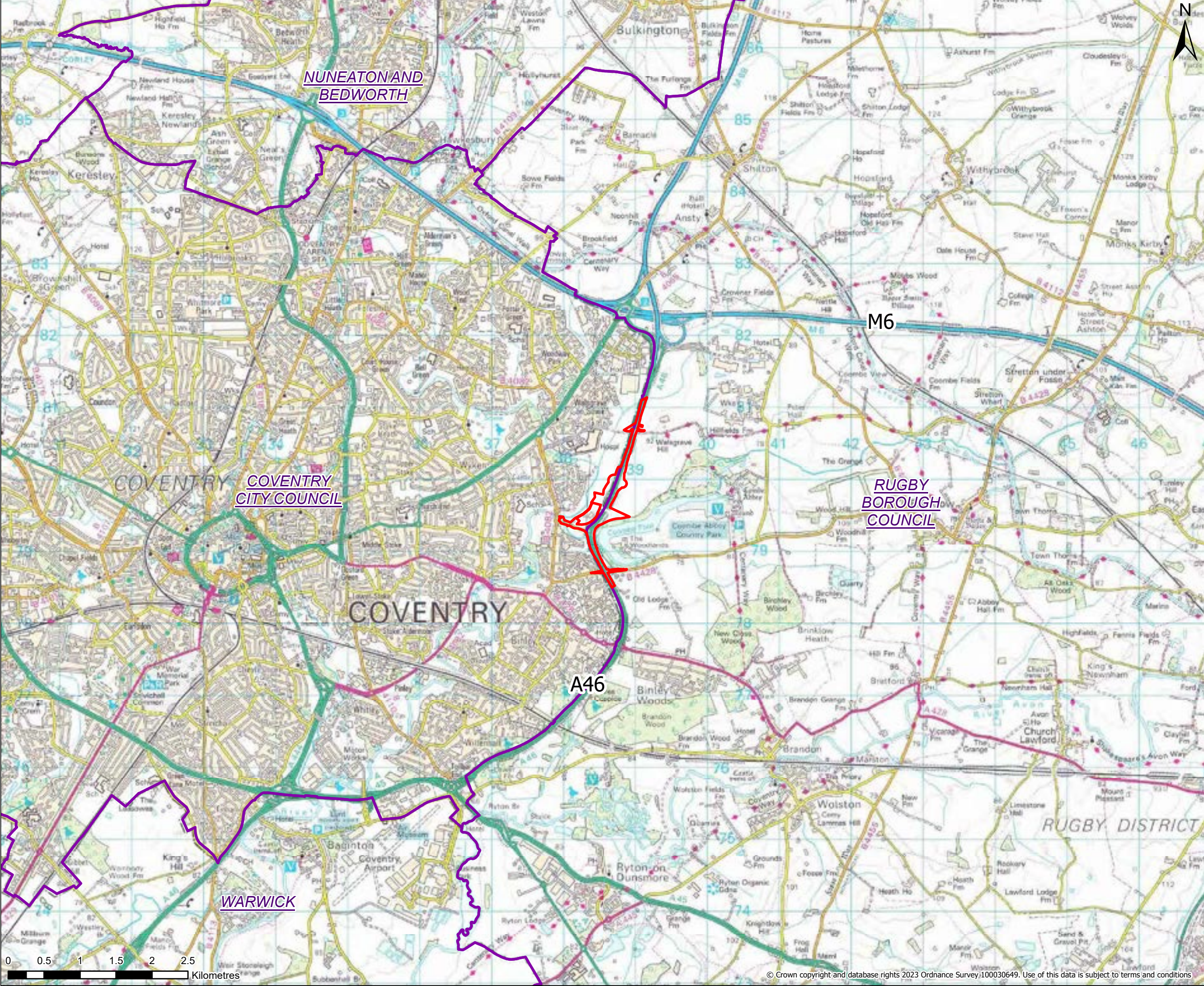
Warwickshire, Coventry and Solihull (2005). Local Biodiversity Action Plan. [online] available at: [Warwickshire, Coventry & Solihull Local Biodiversity Action Plan \(LBAP\) | Warwickshire Wildlife Trust](#) Accessed March 2023

West Midlands Combined Authority. (2019). *WM2041 Five Year Plan 2021-26*. [online] available at <https://www.wmca.org.uk/media/4871/wm-net-zero-fyp-summary-tech-report.pdf> Accessed March 2023

Water Framework Directive-Technical Advisory Group (UK WFD_TAG) (2014) River & Lake Assessment Method Specific Pollutants (Metals), Metal Bioavailability Assessment Tool (M-BAT) available at:
<https://www.wfduk.org/sites/default/files/Media/Environmental%20standards/MBAT%20UKTAG%20Method%20Statement.pdf> Accessed March 2023

Appendix A. Environmental proposed scheme plans

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Legend

- Proposed Scheme Extent
- Local Authority Boundary

P01	24.04.2023	FIRST ISSUE	AC	LP	CF
REV	DATE	REVISION NOTE	ORG	CHKD	APP

Designer

Contractor

Client

Project Title

A46 COVENTRY JUNCTIONS UPGRADE
WALSgrave JUNCTION

Project Stage

PCF STAGE 3

Drawing Title

FIGURE 2.1 :
LOCATION PLAN

Suitability

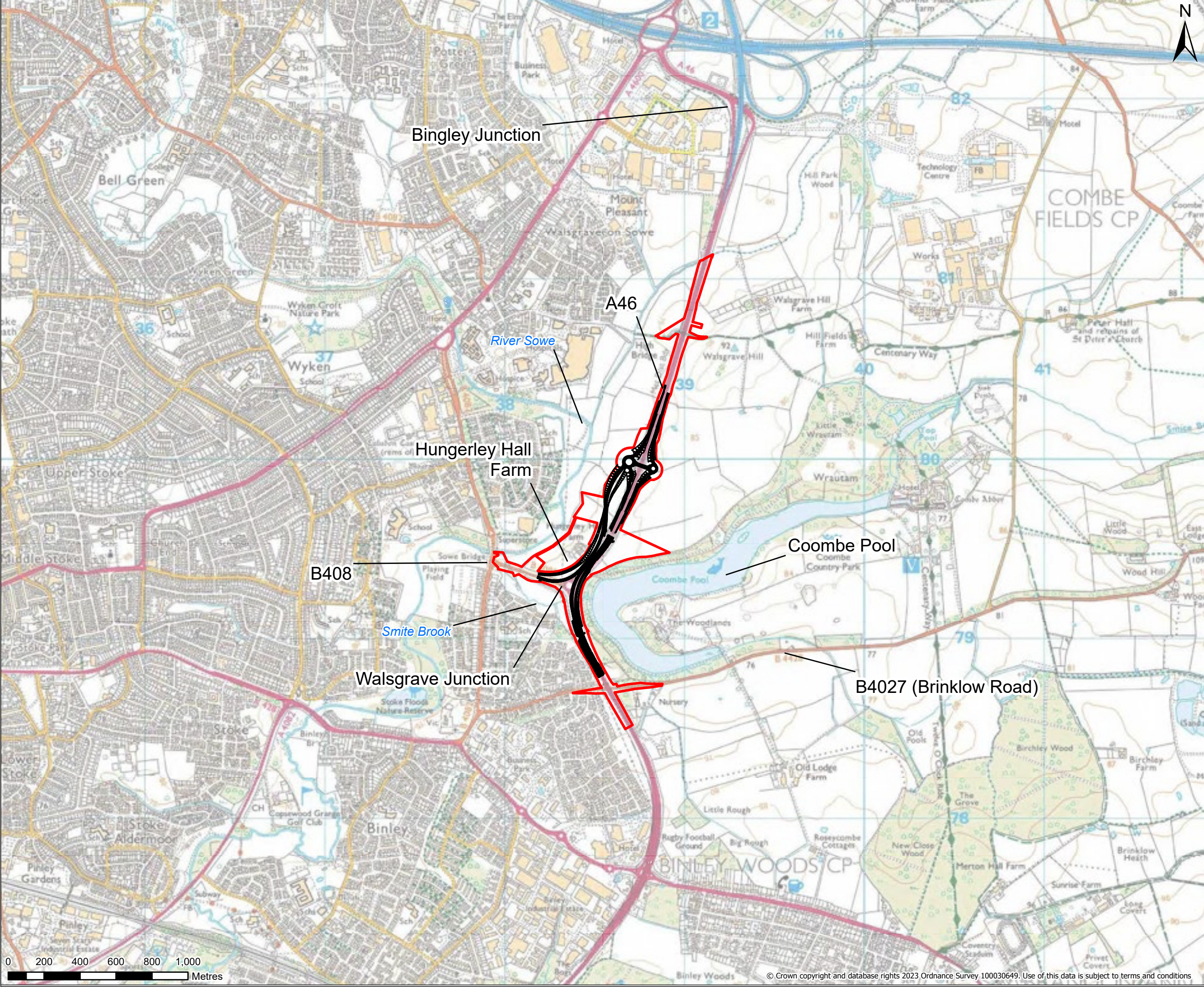
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Drawing Number

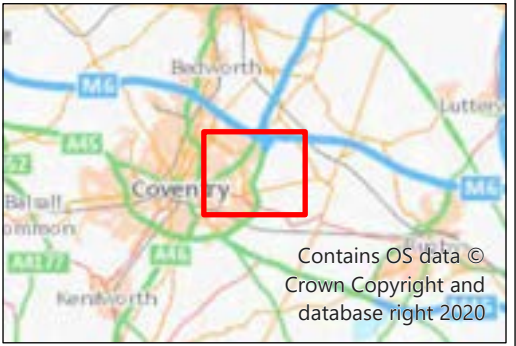
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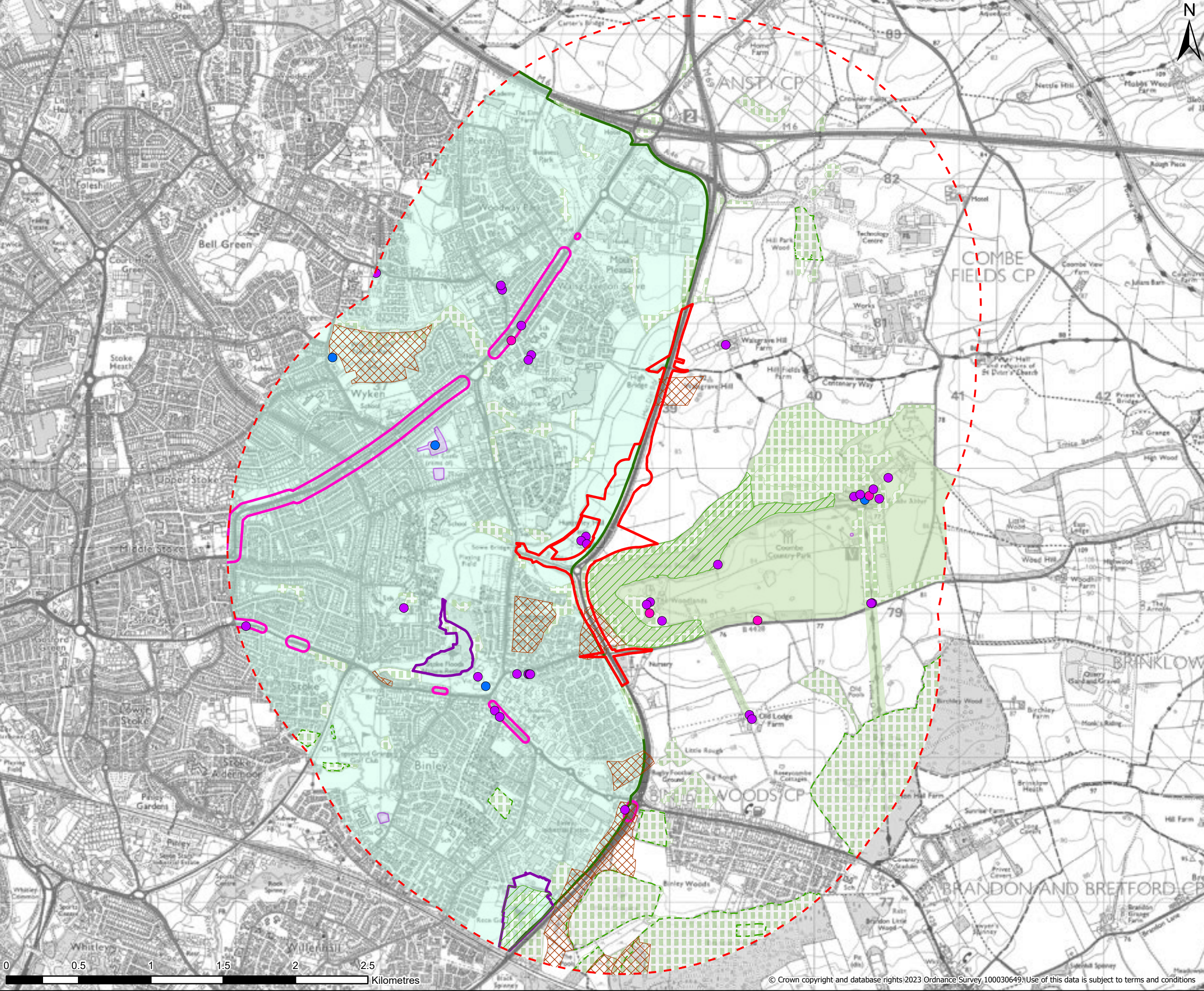
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Proposed Scheme Extent



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Contractor					
					
Client					
					
Project Title					
A46 COVENTRY JUNCTIONS UPGRADE WALSGRAVE JUNCTION					
Project Stage					
PCF STAGE 3					
Drawing Title					
FIGURE 2.2 : INDICATIVE SCHEME EXTENT					
Suitability					
SUITABLE FOR REVIEW AND COMMENT					
Sheet Size		Scale	Status	Revision	
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Drawing Number					
HE604820-OIL-EGN-00-DR-LX-30002					

