Technical note

ATKINS

Project:	**Stratford-upon-Avon Additional Road Capacity**	**To:**	Warwickshire County Council
Subject:	High Level Environmental Assessment	**From:**	Joan Wong
Date:	February 2016	**cc:**	Paul Bate, Gary Oakes, Adrian Taylor

1. Introduction

Atkins have been commissioned by Warwickshire County Council (WCC) to undertake a high level environmental appraisal to inform the business case for a relief road in Stratford-upon-Avon. Within the Strategic Transport Assessment (STA)[1] prepared by WCC, it was identified that several new housing and employment developments are planned across the town. These new developments will have the potential to affect the local road network. In order to accommodate the future demand of increasing road use and resolve existing congestion issues, WCC have proposed seven route capacity options as possible remediation measures.

The purpose of this report is to undertake a high-level, qualitative environmental appraisal of the proposed seven route options by identifying the potential environmental constraints associated with each. A brief summary of the identified constraints associated with the options provided.

1.1. Methodology

The appraisal takes into account the environmental sub-objective headings set out in the Department for Transport's (DfT) WebTAG Unit A.3 Environmental Impact Appraisal[2] published in December 2015, as follows:

- Noise;
- Air Quality (due to lack of modelling data Greenhouse Gases have not been addressed);
- Landscape and townscape;
- Historic Environment;
- Biodiversity; and
- Water Environment.

In this environmental appraisal, the study area has been set to a 300 m buffer zone from the centre line of the proposed routes.

This environmental appraisal uses information from the Multi-Agency Governmental Information for the Countryside[3], Environment Agency[4], Historic England [5] and Warwickshire County Council[6] websites.

[1] Stratford upon Avon Strategic Transport Assessment- Phase 2 Modelling Report, Warwickshire County Council, June 2013.
[2] Web TAG: TAG unit A3 environmental impact appraisal. https://www.gov.uk/government/publications/webtag-tag-unit-a3-environmental-impact-appraisal-november-2014
[3] Multi-Agency Governmental Information for the Countryside. http://magic.defra.gov.uk/
[4] Environment Agency, What's in your backyard. http://apps.environment-agency.gov.uk/wiyby/default.aspx
[5] Historic England, Search the List. https://historicengland.org.uk/listing/the-list/
[6] Warwickshire County Council, INSPIRE Map. http://maps.warwickshire.gov.uk/inspire/

1.2. Limitations of Assessment

This project is currently at early conceptual design stage. This environmental appraisal is based on information provided in route layout drawings and descriptions provided by Warwickshire County Council on 25th November 2015.