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Legend

Proposed Scheme Extent

Proposed Scheme Extent - 2km Buffer

Listed Buildings

Grade I

Grade II

II*

Ancient Woodlands

Air Quality Management Area

Conservation Areas

Historic Landfill Site

Local Nature Reserve

National Forest Inventory

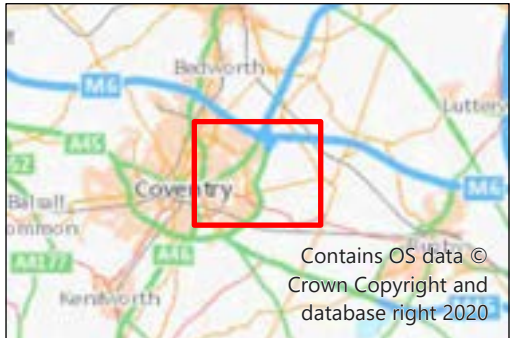
Noise Important Area




Parks and Gardens

Scheduled Monuments

Sites of Special Scientific Interest

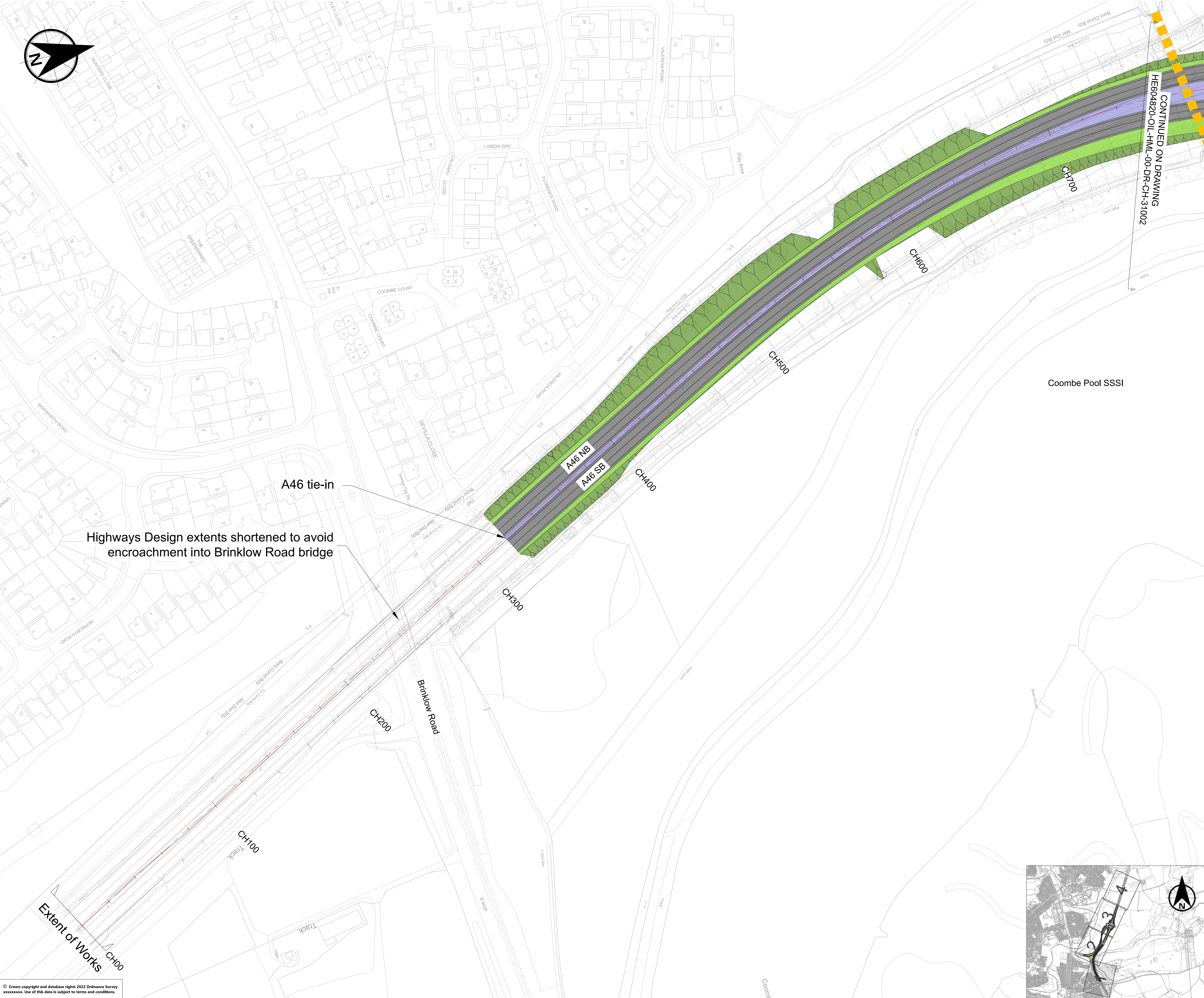
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P01	24.04.2023	FIRST ISSUE	AC	LP	CF
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Contractor					
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Client					
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Project Title					
A46 COVENTRY JUNCTIONS UPGRADE WALSgrave JUNCTION					
Project Stage					
PCF STAGE 3					
Drawing Title					
FIGURE 2.3 : ENVIROMENTAL CONSTRAINTS					
Suitability					
SUITABLE FOR REVIEW AND COMMENT					
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Appendix B. General arrangement drawings

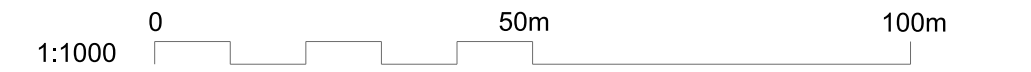
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 5. Existing utilities shown are referenced from Stage 2 and need to be updated based on Stage 3 GPR survey.

KEY TO SYMBOLS

- Proposed Carriageway
- Proposed Central Reserve
- Proposed Verge
- Proposed Earthworks
- Route Chainage
- Existing Culvert



P01	24/04/23	For Information	CHea	SMIs	EBa
REV	DATE	REVISION NOTE	ORG	CHKD	APPD

DESIGNER

COWI SWECO

CONTRACTOR

octavius

CLIENT

national highways

PROJECT TITLE
A46 COVENTRY JUNCTIONS (WALSGRACE)

PROJECT STAGE
PCF STAGE 3

DRAWING TITLE
GENERAL ARRANGEMENT
SHEET 1 OF 4

SUITABILITY
FOR INFORMATION

SHEET SIZE	SCALE	STATUS	REVISION
A1	1:1000	S2	P01

DRAWING NUMBER
HE604820-OIL-HGN-00-DR-CH-31001

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Extent of Works

River Sowe

Existing HHF
brickwall removed

Diverted Farm Access
to be confirmed

CH700







Existing Smite
Brook Culvert

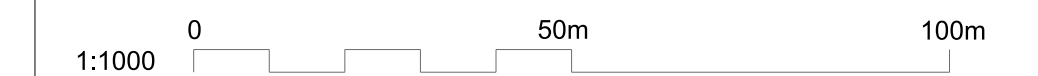
A46 tie-in

- Existing A46 cross section retained north of HHF bridge

KEY TO SYMBOLS

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2. Refer to drawings
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4. All dimensions, chainages, levels and coordinates are in metres unless otherwise stated.
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-  Proposed Carriageway
-  Proposed Central Reserve
-  Proposed Verge
-  Proposed Earthworks
-  Route Chainage
-  Existing Culvert

[illegible]

P01	24/04/23	For Information	CHea	SMis	EBa
REV	DATE	REVISION NOTE	ORG	CHK'D	APP'D

DESIGNER

CONTRACTOR

CLIENT	
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PROJECT TITLE

PROJECT STAGE

3	
	DRAWING TITLE

SUITABILITY

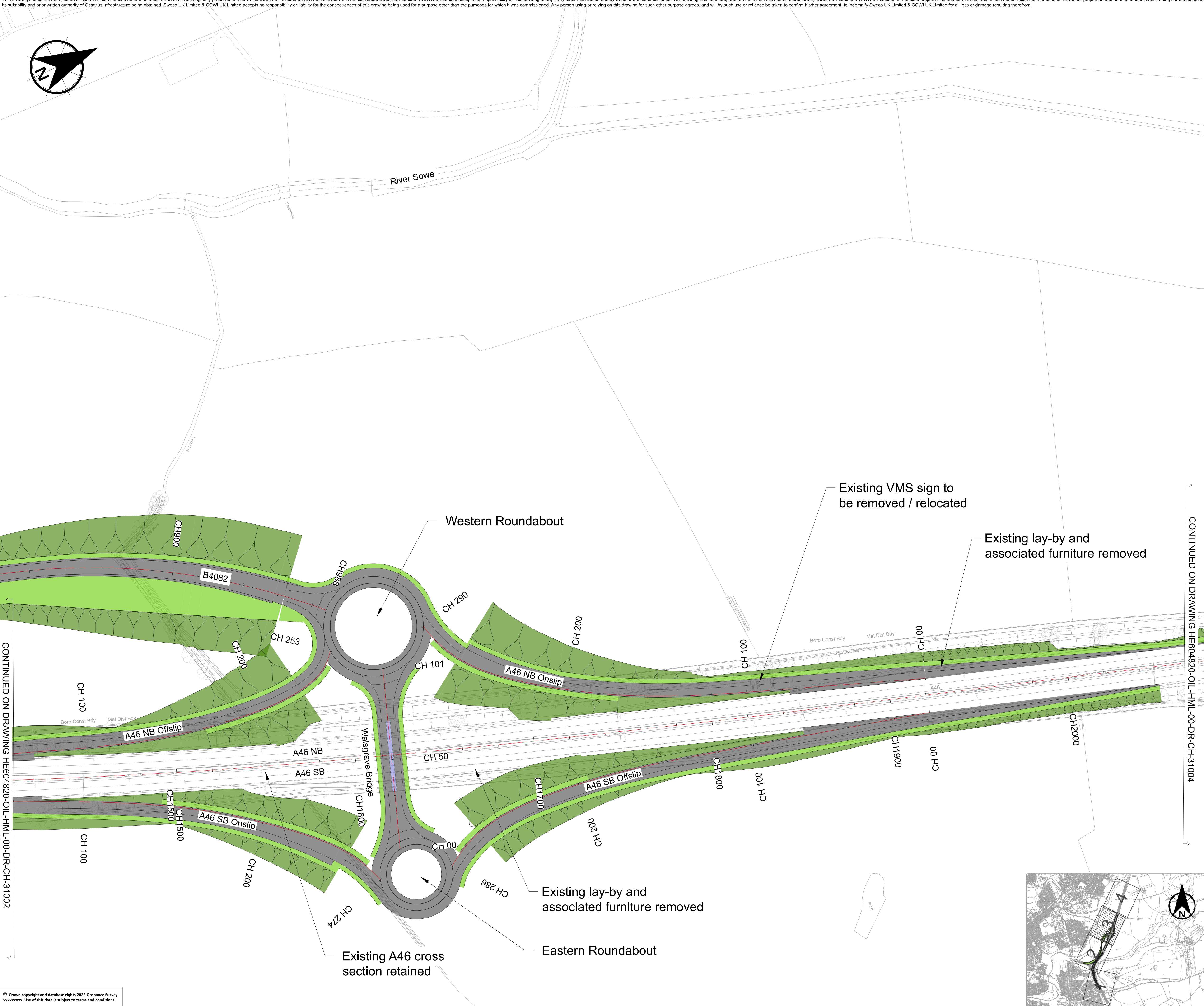
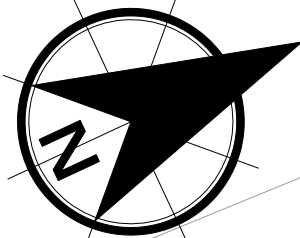
FOR INFORMATION

SHEET SIZE	SCALE	STATUS	REVISION
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	DRAWING NUMBER

DRAWING NUMBER
HE604820-OIL-HGN-00-DR-CH-31002

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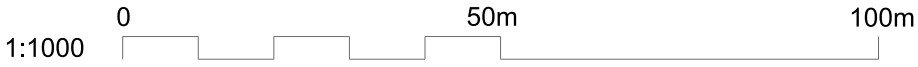


CONTINUED ON DRAWING HE604820-OIL-HML-00-DR-CH-31002

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KEY TO SYMBOLS

- Proposed Carriageway
- Proposed Central Reserve
- Proposed Verge
- Proposed Earthworks
- Route Chainage
- Existing Culvert



P01	24/04/23	For Information	CHea	SMIs	EBa
REV	DATE	REVISION NOTE	ORG	CHKD	APPD

DESIGNER



CONTRACTOR



CLIENT



PROJECT TITLE

A46 COVENTRY JUNCTIONS (WALSGRACE)

PROJECT STAGE

PCF STAGE 3

DRAWING TITLE

GENERAL ARRANGEMENT
SHEET 3 OF 4

SUITABILITY

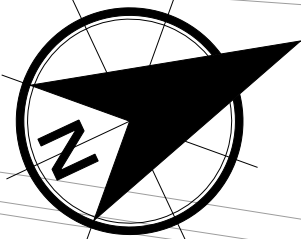
FOR INFORMATION

SHEET SIZE	SCALE	STATUS	REVISION
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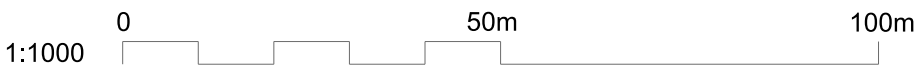
CONTINUED ON DRAWING HE604820-OIL-HML-00-DR-CH-31003

NOTES

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KEY TO SYMBOLS

- Proposed Carriageway
- Proposed Central Reserve
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P01	24/04/23	For Information	CHea	SMis	EBa
REV	DATE	REVISION NOTE	ORG	CHKD	APPD

DESIGNER



CONTRACTOR



CLIENT



PROJECT TITLE

A46 COVENTRY JUNCTIONS (WALSGRACE)