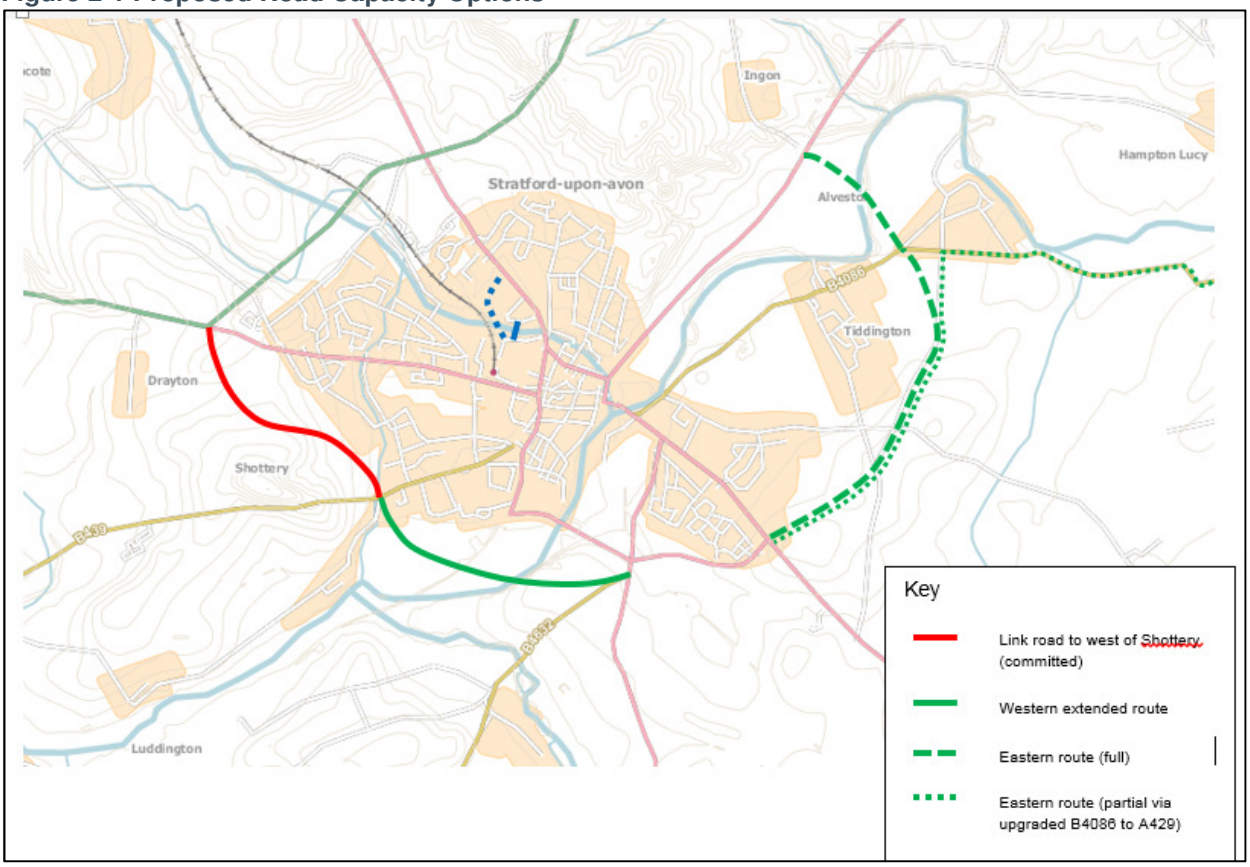
Full scheme information has not been developed for the project and traffic information, which is required for the assessment of air quality, noise and greenhouse gases is not yet available. Greenhouse gases have not been assessed, and noise and air quality have been assessed in broad terms only. To date, no site survey has been undertaken to inform this appraisal.

This appraisal is appropriate for this early stage of project development and will form the basis for future stages where more detailed appraisal and assessment will be required to inform option selection, option development and the requirements of the planning process.

Ecological records were requested by Atkins at the commencement of this appraisal, however responses were not received in time for inclusion in this version of the appraisal.

2. Route Capacity Options

Figure 2-1 Proposed Road Capacity Options



- **Option 1: Reference Case- Link road to west of Shottery (committed)** including committed development on land to the west of Shottery and the link road between A46/A422 at Wildmoor and B439 Evesham Road/Luddington Road - to be funded by the developer.

- **Option 2: Western extended route (extension of Option 1)** - formed by extending Option 1 across the River Avon to form a complete western relief road between A3400 Shipston Road south of Stratford and A46/A422 at Wildmoor to include a new junction on B4632 Clifford Lane – to be funded by the promoter of 3,500 dwellings and employment at Long Marston Airfield. The route shall link the A3400 Shipston Road/ B4632 Clifford Lane with the committed route (Option 1). This route shall provide a signed route for heavy goods vehicles (HGVs) between the A3400/ B4632 to the south of the town and the A46 at Wildmoor.

- **Option 3: Eastern route – full** The link road is proposed to connect the A422 Banbury Road to the A439 Warwick Road via Pimlico Lane and Tiddington Road then a new bridge across the River Avon.

- **Options 4: Eastern route – partial (via upgraded B4086 to A429) -** as per Scenario 3 but continuing along northern section of Pimlico Lane until it joins the B4086 Wellesbourne Road at Alveston. The B4086 would be improved between this point and the A429 at Wellesbourne. Subject to the outcome of local consultation, it is envisaged that WCC would sever the C212 Charlecote Road where it crosses the River Avon, to prevent through traffic using the road as a short-cut between the B4086 and A429.

- **Option 5: Combination of western extended route (Option 2) and full eastern route (Option 3).**

- **Option 6 – Combination of western extended route (Option 2) and partial eastern route (Option 4).**

- **Option 7 – the reference case (Option 1) with preferred scheme for Birmingham Road, closure of Clopton Bridge and pedestrian priority in Bridge Street/High Street.**

3. Environmental Appraisal

This section of the appraisal identifies the potential environmental impacts associated with the proposed seven route capacity options.