PROJECT STAGE

PCF STAGE 3

DRAWING TITLE

GENERAL ARRANGEMENT
SHEET 4 OF 4

SUITABILITY

FOR INFORMATION

SHEET SIZE	SCALE	STATUS	REVISION
A1	1:1000	S2	P01

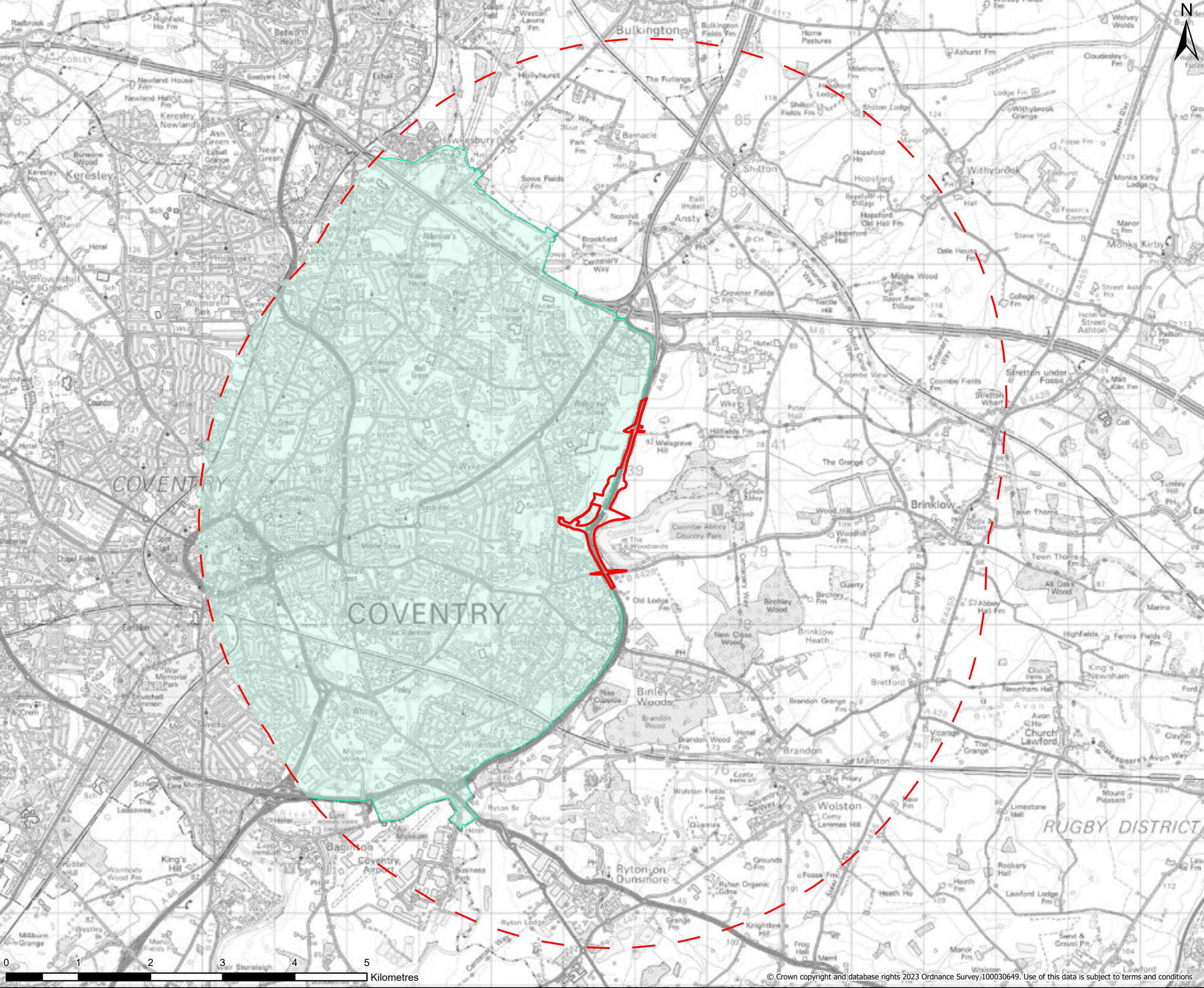
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Appendix C. Air quality figures

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Legend

- Proposed Scheme Extent
- Proposed Scheme Extent - 5km Buffer
- Air Quality Management Areas (AQMA)

P01	24.04.2023	FIRST ISSUE	PK	MB	DM
REV	DATE	REVISION NOTE	ORG	CHKD	APP

Designer

Contractor

Client

Project Title

A46 COVENTRY JUNCTIONS UPGRADE
WALSGRACE JUNCTION

Project Stage

PCF STAGE 3

Drawing Title

FIGURE 6.1 : AIR QUALITY MANAGEMENT
AREAS (AQMAS)

Suitability

SUITABLE FOR REVIEW AND COMMENT

Sheet Size	Scale	Status	Revision
A3	1:50,000	S3	P01

Drawing Number

HE604820-OIL-EAQ-00-DR-LA-30001

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- Legend**
- Proposed Scheme Extent
 - Automatic Monitoring Sites
 - Passive Monitoring Sites
 - Within Coventry City Council
 - Within Rugby Borough Council



P01	24.04.2023	FIRST ISSUE	PK	MB	DP
REV	DATE	REVISION NOTE	ORG	CHKD	APP

Designer

COWI **SWECO**

Contractor

octavius

Client

national highways

Project Title

**A46 COVENTRY JUNCTIONS UPGRADE
WALSgrave JUNCTION**

Project Stage

PCF STAGE 3

Drawing Title

**FIGURE 6.2 : NEARBY LOCAL AUTHORITY
MONITORING SITES**

Suitability

SUITABLE FOR REVIEW AND COMMENT

Sheet Size	Scale	Status	Revision
A3	1:30,000	S3	P01

Drawing Number

HE604820-OIL-EAQ-00-DR-LA-30002

Appendix D. Cultural heritage gazetteer tables

Known heritage assets within the study area

Table D.1 Known heritage assets within the study area

HER/ Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
1014044	Caludon Castle: a moated site and part of an associated water management system	Caludon Castle is a well preserved example of a moated site together with an associated water management system. The moated site will retain structural and artefactual evidence for both the original house which existed here from the end of the 12th century, for the later rebuilding and additions in the mid- 14th century, and for the additions made during the early post-medieval period. The moat ditches and the sample section of the floor of the pool will retain both artefactual and environmental information regarding the occupation of Caludon Castle and for the economy of its inhabitants as well as the landscape in which it was set. Additionally the existence of the pool to the north of the moated site provides evidence for the wider setting of the house, and thus an insight into the way in which the wealth and social status of its occupants in the medieval and early post-medieval periods was made manifest. The interest of Caludon Castle is enhanced by the survival of contemporary documentary records which relate to the site's ownership and the buildings that existed here. As a monument which is open to the public, Caludon Castle serves as a valuable educational and recreational resource.	437386	280164	Medieval	Schedule d Monume nt	High
1014045	Moated site 190m south of Caludon Castle	The moated site 190m south of Caludon Castle is a well preserved example of this class of monument and is unencumbered by modern development. The moated island will retain structural and artefactual evidence for buildings and other structures which originally existed, including evidence of their form, date and function. The	437404	279962	Medieval	Schedule d Monume nt	High

HER/ Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
		moat ditches, which have silted naturally, will contain both artefactual and environmental information relating to the site's occupation and illustrating the landscape in which it was used. The ruins, earthwork and buried remains of Caludon Castle, a high status residence which was originally constructed in the late 12th century and occupied through to the late 17th century, are situated to the north of the moated site. These remains are the subject of a separate scheduling. A relationship with Caludon Castle is highly likely, and the moated site to the south was probably a secondary associated enclosure of similar date.					
1000408	Coombe Abbey	Late C18 park landscaped by Lancelot Brown with structures designed by Henry Holland, together with mid and late C19 formal gardens laid out by William Andrews Nesfield and William Miller which incorporate elements of late C16 and early C17 formal gardens.	440090	279515	Post-Medieval	Grade II* Registered Park and Garden	High
1034896	Old Lodge Farmhouse	Farmhouse, Early C17 with large late C19 addition to rear. Flemish stretcher bond brick with some flared headers, and sandstone dressings. Old plain-tile roof; large brick external stack to rear.	439553	278295	Post-Medieval	Grade II Listed Building	High
1034897	Old Lodge Farm, Barn Approximately 10 Metres South of Farmhouse	Barn. C17 with C19 rebuilding. Timber framed with brick infill; largely rebuilt in brick. Old plain-tile roof. 5 bays. Double-leaf plank doors. Left return side has plank door with wood lintel. Interior has C19 brick buttresses to central bay. Trenched purlin queen strut roof has renewed struts. Included for group value.	439570	278266	Post-Medieval	Grade II Listed Building	High
1076629	Church of St Bartholomew	1771-3 for William Lord Craven of Coombe Abbey. Nave with sanctuary apse, recessed west porch. Attributed to Robert Adam, Ashlar, cement slurry. North transept leading to vestry with semi-circular ends. Coved ceiling with garlands and medallions in relief. Similar wall decoration. East end niches flanking alabaster columns,	437729	278494	Post-Medieval	Grade I Listed Building	High

HER/ Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
		Tower of the Winds capitals. Greek Ionic alabaster north screen. Madonna and Child east window. West gallery.					
1076630	The Vicarage	Late C18 west block. Cement rendering, hipped Welsh slated roof. 2 storeys, 2 full height canted bays, sash windows with glazing bars. Cornice. Early front block, C16, altered. 2 storeys, 2 gables on right. Casement windows. C19 porch with ornamental bargeboards. Interior: C16 stone chimneypiece. Very fine mid C18 chimneypiece, carved wood, Rococo design, in drawing room.	437675	278559	Post-Medieval	Grade II Listed Building	High
1076631	1 And 2, Brinklow Road	C17 refaced C18 with C19 back wing. Timber frame, whitewashed brick nogging. Tiled roof. Front of whitewashed brick with 1st floor band. 2 casement windows, ground floor cambered arches. Back wing of red brick, casement window with glazing bars, bracketed door hood.	437945	278578	Post-Medieval	Grade II Listed Building	High
1076632	6, Brinklow Road	Late C16 or early C17. Timber frame, whitewashed brick nogging. Tiled roof. 2 storeys, casement window with glazing bars. Single storey back wing. 1 building with No 8.	438023	278577	Post-Medieval	Grade II Listed Building	High
1076633	8, Brinklow Road	Late C16 or early C17. Stone plinth, timber frame with gable end to road, red brick nogging. 2 storeys and attic, casement window with glazing bars.	438032	278577	Post-Medieval	Grade II Listed Building	High
1076634	10 And 12, Brinklow Road	C16, refronted with red brick, No 10 refaced with whitewashed pebbledash. Tiled roof. Timber frame exposed at left angle and side elevation. 1 storey and attics, 2 casement windows flush set, cambered arch and glazing bars and louvered shutters on left. Gabled C19 casement dormer on right.	438037	278576	Post-Medieval	Grade II Listed Building	High
1076645	Remains of Caludon Castle	Circa 1354, or earlier. John Segrave was granted a licence to crenellate 1305. Another licence granted 1354. Descended to Thomas Mowbray, Duke of Norfolk. Fell into dereliction after his banishment 1398. Rebuilt circa	437379	280159	Medieval	Grade I Listed Building	High

HER/ Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
		1580 by Henry Lord Berkeley. Ruined by the later C17. Sole remaining fragment consists of tall sandstone wall containing 2 large pointed arched windows above 2 smaller. Remnants of stone window tracery.					
1087021	Stoke House	Early to mid C19, Stucco, Welsh slated roof. 3 storeys, 1st floor simplified entablature; frieze and bracketed cornice at eaves. 3 sash windows with glazing bars, central 1st floor pediment on consoles. Doric closed porch with pilasters.	437163	279034	Post-Medieval	Grade II Listed Building	High
1115404	Church of St Mary The Virgin	Parish church. c1300 chancel, with late medieval phases, on an earlier site. Restored By G.E Street in 1865. Church rooms (not of special interest) added 1981.	437906	280883	Medieval	Grade II* Listed Building	High
1226789	Barn Approximately 50 Metres North of Hungerley Hall Farmhouse	Barn. Mid C18. Red brick with some decorative flared headers. Plain-tile roof. Brick plinth. Central double doorway. Opening to upper right. Interior: 4-bay tie-beam truss roof with double trenched purlins and coupled rafters.	438422	279528	Post-Medieval	Grade II Listed Building	High
1233531	Walsgrave Hill Farmhouse	Late C18. Brick, with C20 tile roof and brick stack to ridge. 2 storeys plus attic; 3-window range. C19 part-glazed door with overlight within C19 brick porch. To left and right of ground and first floors 24-pane, 3-light casements, those to ground floor with gauged brick arches, those to first floor with segmented brick arches. 16-pane, 2-light casement above door. Gabled dormers with C20 casements. The house rests upon a plinth and has a first floor storey band. Brick dentilled eaves cornice. C19 one-bay extension abutted to left of 2 storeys. C18 wing to rear. Interior: some chamfered beams, with stops.	439389	280853	Post-Medieval	Grade II Listed Building	High
1233532	West Lodge	House, formerly lodge. Late C18. Sandstone ashlar with some brick to ends. Lead roof removed. Brick stacks to ends. 2 storeys; 2-window range, with one-storey, one-bay wings to left and right. In style of a Roman triumphal	439609	278948	Post-Medieval	Grade II* Listed Building	High

HER/ Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
		arch. Central archway. To left and right a round-headed sash of 12-panes, with further 12-pane sashes to wings with wedge lintels. Above round-headed sashes to left and right a blind window with wedge lintels. Flanking arch, and to corners of main range, Corinthian pilasters supporting entablature. Plinth, and first floor storey band. Parapet to flanking wings. Urns to left and right corners of main range decorated with festoons.					
1233533	The Woodlands	Hunting Lodge, now house. Late C18 with C19 additions. Probably by Capability Brown. Sandstone ashlar, with some brick. Slate and lead roofs with ashlar stacks. Complex plan of polygonal wing to left, centre range and projecting cross-wing to right. 2 storeys; 5-window range. C20 plank door within hexagonal porch with wood modillion eaves cornice. 12-pane unhorned sashes to ground floor of left polygonal range, to right of door and to front of wing to right. One blind window to right facade of wing. 9-pane unhorned sashes to first floor of polygonal range, those to main range and right wing with keyblocks. Plinth and first floor storey band. Stone modillion eaves cornice. Interior: some panelled, some plank doors. One chamfered beam with ogee stop.	438862	278998	Post-Medieval	Grade II* Listed Building	High
1233663	Menagerie Farmbuildings to North West of The Woodlands	Menagerie farm buildings. c1778. Built to serve the Menagerie designed by Lancelot (Capability) Brown. Red brick with plain tile roofs. Two 1-plan ranges linked by a gate. The larger northern range has a 2 storey wing to the west, with 4 segment-headed carriage arches, that to the right with double plank doors. Beyond to the right a stable door flanked by single 2-light glazing bar casements all with segment heads. Above 3 tall 2-light glazing bar casements to the eaves. Beyond to the right a slightly set back lower range with a single stable door. This range continues at right angles with a further stable door and becomes single storey with two stable doors and a shuttered opening between. The smaller southern range,	438866	279075	Post-Medieval	Grade II Listed Building	High

HER/ Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
		single storey, with the 2 cart entrances to the north range, and 2 bricked-up cart shed entrances to the south range that to the left with a 3-light glazing bar casement. Beyond a single plank door flanked by single light glazing bar casements. These buildings are extremely rare, they were built to store food and bedding for the animals in the Menagerie, and they also provided space for sheltered winter accommodation for these exotic beasts.					
1233703	Wall to South of The Woodlands Coombe Abbey	Boundary wall. c1770-78, with later alterations. By Lancelot (Capability) Brown. Red brick with coping in part and remains of bases for urns. This wall extends south-east of The Woodlands (qv) to the edge of The Pool and is approx 2-3m in height but has the occasional gap or area of collapse. The wall was originally built by Brown together with that to north (qv) of The Woodlands to cut off the area of land bordering The Pool which he had formed into a Menagerie. The area is named as such and the wall is shown in a plan of 1778.	438948	278945	Post-Medieval	Grade II Listed Building	High
1265638	Granary, Cowshed and Stable Range Approximately 15 Metres North West of Hungerley Hall Farmhouse	Granary, cowshed and stable range. Mid/late C18, the stable with early C19 roof. Red brick with plain-tile roofs. L-plan, stable projecting forward on right. 2-storey granary to left has double and single doors, brick dentilled eaves and doorway to granary on left-end. Single-storey cowshed to centre has 4 stable doors. 2-storey stable has stable door to centre, blind window above and a shuttered window either side on both floors. Lean-to on left end, loft door on right end. Interiors. Granary has 2-bay roof with coupled rafters, old purlins and brick partition. Cowshed has 8-bay roof with chamfered ties, clasped principals and trencled overlapping purlins. Plank ridge. Stable has hay loft, chamfered beams with run-out stops and early C19 3-bay king-post truss roof.	438389	279499	Post-Medieval	Grade II Listed Building	High

HER/ Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
1265694	Hungerley Hall Farmhouse	Farmhouse. Probably late C17/early C18 with mid C18 extensions and late C18/ C19 alterations. Red brick with plain-tile roof and brick ridge and end stacks. Complex plan. Main front faces garden. 2 storeys and cellar. 4-window range of 3-light casement windows the 2 to centre under brick cambered arches. Under these the door within wooden lattice porch with gabled hood. Similar 3-light casement to right and 2-light to left. Two 2-light casement to far right. Blocked window to far left, where also 1st floor band. The differences in brickwork together with interior evidence suggest that a timber-framed 3-unit-plan house was extended on either end in brick in mid C18, then the framing refronted in brick late C18/early C19 and then the section of roof to centre and left slightly raised mid C19. The rendered left end has a 4-light casement with 3-light over, and the right end various casements, lean-tos and steps leading to 1st floor doorway. Rear has mainly 3-light casements, and a cross-wing projecting to centre-left with a 2nd span extension to its left, gable facing left. Further single-storey extension to centre right with doorway to left and small canted bay to right of it. Interior: chamfered beams; open fireplace and bressumer, Cellar has brick thrawls. Plank door and 2-panel door on 1st floor, together with hood to open fireplace, timber- framed partition) old floor boards, a 2nd fireplace hood and wall posts.	438428	279477	Post-Medieval	Grade II Listed Building	High
1276492	Boat House on South Side of The Pool, Coombe Abbey	Boat House on South side of The Pool, Coombe Abbey - II Boathouse. c1770-78, with later alterations. Probably by Lancelot (Capability) Brown. Red brick and plain-tile roof. Single storey. Open ended to The Pool and entrance door opposite. King-post roof construction possibly early C19. The boathouse is marked on a plan of 1778.	439334	279334	Post-Medieval	Grade II Listed Building	High
1276493	Wall to North of The Woodlands,	Boundary wall. c1770-78, with later alterations. By Lancelot (Capability) Brown. Red brick with coping in part. This wall extends north and north-west of The Woodlands	438842	279058	Post-Medieval	Grade II Listed Building	High

HER/ Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
	Coombe Abbey and Attached Farm Buildings	(qv) to the edge of The Pool and is approx. 3m in height but has the occasional gap or area of collapse. The wall was originally built by Brown together with that to south (qv) of The Woodlands to cut off the area of land bordering The Pool which he had formed into a Menagerie. The area is named as such and the wall shown in a plan of 1778. Attached to the western side of this wall a range of single storey outbuildings. Red brick with plain tile roofs and a single ridge stack. Central range has to right 2 doorways with plank doors flanked by single 2-light glazing bar casements. Set back to right a remodelled C19 wing. Set back to left an original wing with 2 plank doors and two 2-light casements. These buildings were built to serve the Menagerie, to provide feed storage and winter quarters for the exotic animals kept here.					
1335842	14, School House Lane	C16 or early C17. Timber-frame, whitewashed plaster infilling, medieval tiled roof. 2 casement windows with segmental heads, metal glazing bars. 2 nailed and boarded doors.	438044	280783	Post-Medieval	Grade II Listed Building	High
1342892	White House	Early to mid C19 front to earlier house. Whitewashed brick, Welsh slated roof. 2 storeys, 5 sash windows with glazing bars in reveals, ground floor cambered arches. 6 fielded panel door, oblong fanlight with glazing bars, slim reeded pilasters, simplified entablature.	438024	280748	Post-Medieval	Grade II Listed Building	High
1342904	22, Brandon Road	C18. Red brick, tiled roof. 2 storeys, 3 flush casement windows with glazing bars under rusticated stone lintels. Glazed C19 porch.	437791	278325	Post-Medieval	Grade II Listed Building	High
1342913	Cruck House	Medieval cruck timber frame. Early C19 or late C18 front, of red brick. Thatched roof. 1 storey and attics, 4 flush casement windows under cambered arches. 2 casement dormers. (No No. 18).	437975	280986	Medieval	Grade II Listed Building	High

HER/ Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
1342922	34, Brandon Road	C17 or earlier, slightly altered. Whitewashed pebbledash, old tiled roof. 2 storeys, 3 casement windows with glazing bars. Timber framework exposed internally.	437826	278281	Post-Medieval	Grade II Listed Building	High
1365086	The Cocked Hat Restaurant and Hotel, Binley Common House	Farmhouse, now restaurant and hotel. Late C17 with mid/late C19 additions and alterations, and late C20 alterations. Flemish bond brick with sandstone splayed plinth, moulded string course and alternating quoins. Plain-tile hipped roof has deep eaves. Large brick left end and right external stacks have gables and roofs and partly rebuilt shafts. U-plan with wings to garden to rear. 2 storeys and attic; 4-window range. Symmetrical fronts. C20 moulded 6-panelled door in simple painted moulded stone doorcase with heavy dentil cornice. Painted stone chamfered cross windows have glazing bars. Outer bays are widely spaced. 4 hipped roof dormers have C20 two-light casements with glazing bars. C19 single-storey wing at right angles on left has end stack. Late C20 windows. Right external stack has moulded stone string course and cornices. Garden front of 4 bays. Recessed centre has late C20 six-panelled door. Painted moulded stone eared architrave has pulvinated frieze and pediment. Panel of sandstone blocks above. Flanking windows. Late C20 top-hung sashes throughout have brick flat arches with painted keystones to centre, and C19 rusticated painted rendered flat arches to wings. Wings have C19 canted bays to ground floor. Four C20 two-light nipped roof dormers. Small C19 single-storey range at right angles on right. Interior is altered but retains dog-leg staircase with turned balusters.	438692	277640	Post-Medieval	Grade II Listed Building	High
MCT60	An Elizabethan coin (1588-1603) found in the Binley area	6d of Elizabeth (1588-1603)	438400	278500	Undated	None	None

HER/ Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
MCT65	Ridge and Furrow	Cropmark of Ridge and Furrow (roughly N-S) N of allotments. Visible on 2005 aerial photographs.	437813	279631	Medieval	None	Low
MCT304	Ridge and Furrow	Part of large, well-preserved area of ridge and furrow c300m W of Walsgrave Hill surveyed by plane-table, with photographic and sketch records of remainder. In excess of 90% since been destroyed by road corridor and removal of hill for construction use. Close dating not possible though several phases of activity were represented. Of particular interest were clear signs of at least 2 main phases where furlongs intersected and a possible third phase where low, flat-topped ridges were noted between many of higher ones.	439200	280700	Medieval	None	Low
MCT581	Area of ridge and furrow, Walsgrave on Sowe	An area of ridge and furrow cultivation that was visible on a 1977 aerial photograph was evaluated in 2002 but no dating evidence was found.	438427	280531	Medieval	None	Low
MCT891	Ridge and Furrow	A small area of ridge and furrow was recorded during a field investigation in this area. Post-1800 finds of coins and a belt buckle were also found.	438300	279300	Post-Medieval	None	Low
DCT1176	Area of ridge and furrow north Clifford Bridge Road allotments	An area of ridge and furrow north Clifford Bridge Road allotments, visible on 1980 aerial photograph.	437823	279438	Unknown	None	Low
MWA3720	High Bridge, Walsgrave on Sowe	High Bridge, the site of a modern bridge. A map of 1823 suggests that this might be the site of an earlier bridge. The site is located 700m west of Walsgrave Hill.	438727	280703	Medieval to Modern	None	Low

HER/ Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
MWA3732	Site of Brickworks 400m S of The Woodlands	The site of brick and tile works dating to the Imperial period which were indicated on an estate map of 1823. No surface evidence remains. The site is south of the southwest end of Coombe Country Park	438968	278643	Post-Medieval	None	Low
MWA3733	Quarry within Coombe Abbey Deer Park	The site of a gravel pit from which gravel was extracted during the Post Medieval period. It is marked on an estate map of 1823. The gravel pit was situated inside Coombe Abbey Deer Park.	438816	279099	Post-Medieval	None	Negligible
MWA3737	Possible Quarry, 'Marlpit Close', Walsgrave on Sowe	The possible site of a marl pit dating to at least the Imperial period is suggested by documentary evidence. Evidence of ridge and furrow cultivation also exists in this area and survives as earthworks. These features are situated 500m north of Walsgrave	439458	281079	Post-medieval	None	Negligible
MWA4788	Turnpike road from Market Harborough to Coventry	A toll road that was in use during the Imperial period. Travellers had to pay a toll to use the road. It ran from Coventry to Market Harborough.	438588	278719	Post-medieval	None	Low
MWA6724	Site of Gravel Pit SW of Walsgrave Hill	The site of a gravel pit from which gravel was extracted during the Imperial period. The site is marked on the Ordnance Survey map of 1886. It was situated 500m south west of Walsgrave Hill.	439011	280167	Post-medieval	None	Negligible
MWA6853	Site of Fish Pond NE of Oak Farm	The site of a fishpond, used for the breeding and storage of fish. It is marked on the Ordnance Survey map of 1886. It dates to the Imperial period, and is situated north of Lyttleton Close, Binley Woods.	438459	278500	Post-Medieval	None	Low
MWA6929	Site of Gravel Pit NW of The Woodlands	The site of a gravel pit from which gravel was extracted during the Imperial period. It was marked on the Ordnance Survey map of 1886, and was situated 100m northeast of the Boat House of Coombe Country Park Pool.	438793	279148	Post-Medieval	None	Negligible

HER/ Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
MWA6986	Findspot - Post Medieval coin	Findspot - a Post Medieval coin was found 500m north-east of Binley.	438401	278498	Post-medieval	None	None
MWA8193	The Menagerie within Coombe Abbey Deer Park	The site of a menagerie or zoo associated with the Coombe Abbey estate. It dated to the Imperial period and was situated within Coombe Abbey Deer Park.	438849	279022	Post-medieval	Duplicate of designated asset	High
MWA8277	Ridge and furrow, Coventry Eastern Bypass Site 4	The remains of Medieval ridge and furrow cultivation which survived as earthworks. Much of the ridge and furrow has been destroyed by recent road building and pipeline installation. The site is located north-west of Walsgrave Hill.	439199	280702	Medieval	None	Low
MCT15261	Road	Road on the 1888 OS map; no Tithe Map available	436987	278516	Post-Medieval	None	Unknown
MCT15391	River Sowe	River Sowe on the 1888 OS map; no Tithe Map available. Natural feature.	437673	278834	Natural feature	None	None (natural feature)
MCT15955	Stream	Stream at Walsgrave on the 1887 OS map; no Tithe map available	438605	281269	Post-Medieval	None	None (natural feature)
MCT15956	Pingle	Pingle at Walsgrave on the 1887 OS map; no Tithe map available	438633	280714	Post-Medieval	None	Low
MCT15973	Sheepwash	Sheepwash at Walsgrave on the 1887 OS map; no Tithe map available	438713	280655	Post-Medieval	None	Low
MCT15982	Old Quarry?	Old Quarry at Walsgrave on the 1887 OS map; no Tithe map available	438966	280907	Post-Medieval	None	Negligible
MCT16039	Road	Road at Walsgrave on the 1887 OS map; no Tithe map available	438550	280750	Post-Medieval	None	Unknown

HER/ Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
MCT16043	Stream	Stream at Walsgrave on the 1887 OS map; no Tithe map available	439160	280996	Post-Medieval	None	None (natural feature)
MCT16045	High Bridge	High Bridge at Walsgrave on the 1887 OS map; no Tithe map available. Potential duplicated asset	438725	280695	Post-Medieval	None	Low
MCT16200	Stream	Stream at Walsgrave on the 1887 OS map; no Tithe map available	439094	281236	Post-Medieval	None	None (natural feature)
MCT16481	Ridge and Furrow	The course of the pipeline [in area E] cut-well defined ridge and furrow earthworks in a field (Field 1507) under pasture to the south of a stream north-west of Walsgrave Hill Farm. This ridge and furrow orientated northwest-southeast terminated at a bank [headland] orientated northeast-southwest. A later field boundary bank aligned northwest-southeast incorporated a mature tree and cut across the ridge and furrow. Traces of similarly aligned ridge and furrow were also noted in adjacent fields to the east and south (Fields 1057a, 2680 and 1648). ... [Area F] In a field (Field 0778) under pasture, immediately to the south of field 1507, north of Faber Road the route cut ridge and furrow orientated north-west, south-east. Traces of similarly aligned ridge and furrow were also noted in a field to the south of faber Road (Field 1648).	439305	280884	Early Medieval to Modern	None	Low
MCT16482	Ridge and Furrow	Ridge and furrow recorded during a watching brief in 1993/4. It is visible as an earthwork on 2005 aerial photographs.	438843	280789	Early Medieval to Modern	None	Low
MCT16484	Deposit of Charcoal, Coventry Pipeline Phase 2	To the south [North?] of this structure [MCT16483] also in Field 8700, a large deposit of charcoal approx 10m long and 5m wide overlaying natural gravels was exposed by topsoil stripping approximately 520m south {north?} of the A428. No dating evidence was recovered from this deposit.	438814	278350	Unknown	None	None

HER/ Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
MWA31267	Walsgrave Hill Trig Point, Coombe Fields	Trig point pillar	439266	280630	Post- Medieval to Modern	None	Low