3.1. Option 1: Reference Case- Link road to west of Shottery

3.1.1. Site Description

This route option is committed by WCC and the developer of the proposed developments west of Shottery. Route Option 1 is 2.72 km in length. The northern section of the route starts at the junction of A46/ A422 at Wildmoor. The A46 and A422 are the main access routes to Stratford-upon-Avon from the west. According to the STA, both routes are currently congested with a high percentage of HGVs.

Route Option 1 passes through open agricultural and pasture fields west of Shottery, with two new junctions designed to accommodate the proposed new residential/ employment developments near to Shottery. The route then connects to the B439 Evesham Road/ Luddington Road, and a new roundabout is proposed to replace the current junction with Luddington Road. The proposed alignment appears to cut through a row of existing properties on Evesham Road.

Route Option 1 is situated in a semi-rural environment with a number of sensitive receptors such as residential properties and a primary school located within the study area.

3.1.2. Noise

Route Option 1 would introduce a new noise source to sensitive receptors within the study area. This could result in an increase to noise levels experienced by some receptors, in particular those residential properties and school currently positioned away from the A422 and the B439 where the existing noise climate is likely to be quieter than for receptors near to busy roads. Depending on how the link road impacts on traffic flows in the wider area, there could be some improvement to noise levels associated with reductions to traffic flows on existing routes, however this cannot be substantiated without traffic and subsequent noise modelling.

3.1.3. Air Quality

Along Evesham Road (B439) by Bordon Hill, the area is part of the Air Quality Management Area (AQMA) designated by the Stratford-upon-Avon District Council; the pollutant of concern is Nitrogen dioxide (NO_2). There are no Special Areas of Conservation, Special Protection Areas, or Ramsar sites within a 2 km radius of this route option.

Route Option 1 consists of building a new road which may adversely impact the local air quality by introducing more vehicle emissions to the local area. Adjacent sensitive receptors could be affected by the additional vehicle emissions. However, this route option is likely to provide relief to the already congested road network within Stratford-upon-Avon, as well as accommodate the extra demands resulting from the proposed new developments west of Shottery. In the wider area, this route option could improve traffic flow and reduce vehicle congestion in the centre of Stratford-upon-Avon, which may subsequently improve local air quality for the AQMA, however this cannot be substantiated without traffic and subsequent air quality modelling.

3.1.4. Landscape & Townscape

Route Option 1 lies to the west of Stratford-upon-Avon between the village of Drayton and the village of Shottery, all within the Severn and Avon Vales national character areas[7]. The route option is within an urban fringe with arable fields, improved grassland and generally open landscape. Anne Hathaway's Cottage and its farmstead are situated approximately 190 m east of the proposed route, they are designated listed buildings. The listed buildings are all positioned within the Shottery Conservation Area[8] as designated by Stratford-upon-Avon District Council. The surrounding land uses in Shottery are predominately urban residential settlements with recreational ground and several small businesses units. To the west of the proposed route is mainly farmland. Shottery Brook runs adjacent to the Shottery settlement area and passes below the B439 Evesham Road; the brook has been indicated as south flowing. It is currently not known if any of the trees within the study area are protected by a Tree Preservation Order.

The proposed route option will introduce a new linear transport corridor to an open landscape. Nearby receptors including residential properties, heritage assets, and other business units are likely to be affected by potential visual amenity and landscape impacts caused by the new route. Townscape of Shottery could be affected by the introduction of the route, however, this cannot be substantiated without a townscape assessment.

[7] National Character Areas, Natural England. http://publications.naturalengland.org.uk/publication/1831421?category=587130
[8] Shottery Conservation Area, Stratford-upon-Avon District Council. https://www.stratford.gov.uk/files/seealsodocs/2763/SDC0517JAN06.pdf

3.1.5. Historic Environment

There are eight listed buildings (seven Grade II listed and one Grade I listed buildings), but no scheduled ancient monuments or world heritage sites within the study area of this route option. All of the listed buildings are part of the Anne Hathaway's Cottage and Hathaway Hamlet farmstead, also designated as Shottery Conservation Area. There are no registered battlefield or registered parks and gardens within the study area. According to National Heritage List for England[9], the listed buildings are immediately surrounded by historic landscape that has Tudor influences. The Shakespearian history of the site is world renowned and hence the listed buildings are considered highly valuable. There is the possibility of buried archaeology within the area of the proposed route option.