Previous archaeological events within the study area

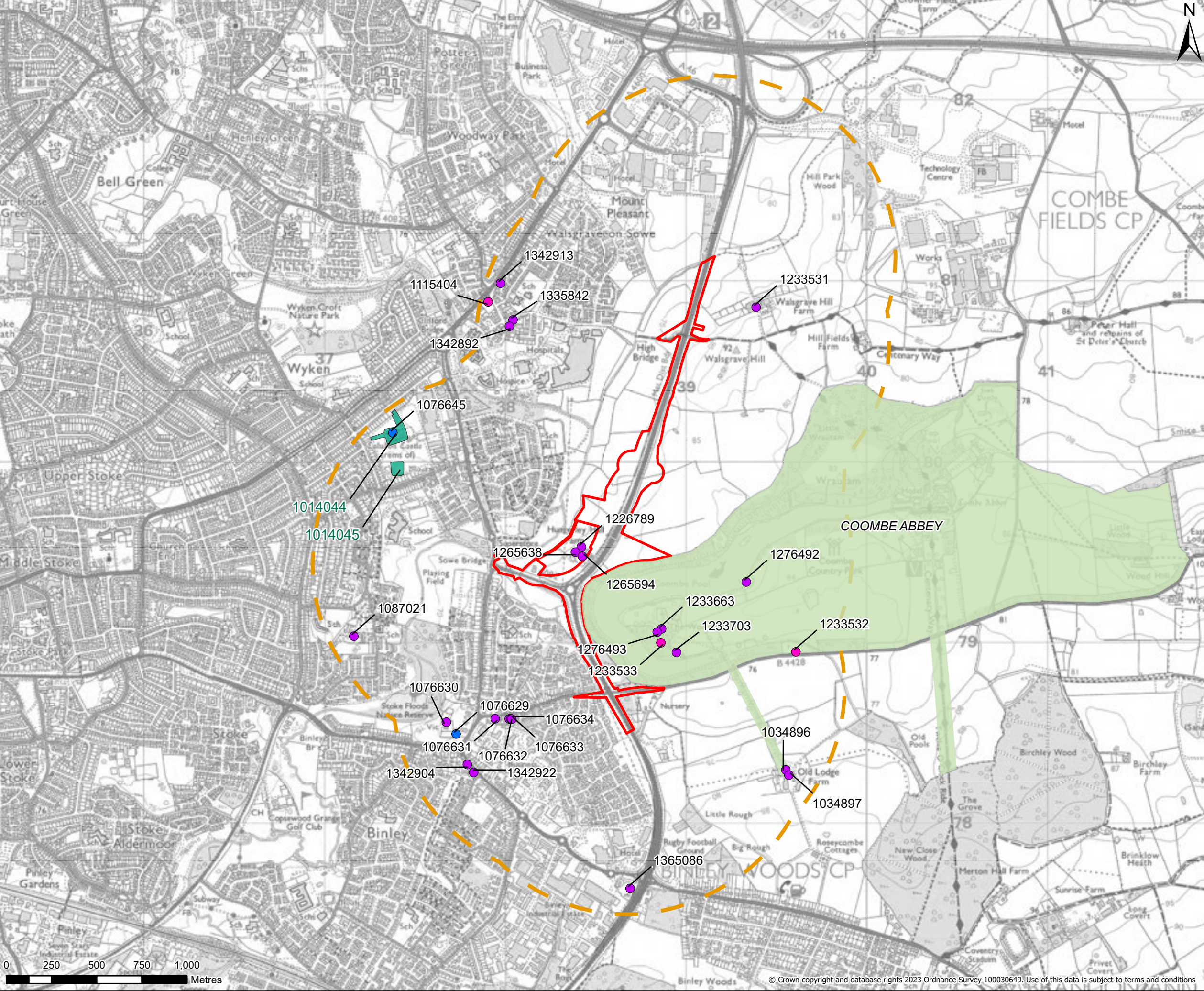
Table D.2 Previous archaeological events within the study area

Event Ref	Name	Description	Easting	Northing
ECT36	Coventry Eastern Bypass Site 4, 1987	Survey, 1987	439116	280714
ECT37	Coventry Eastern Bypass Site 4, 1994	Intervention, 1994	439008	280729
ECT63	Coventry Eastern Bypass Site 3 Fieldwalking	Survey, 1987-1988	438297	279301
ECT64	Coventry Pipeline Phase 2	Intervention, 1993-4	438196	279269
ECT76	Eastern Bypass Site 3	Field Observation, 1987	438301	279301
ECT77	Eastern Bypass Site 4	Survey, 1987	439205	280703
ECT93	Coventry Pipeline Phase 2 (North east)	Intervention, 1993-4	438707	280602
ECT117	Walsgrave Hospital	Intervention, 2002	438373	280576
ECT144	Walsgrave Hospital	Interpretation	438127	280533
ECT492	EDP 209 Walsgrave	Survey, 2006	438688	280295
EWA1871	Site visit to the Brickworks 400m South of The Woodlands, Coombe Fields	A site visit was made to the location of a brickworks, 400m South of The Woodlands, Coombe Fields by Warwickshire Museum on the 16th November 1983.	438974	278651

Event Ref	Name	Description	Easting	Northing
EWA9620	Site visit to Coombe Abbey, Coombe Fields, Rugby	by J Lovie c1996	439471	279376
EWA9683	Coombe Abbey Country Park Management Plan 2001-2011	Management plan assessing the historic landscape of the park and suggesting management strategies for each	439471	279376

Appendix E. Cultural heritage figures

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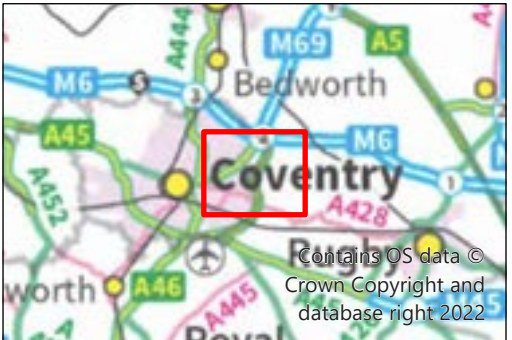


Legend

- Proposed Scheme Extent
- Proposed Scheme Extent 1km Buffer
- Scheduled Monument
- Registered Park / Garden

Listed Buildings - Grade

- I
- II*
- II



P02	09.06.2023	FIRST ISSUE	AC	RS	BM
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Designer

COWI **SWECO**

Contractor

octavius

Client

national highways

Project Title

**A46 COVENTRY JUNCTIONS UPGRADE
WALSgrave JUNCTION**

Project Stage

PCF STAGE 3

Drawing Title

**FIGURE 7.1 :
DESIGNATED HERITAGE ASSETS**

Suitability

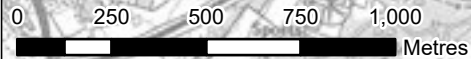
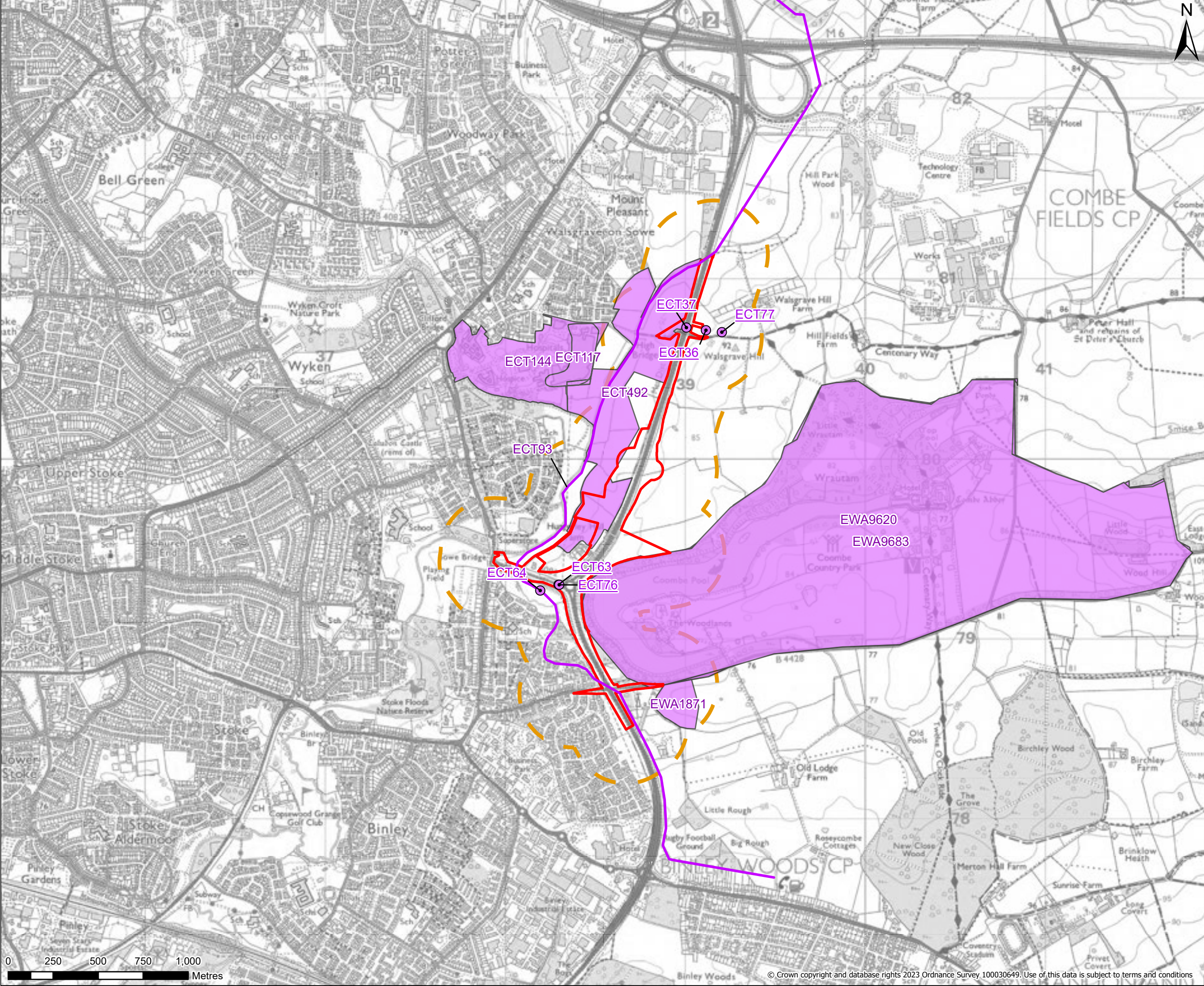
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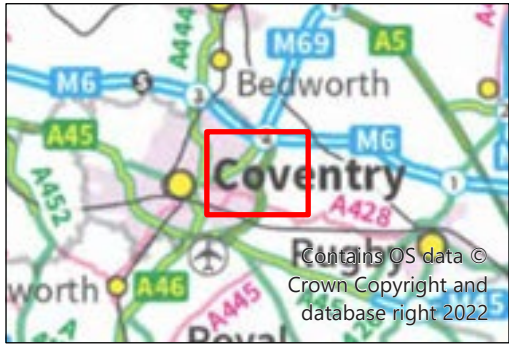
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Legend

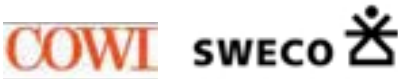
- Proposed Scheme Extent
- Proposed Scheme Extent 300m Buffer
- Events (Point)
- Events (Linear)
- Events (Area)



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Designer



Contractor



Client



Project Title

A46 COVENTRY JUNCTIONS UPGRADE
WALSgrave JUNCTION

Project Stage

PCF STAGE 3

Drawing Title

FIGURE 7.3 :
HERITAGE EVENTS (POTENTIAL)

Suitability

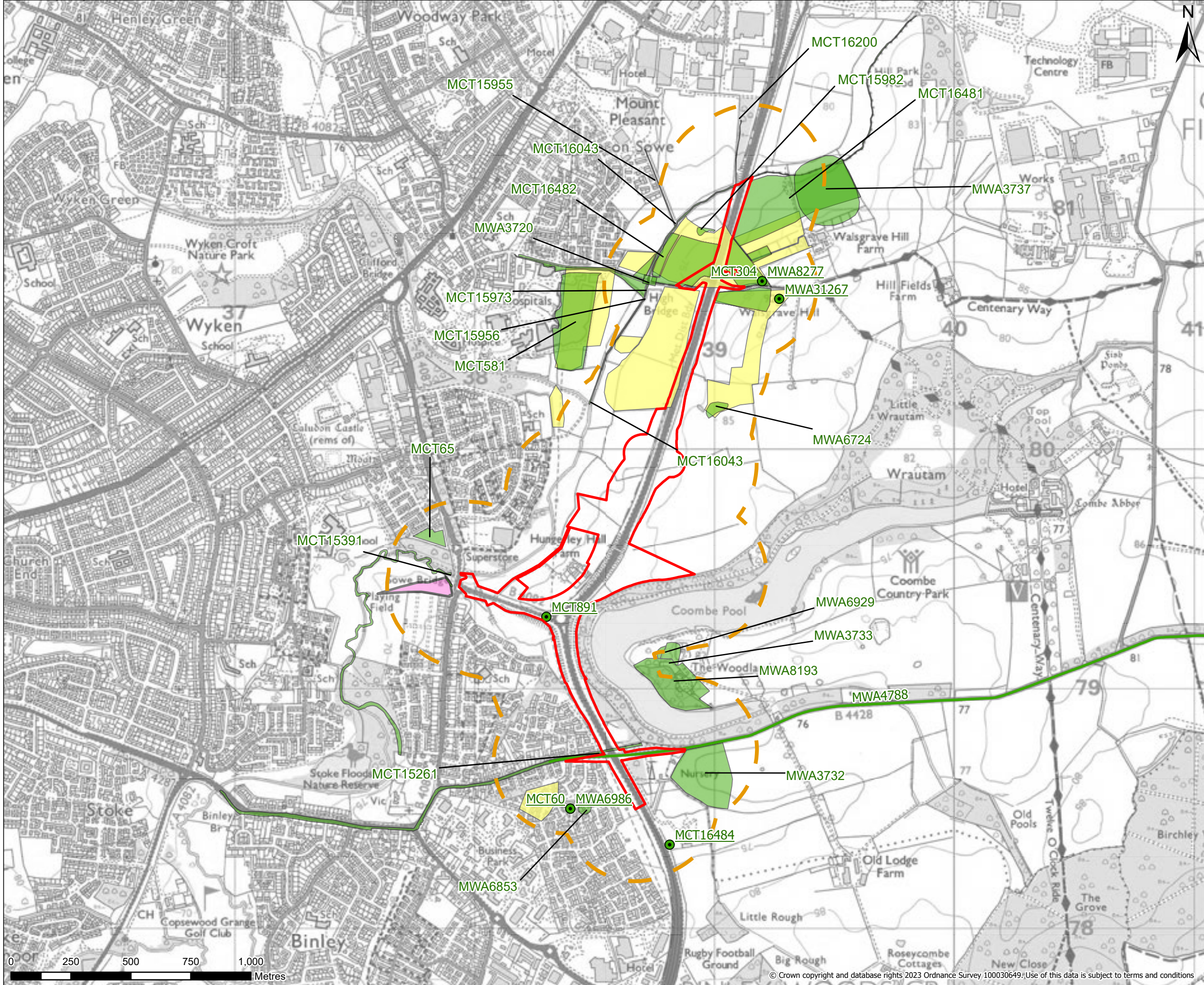
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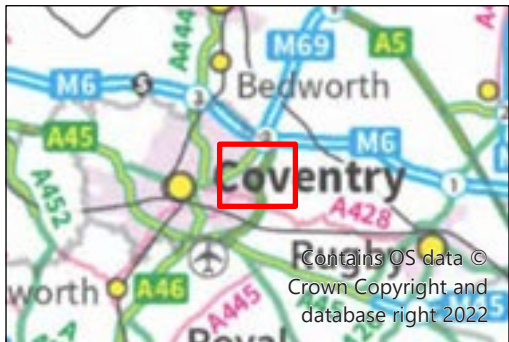
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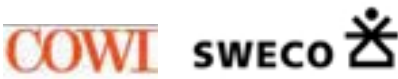
Legend

-  Proposed Scheme Extent
-  Proposed Scheme Extent 300m Buffer
-  HER Monument (Point)
-  HER Monument (Linear)
-  HER Monument (Area)
-  Warwickshire Ridge and Furrow
-  Coventry Archaeological Constraints Area



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Designer



Contractor



Client



Project Title

A46 COVENTRY JUNCTIONS UPGRADE WALSGRAVE JUNCTION

Project Stage

PCF STAGE 3

Drawing Title

FIGURE 7.2 :
NON-DESIGNATED HERITAGE ASSETS

Suitability

SUITABLE FOR REVIEW AND COMMENT

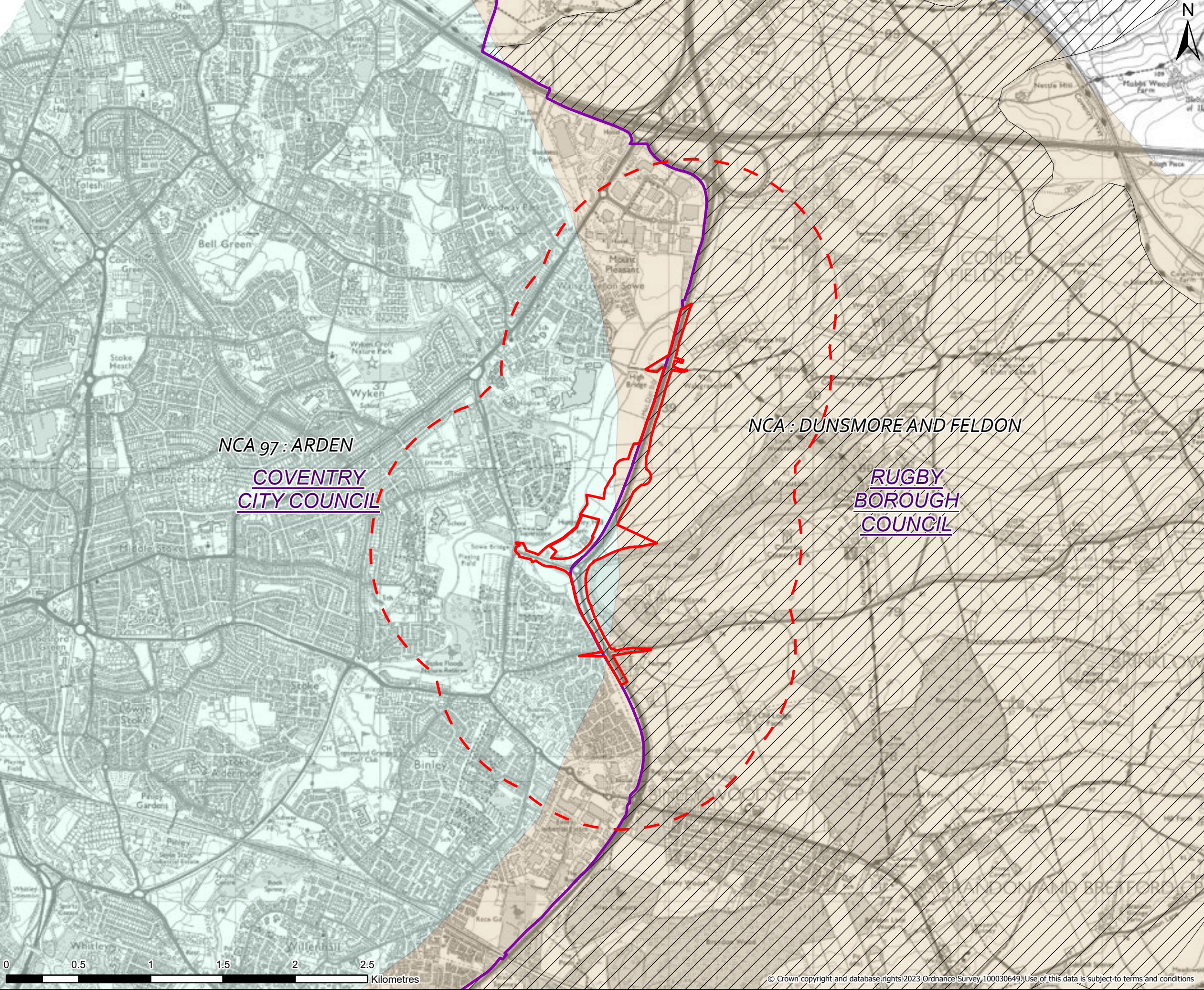
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Drawing Number

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Appendix F. Landscape figures

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Legend

- Proposed Scheme Extent
- Study Area - 1km
- Local Authority Boundary

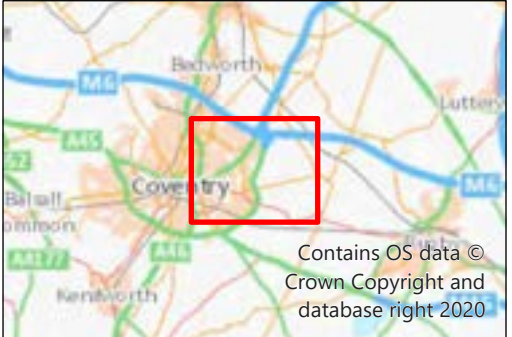
National Character Area (NCA)

- 97 - Arden
- 96 - Dunsmore and Feldon

Local Landscape Character Assessment - Warwickshire County Council

- Dunsmore Parklands

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Project Title
**A46 COVENTRY JUNCTIONS UPGRADE
WALSgrave JUNCTION**

Project Stage
PCF STAGE 3

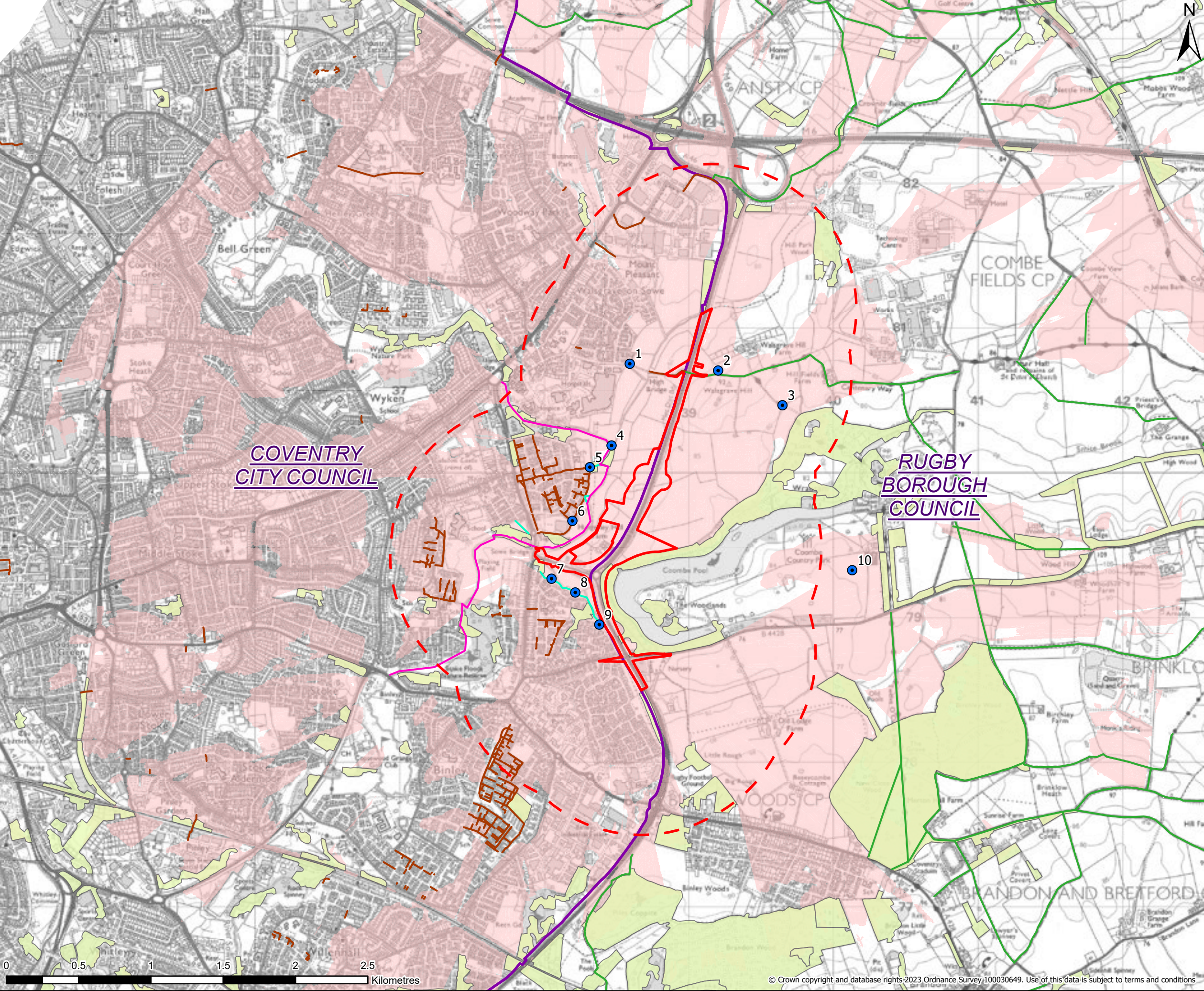
Drawing Title
**FIGURE 8.1 :
LANDSCAPE CHARACTER CONTEXT**

Suitability
SUITABLE FOR REVIEW AND COMMENT

Sheet Size	Scale	Status	Revision
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Drawing Number
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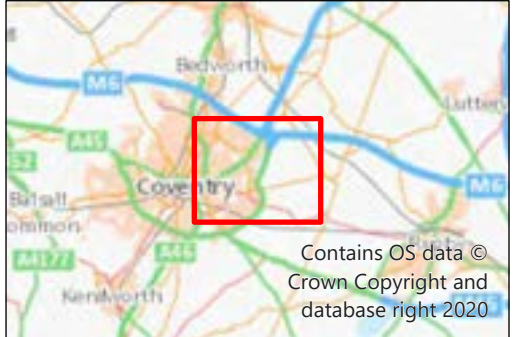
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- Legend**
- Proposed Scheme Extent
 - Study Area - 1km
 - Local Authority Boundary
 - Proposed Representative Viewpoint Locations - refer to Environmental Scoping Report Chapter 8
 - Public Rights of Way - Coventry
 - Public Rights of Way - Warwickshire
 - Local Paths
 - Sowe Valley Way
 - 10m National Forest Inventory – Woodland 10m
 - Zone of Theoretical Visibility (ZTV)*

* ZTV image shown is the PCF Stage 2 ZTV as per Figure 7.1 (HE604820-ACM-EGN-WAL-SW-000-Z-MP-LE-0018)
As Figure 7.1 ZTV Note: Zone of Theoretical Visibility (ZTV) has been generated using a 5m Digital Terrain Model which does not take account of the screening effects of vegetation, buildings or other structures. Woodland from National Forest Inventory has been incorporated into the DTM with an assumed height of 10m. ZTV is based upon a series of points spaced 25m apart (using the Paved Edge of Carriageway and Central Reservation Edge) at a height of 4.5m (HGV Trucks) above the proposed scheme elevation, and 10m at notional lighting column locations in the centre of each roundabout with an observer eye height of 1.6m. The ZTV does not include embankments and cuttings and there are some areas where the proposed scheme alignment is lower than the existing ground level.