Route Option 1 could impact the setting of the Grade I and II listed buildings and the setting of the Conservation Area. Introduction of a new linear transport corridor to an open landscape may degrade the setting of the listed buildings and historic landscape. The route could cause adverse impact to buried archaeology. Further heritage and archaeological assessments are recommended to confirm the potential effects to receptors.

3.1.6. Biodiversity

There are no statutory European designations within the study area. Racecourse Meadow, which has been designated as a Site of Special Scientific Interest (SSSI) is located approximately 290 m south of Route Option 1 at Bordon Hill. There are four confirmed Local Wildlife Sites (LWS) within the study area, namely Steeplechase Meadow, Bordon Hill Old Rifle Range, Cadle Pool Farm Meadow and the River Avon catchment. There are three other potential LWS (pLWS) within the study area, namely the Canal, Wildmoor and the Triangle Hedgerow.

Based on the aerial photographs from Google, the study area includes grassland; hedgerows; trees; and aquatic habitat (Shottery Brook).

Route Option 1 would directly impact the Cadle Pool Farm Meadow LWS and may result in habitat loss and fragmentation of the ecological site. Protected and notable species and their habitats are likely to be affected by the proposed route. There are predicted to be adverse impacts to local biodiversity.

3.1.7. Water Environment

The proposed route will cross Shottery Brook at the B439 Evesham Road/ Luddington Road junction. Shottery Brook is classified as a main river, and at the Bordon Hill junction, the area has been identified as flood zone 3, indicating that the area has 1% or greater chance to experience flooding each year. The route does not lie on a groundwater source protection zone. The southern part of the route overlies a Secondary A Superficial deposits aquifer.

The route option will cross the floodplain of Shottery Brook. The proposed route could cause adverse impacts to water quality and may increase flood risk, however, this cannot be substantiated without further assessment on water environment as well as flood modelling.

3.2. Option 2: Western extended route (extension of Option 1)

3.2.1. Site Description

Route Option 2 is a continuation of Route Option 1, the total length is 5.42 km. The extended part of the route would carry on from a proposed roundabout at B439 Evesham Road/ Luddington Road and

[9] National Heritage List for England, Historic England https://historicengland.org.uk/listing/the-list/

passes the open fields between the Shottery Brook and the Stratford Racecourse. This route comprises a new bridge over the River Avon and the Greenway, a disused railway line currently used as a cycle path. The route subsequently heads eastward passing through farmland then crosses the B4632 Clifford Lane, where a junction is proposed. The route will connect to the A3400 Shipston Road, near to the south of Orchard Hill Cottages. The A3400 is one of the strategic access routes for traffic coming from the south of the region into Stratford-upon-Avon.

As Route Option 2 is an extension of Route Option 1, the environmental impacts identified for Route Option 1 will also be applicable to this option. The following sections will solely concentrate on the extended part of the western route between B439 Evesham Road and A3400 Shiptson Road.

Route Option 2 is situated in a semi-rural environment with sensitive receptors such as residential properties situated along Luddington Road, Stannells Close and Shipston Road. Other sensitive receptors within the study area included the River Avon, Shottery Brook and the River Stour, all designated as main rivers, and Racecourse Meadow SSSI.

3.2.2. Noise

Route Option 2 would introduce a new noise source to adjacent sensitive receptors within the study area. This could result in an increase to noise levels experienced by some receptors, in particular residential properties currently positioned on Luddington Road and Stannells Close where the existing noise climate is likely to be quieter than for receptors near to busy roads. Depending on how the link road impacts on traffic flows in the wider area, there could be some improvement to noise levels associated with reductions to traffic flows on existing routes, however this cannot be substantiated without traffic and subsequent noise modelling.

3.2.3. Air Quality

The proposed route section along the Luddington Road and adjacent to the Stratford Racecourse is designated as an AQMA by Stratford-upon-Avon District Council. Racecourse Meadow SSSI is located approximately 20 m east of the proposed route. There are no Special Areas of Conservation, Special Protection Areas, or Ramsar sites within 2 km of this route option.

Route Option 2 will introduce vehicle emissions to the immediate area of the route and this may adversely affect sensitive receptors. However, diverting HGVs from the town centre may lessen congestion and may help to reduce vehicle emissions within the AQMA. In both cases, traffic and subsequent air quality modelling would be required to confirm the effects of the route option.