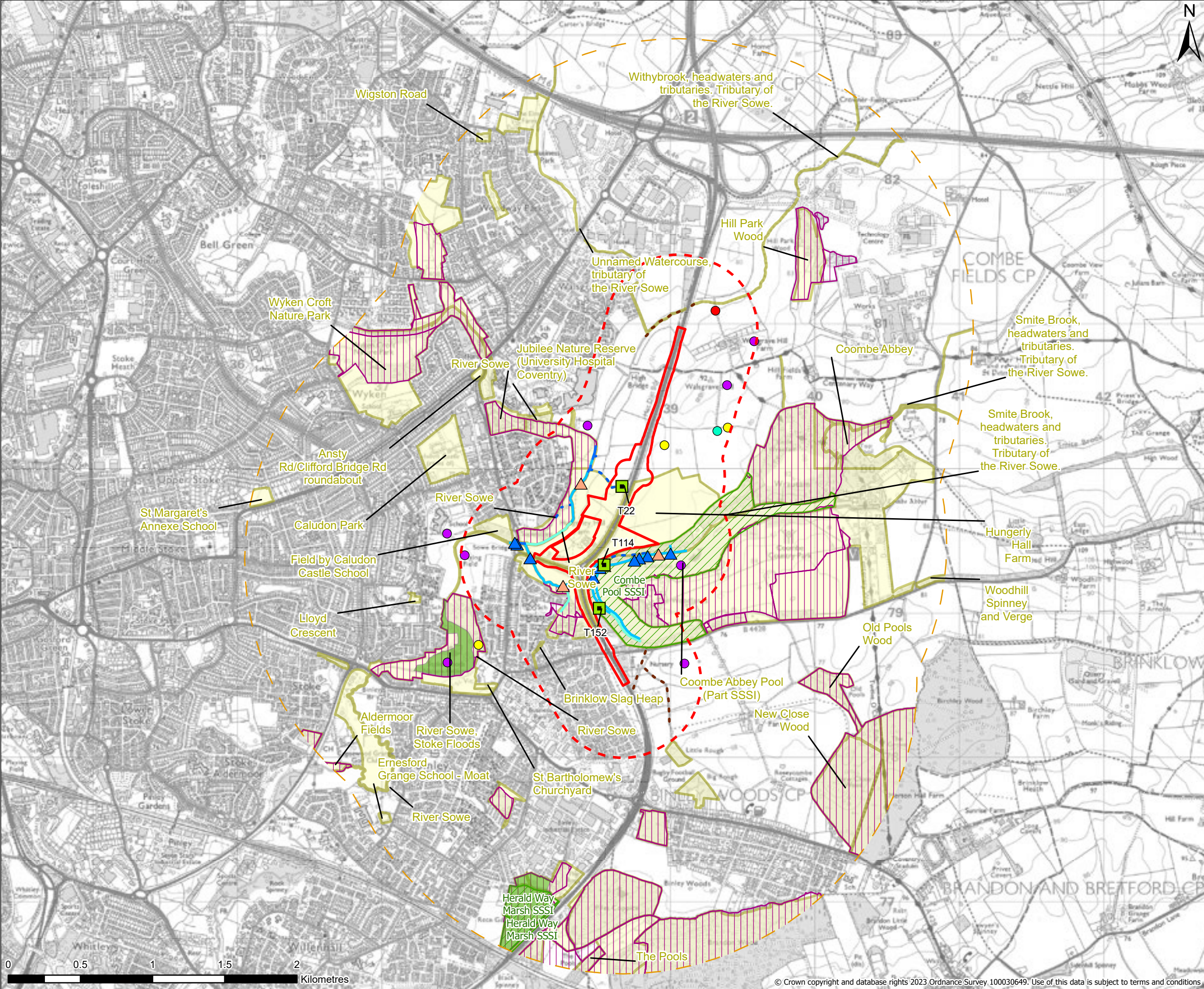
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Project Title					
A46 COVENTRY JUNCTIONS UPGRADE WALSgrave JUNCTION					
Project Stage					
PCF STAGE 3					
Drawing Title					
FIGURE 8.2 : VISUAL CONTEXT					
Suitability					
SUITABLE FOR REVIEW AND COMMENT					
Sheet Size	Scale	Status	Revision		
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Appendix G. Ecological constraints plan

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Legend

- PCF Stage 2 Proposed Scheme Extent
- PCF Stage 2 Proposed Scheme Extent - 500m Buffer
- PCF Stage 2 Proposed Scheme Extent- 2km Buffer
- Tree with Bat Hibernation Potential *
- Ecosites
- Local Nature Reserve
- Local Wildlife Site
- Sites of Special Scientific Interest
- Great Crested Newts**
 - Positive eDNA result
 - Negative eDNA result
 - Inconclusive eDNA result
 - Pond scoped out
- Otter Sign**
 - Otter Field Sign
 - Otter Couch
- Water Vole Habitat Suitability**
 - Optimal
 - Sub-optimal
 - Unsuitable
 - Dry watercourse
 - Scoped out watercourse

*Within the PCF stage 2 proposed scheme extent and a 50m buffer (the survey area for roosting bats) 158 trees and one group of trees, including T22, T114 and T152 shown here, were identified with bat summer roost potential. With the exception of the three trees with hibernation potential, these trees are not included on this ecological constraints figure as this would obscure the other shown ecological constraints. Trees with bat summer roost potential can be seen on Appendix A of the

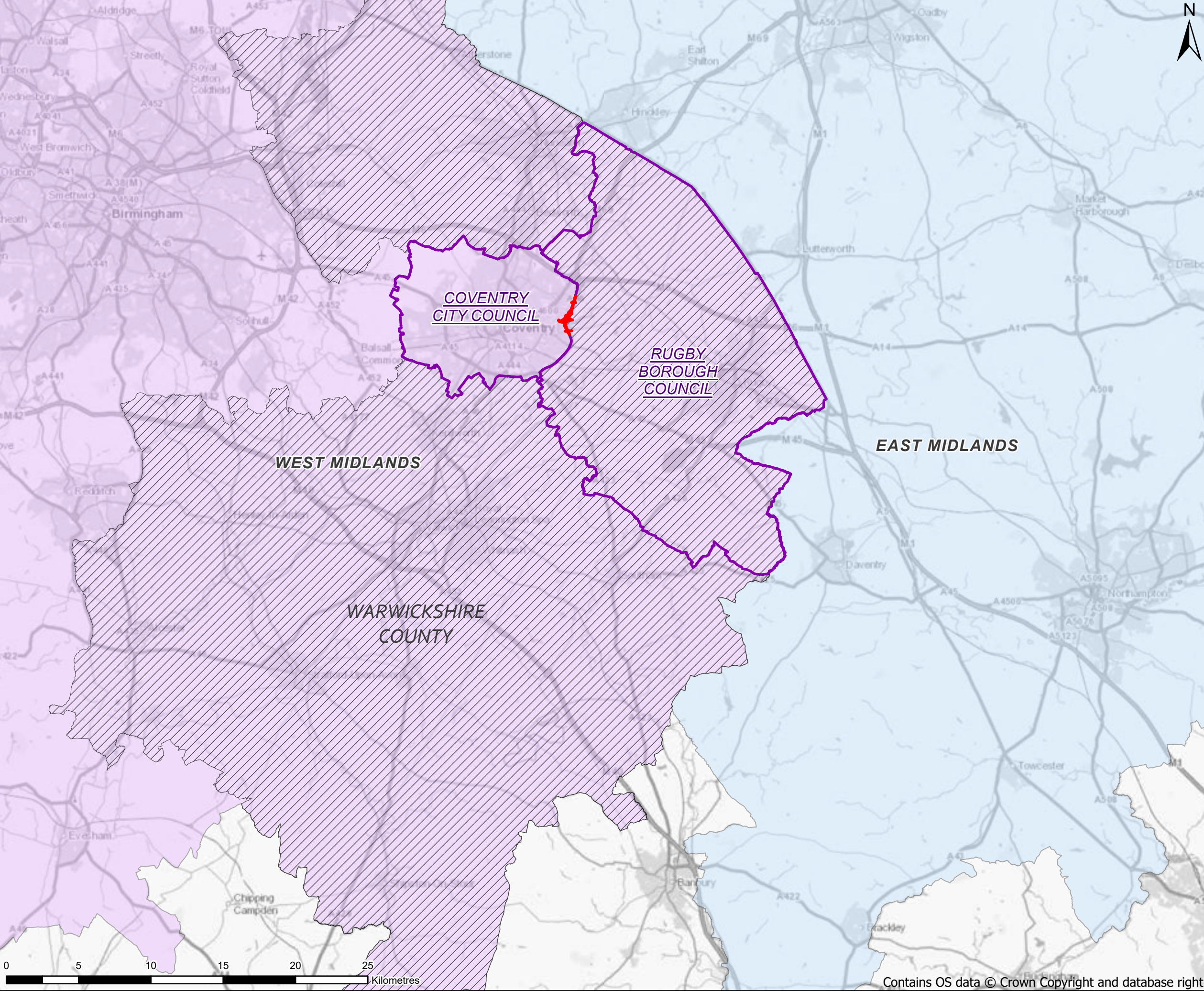
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Contractor					
					
Client					
					
Project Title					
A46 COVENTRY JUNCTIONS UPGRADE WALSgrave JUNCTION					
Project Stage					
PCF STAGE 3					
Drawing Title					
FIGURE 9.1 : ECOLOGICAL CONSTRAINTS					
Suitability					
SUITABLE FOR REVIEW AND COMMENT					
Sheet Size	Scale	Status	Revision		
A3	1:25,000	S3	P01		
Drawing Number					
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Appendix H. Material assets and waste figure

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Legend

- Proposed Scheme Extent
- Local Authority Boundary
- Warwickshire County
- East Midlands Region
- West Midlands Region

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P01	05.05.2023	FIRST ISSUE	AC	LP	CF
REV	DATE	REVISION NOTE	ORG	CHKD	APP

Designer



Contractor



Client



Project Title
**A46 COVENTRY JUNCTIONS UPGRADE
WALSgrave JUNCTION**

Project Stage
PCF STAGE 3

Drawing Title
**FIGURE 11.2 :
REGIONAL PLAN**

Suitability
SUITABLE FOR REVIEW AND COMMENT

Sheet Size	Scale	Status	Revision
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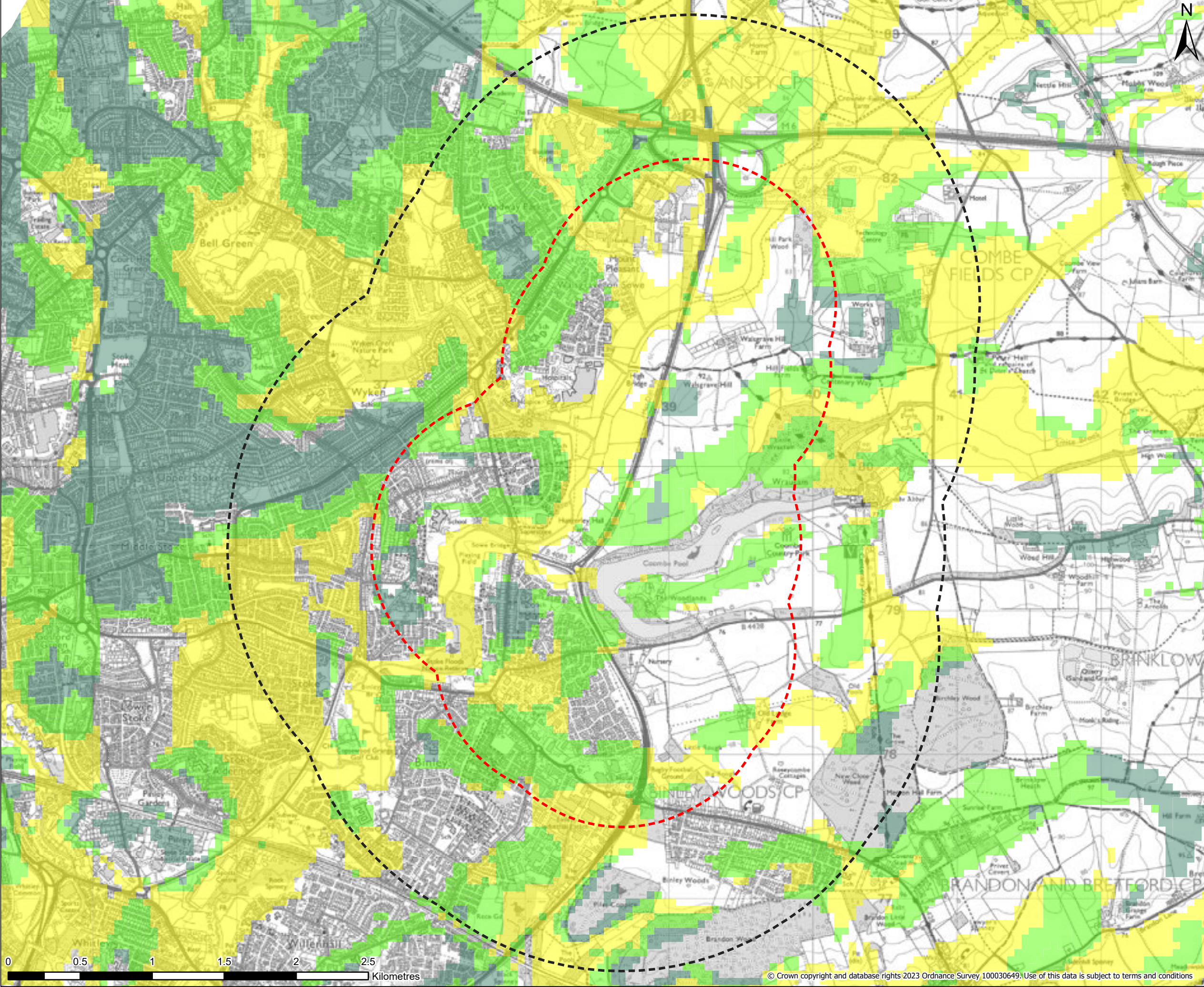
Drawing Number
HE604820-OIL-EMA-00-DR-LX-30001

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Appendix I. Population and human health figure

Appendix J. Road drainage and water environment figures

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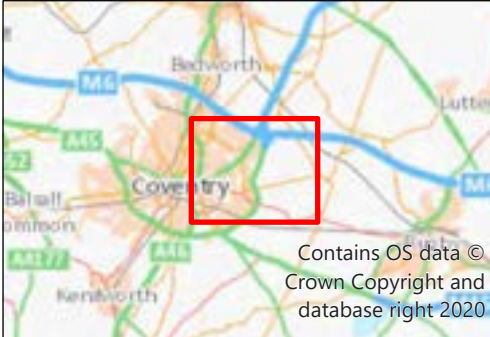
Legend

- Proposed Scheme Extent - 1km buffer
- Proposed Scheme Extent - 2km Buffer

Groundwater Flooding

- Limited potential for groundwater flooding to occur
- Potential for groundwater flooding of property situated below ground level
- Potential for groundwater flooding to occur at surface

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P02	14.06.2023	FIGURE UPDATE	PK	KD	JB
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Designer

Contractor

Client

Project Title
**A46 COVENTRY JUNCTIONS UPGRADE
WALSgrave JUNCTION**

Project Stage
PCF STAGE 3

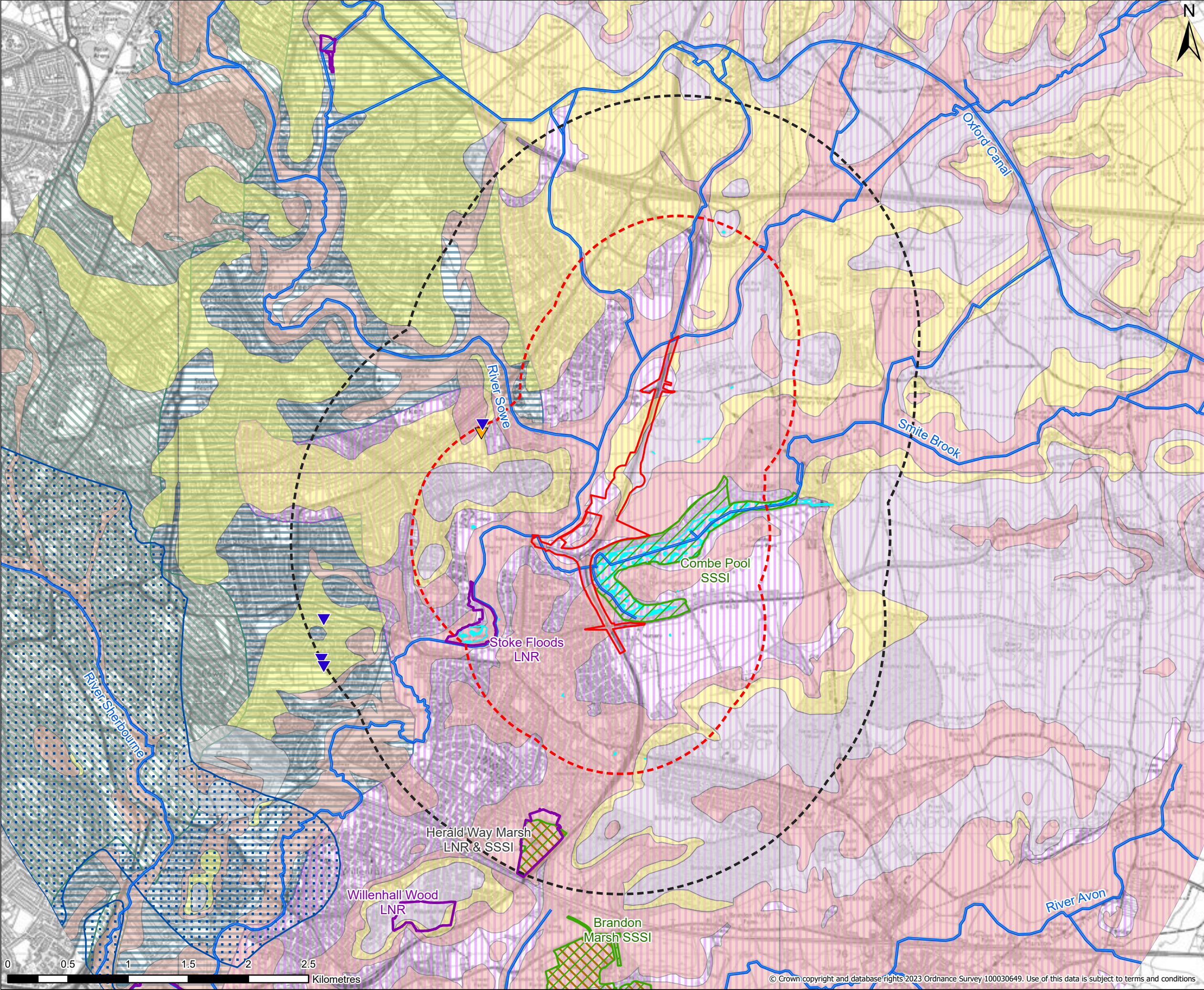
Drawing Title
FIGURE 14.3 : GROUNDWATER FLOODING

Suitability
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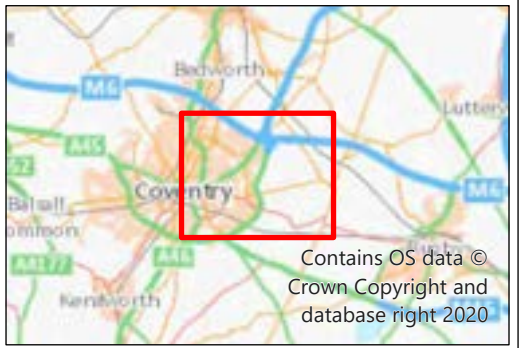
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Drawing Number
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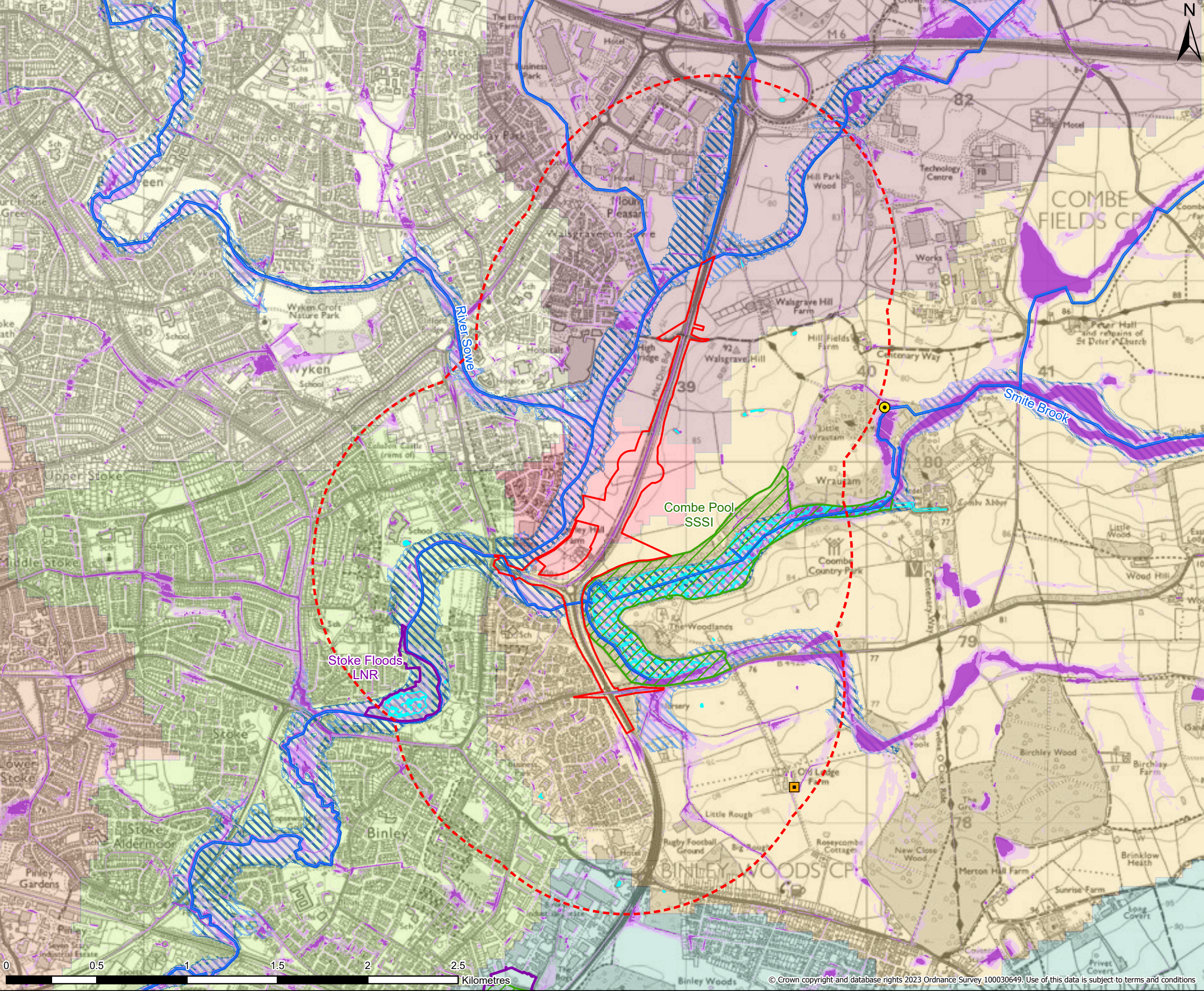


- Legend**
- Proposed Scheme Extent
 - Proposed Scheme Extent - 1km buffer
 - Proposed Scheme Extent - 2km Buffer
 - Active Groundwater Abstraction Location
 - Historical Groundwater Abstraction Location
 - Watercourse
 - Ponds / Lakes
 - Sites of Special Scientific Interest (SSSI)
 - Local Nature Reserve (LNR)
 - Groundwater Dependent Terrestrial Ecosystems
 - Source Protection Zones
 - Zone III - Total Catchment
 - Aquifer Designation (Superficial Deposits)
 - Secondary A
 - Secondary (undifferentiated)
 - Unproductive
 - WFD Groundwater Bodies
 - Warwickshire Avon - Coal Measures Coventry
 - Warwickshire Avon - PT Sandstone Warwick/Avon Confined
 - Warwickshire Avon - Secondary Mudrocks
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Project Title					
A46 COVENTRY JUNCTIONS UPGRADE WALSgrave JUNCTION					
Project Stage					
PCF STAGE 3					
Drawing Title					
FIGURE 14.2 : GROUNDWATER					
Suitability					
SUITABLE FOR REVIEW AND COMMENT					
Sheet Size	Scale	Status	Revision		
A3	1:30,000	S3	P01		
Drawing Number					
HE604820-OIL-EWE-00-DR-LW-30002					

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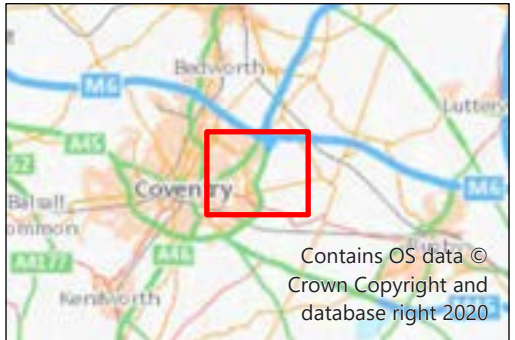
Legend





- Proposed Scheme Extent
- Proposed Scheme Extent - 1km Buffer
- Surface Water Abstraction
- Surface Water Discharge Consent
- Watercourse
- Ponds / Lakes
- Flood Zone 3
- Flood Zone 2
- Risk of Flooding from Surface Water - High
- Risk of Flooding from Surface Water - Medium
- Risk of Flooding from Surface Water - Low
- Sites of Special Scientific Interest (SSSI)
- Local Nature Reserve (LNR)

WFD Surface Waterbody Catchments

- R Avon - Claycoton/Yelvertoft Bk to conf R Sowe
- R Sherbourne - source to conf R Sowe
- R Sowe - conf Beach Bk to conf Withy Bk
- R Sowe - conf Smite Bk to conf R Avon
- R Sowe - conf Withy Bk to conf Smite Bk
- Smite Bk - source to conf R Sowe
- Withy Bk - source to conf R Sowe

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Project Title					
A46 COVENTRY JUNCTIONS UPGRADE WALSgrave JUNCTION					
Project Stage					
PCF STAGE 3					
Drawing Title					
FIGURE 14.1 : SURFACE WATER					
Suitability					
SUITABLE FOR REVIEW AND COMMENT					
Sheet Size	Scale	Status	Revision		
A3	1:20,000	S3	P01		
Drawing Number					
HE604820-OIL-EWE-00-DR-LW-30001					

Appendix K. Lighting impact assessment

Introduction and study area

A lighting impact assessment will be included as part of the EIA process to determine the likely effects of the lighting design of the proposed scheme on the surrounding environment. The assessment will ensure that the preliminary lighting design (at the preliminary design stage) will conform to maximum allowable obtrusive lighting levels and will provide recommended luminaire types, mounting heights and angles for use within various areas of the proposed scheme.

The lighting assessment will inform the landscape and ecology impact assessments and will be included as a technical appendix to the Landscape and Visual Impact Assessment within the ES. The assessment is considered important to assess possible impacts on protected species and nearby residential properties.

Guidance and best practice

In considering the potential effects of the proposed scheme, the following aspects of obtrusive light, taken from the Institute of Lighting Professionals Guidance Note for the Reduction of Obtrusive Light GN01:2021 must be considered and assessed:

- sky glow
- light intrusion (nuisance)
- luminaire / luminous intensity
- building or façade luminance

The assessment will be in accordance with the following legislation and guidance. Further guidance documents will be consulted as appropriate – the following list is not exhaustive:

- Environmental Protection Act 1990
- Clean Neighbourhoods and Environment Act 2005
- DEFRA: Statutory Nuisance from Insects and Artificial Light
- The Landscape Institute and Institute of Environmental Assessment, 3rd Edition, 2013
- Institution of Lighting Professionals (ILP) Guidance Notes for the Reduction of Obtrusive Light (GN01):2021
- Institution of Lighting Professionals (ILP): ILP Professional Lighting Guide 04, Guidance on Undertaking Environmental Lighting Impact Assessments (2013)
- Institute of Lighting Professionals (ILP) Guidance Note 08/18 Bats and artificial lighting in the UK, part of the Bats and the Built Environment series.
- Bats Conservation Trust (2009). Bats and lighting in the UK, part of the Bats and the Built Environment series.

- Commission Internationale de l'Eclairage (CIE) 150: Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations
- CIE 126: Guidelines for Minimising Sky Glow
- The Chartered Institution of Building Services Engineers (CIBSE) LG06 The Exterior Environment 2016
- BS EN 12464 Part 2 Outdoor Lighting
- BS EN 13201 European Norm for Road Lighting
- BS 5489-1:2013 Code of Practice for the Design of Road Lighting and Public Amenity Areas

Proposed methodology and scope

The assessment will follow best practice guidance detailed in 'Institution of Lighting Professionals (ILP): ILP Professional Lighting Guide 04, Guidance on Undertaking Environmental Lighting Impact Assessments'. Potential receptors will be identified and discussed with the LPA as well as landscape and ecology teams to agree the proposed receptor locations and identify any further survey requirements or assessment methodology.

A baseline survey will be carried out. This will provide lux measurements and photographs taken at a survey viewpoint for each receptor and will provide a baseline against which any obtrusive light from the proposed scheme can be compared. Information gathered on baseline surveys will facilitate agreement with the LPAs in determining which environmental lighting zone the site falls under and therefore the maximum permissible levels of obtrusive light.

Environmental zones are set out in Table K-1.

Table K-1: Environmental zones

Zone	Surrounding	Lighting environment	Examples
E0	Protected	Dark (SQM 20.5+)	Astronomical Observable dark skies, UNESCO starlight reserves, IDA dark sky places
E1	Natural	Dark (SQM 20 to 20.5)	Relatively uninhabited rural areas, National Parks, Areas of outstanding Natural Beauty, IDA buffer zones etc
E2	Rural	Low District Brightness (SQM ~15 to 20)	Sparsely inhabited rural areas, village or relatively dark outer suburban locations
E3	Suburban	Medium District Brightness	Well inhabited rural and urban settlements, small town centres of suburban locations
E4	Urban	High District Brightness	Town / city centres with high levels of night-time activity

Source: Guidance Notes for the Reduction of Obtrusive Light GN01:2021 (ILP/2021)

Potential effects, including monitoring and mitigation measures

The proposed scheme is likely to result in obtrusive light impacts associated with construction such as temporary lighting for safety and security, lighting of haul routes, laydown areas, offices and temporary parking areas. There are also likely to be obtrusive lighting impacts during the operational phase as a result of any proposed lighting or changes to existing lighting.

Where mitigation is required, it will be zone and use specific i.e., it will be specific to areas of the site and further assessed by the proposed use of the zone. Mitigation measures will also take into account the findings of the landscape / ecological assessment and any such mitigation which is proposed in the associated reporting.