3.2.4. Landscape & Townscape

Route Option 2 lies to the south / southwest of Old Town within Stratford-upon-Avon. This route option is located within the Severn and Avon Vales national character area. The surrounding landscape is semi-rural with farmland, residential settlements and Stratford Racecourse in the western section of the route. The landscape of the western section comprises grassland in the floodplain of the River Avon; the Greenway (a disused railway line, currently a cycle path) and the River Avon. In the central and eastern sections of the route, the landscape is predominately open arable fields with occasional farms.

Route Option 2 will introduce a new linear transport corridor to an open landscape. Due to the significant physical changes resulting from the new road, visual amenity impact to the adjacent sensitive receptors is likely. The route could affect the landscape and townscape of Stratford-upon-Avon, however, this cannot be substantiated without a landscape and townscape assessment.

3.2.5. Historic Environment

There is one Grade II listed building but no scheduled ancient monuments or world heritage sites within the study area. According to the National Heritage List for England, the listed building is the Springfield Bridge located off the A3400 by Springfield House. There are no registered battlefield or registered parks and gardens within the study area.

The proposed alignment may affect the setting of the Grade II listed building. According to the current proposed route alignment, the proposed new road is positioned approximately 60 m north of the listed building. The route could cause adverse impact to any buried archaeology present along the alignment.

3.2.6. Biodiversity

There are no statutory European designations within the study area. Racecourse Meadow SSSI is located approximately 20 m east of the alignment, the route has potential to directly impact the SSSI. Racecourse Meadow is designated for its rare flood meadow and the abundance of species rich natural grassland which included rare plants such as meadow foxtail and great burnet[10]. According to the WCC INSPIRE interactive map, there are two LWS located within the study area namely, Steeplechase Meadow and the River Avon. There are three pLWS positioned within the study area, namely Seven Meadows and Stratford Steeplechase Meadow, the River Stour and Riparian Wood.

The study area includes semi-improved grassland; arable fields; linear hedgerows; trees; and aquatic habitats of the River Avon. Considering the nature and landuse of the study area and the types of vegetation and habitats present, there are possibilities that protected and notable species and their habitats could be present.

Route Option 2 would pass immediately adjacent to the Racecourse Meadow SSSI and bisects the Seven Meadows and Stratford Steeplechase Meadow pLWS, Stratford Steeplechase Meadow LWS and the River Avon LWS. The rare meadow habitats in Racecourse Meadow could be adversely affected by the increasing vehicle emissions from the new road. The proposed route could cause habitat loss and fragmentation to ecological sites. Protected and notable species and their habitats are likely to be affected by the proposed route. Route Option 2 is predicted to cause adverse impacts to local biodiversity.

3.2.7. Water Environment

Route Option 2 will cross Shottery Brook and the River Avon at the western section of the route. Both watercourses are classified as main rivers by the Environment Agency. According to the Environment Agency flood map, the entire western section of the route (between B439 to the River Avon) is identified as within flood zone 3. The proposed route is not located on a source protection zone. The entire route is designated as a Secondary A superficial deposits aquifer and underlain by a Secondary B bedrock aquifer.

It is currently not known if this route could reduce the ability to retain flood water retention and cause volume displacement leading to increasing flood risk. The proposed route could cause adverse impacts to water quality and may increase flood risks, however, this cannot be substantiated without further assessment on water environment as well as flood modelling.

[10] http://www.sssi.naturalengland.org.uk/citation/citation_photo/2000249.pdf

3.3. Option 3: Eastern route - full

3.3.1. Site Description

The southern end of Route Option 3 starts from the A4390/ A422 junction near Alveston Hill, approximately 2 km southeast of the Stratford-upon-Avon town centre. From the A422, the alignment runs northward and links to Pimlico Lane, which the proposed route partially follows until Pimlico Cottage, it then crosses arable fields to the west of Glebe Farm House and heads northward towards Tiddington. The route then intersects with Main Street in Tiddington and crosses over the River Avon by Cliffe Cottage and finally links to the A439. The Eastern Route is 4.12km in length.

Route Option 3 is situated in semi-rural environment with various sensitive receptors such as residential properties, business units, a preparatory school and the River Avon within the study area. Several residential properties along Alveston Lane in Alveston and Main Street in Tiddington are in the immediate vicinity of the route alignment and are likely to be impacted by this proposal.

3.3.2. Noise

Route Option 3 would introduce a new noise source to sensitive receptors within the study area. This could result in an increase to noise levels experienced by some receptors, in particular those residential properties and school currently positioned on the Pimlico Lane, Alveston Lane and Main Street in Tiddington. The existing noise climate in those areas is likely to be quieter than for receptors near to busy roads. Depending on how the link road impacts on traffic flows in the wider area, there could be some improvement to noise levels associated with reductions to traffic flows on existing routes, however this cannot be substantiated without traffic and subsequent noise modelling.

3.3.3. Air Quality

The A422 Banbury Road is located within the Stratford-upon-Avon AQMA but the actual proposed route is outside of the air quality designation. There are no Special Areas of Conservation, Special Protection Areas, or Ramsar sites within 2 km radius of this route option.

Route Option 3 consists of connecting the A422 to the A439 with a new road; the new road will introduce vehicle emissions to the immediate area of the route and could adversely affect surrounding sensitive receptors. The STA noted that this route option could divert vehicles from using the inner road network by providing an additional link for traffic going from south to east of the town and beyond. In the wider area, this route option could improve traffic flow and reduce vehicle congestion in the centre of Stratford-upon-Avon, which may subsequently improve local air quality for the AQMA, however this cannot be substantiated without traffic and subsequent air quality modelling.

3.3.4. Landscape & Townscape

Route Option 3 lies to the east of Stratford-upon-Avon. This route option is located within the Severn and Avon Vales national character area. The surrounding landscape includes semi-rural environment with farmland, residential settlements, semi-mature woodland and the River Avon floodplain. Sections in flood plain are likely to be elevated which would increase the visual impact of the scheme.

Route Option 3 will introduce a new linear transport corridor to open landscape in Alveston Hill and the River Avon floodplain. Visual amenity of the surrounding sensitive receptors could be affected. However, a section of this route will utilise the existing Pimlico Lane which may lessen the potential for visual amenity impacts along that particular section. The route could affect the landscape and may impact the townscape of Stratford-upon-Avon, Alveston and Tiddington, however, this cannot be substantiated without a landscape and townscape assessment.

3.3.5. Historic Environment

There are ten Grade II listed buildings but no scheduled ancient monuments or world heritage sites within the study area. The listed buildings are concentrated in several areas- three in Alveston Hill Farm (Alveston Hill Farm, the barn and cart shed), two along Church Lane in Alveston (Hemingford House and Church of St James), and five off the Church Lane near to the Alveston House (Former Parish Church of St James, four headstones, Alveston Lodge and the Old Rectory). Of which, the nearest listed building is Hemingford House located approximately 200 m west of the proposed route. The village of Alveston has been designated as a Conservation Area, with the nearest point approximately 280 m west of the route. There are no registered battlefield or registered parks and gardens within the study area.

The proposed Route Option 3 is could affect the setting of the listed buildings within the study area and could affect the setting of the Conservation Area, although this is not in close proximity. The route may cause adverse impact to any buried archaeology along the route corridor.

3.3.6. Biodiversity

There are no statutory European or national designations within the study area. The WCC INSPIRE interactive map shows River Avon LWS and the Croft Preparatory School Plantation, pLWS, within the study area. The proposed route alignment would cut through the River Avon LWS; the route also passes immediately adjacent to the Croft Preparatory School Plantation, pLWS.

As illustrated on aerial photographs, the study area includes semi-improved grassland; arable fields; woodland; linear hedgerows; trees; aquatic habitats of the River Avon. Considering the nature and landuse of the study area and the types of vegetation and habitats present, there are possibilities that protected and notable species and their habitats could be present.

Route Option 3 would bisect the River Avon LWS and pass immediately adjacent to the Croft Preparatory School Plantation, pLWS. The habitats in River Avon LWS could be adversely affected by the construction of the new road. The proposed route could cause habitat loss and fragmentation to ecological sites. Protected and notable species and their habitats are likely to be affected by the proposed route. Route Option 3 is predicted to cause adverse impacts to local biodiversity.

3.3.7. Water Environment

The northern section of the proposed route between Alveston and Ryon Hill lies within the River Avon floodplain, which is in flood zone 3. There are three groundwater source protection zones within the study area, all of which are designated as Inner zone. Approximately 90% of the proposed route is positioned on Secondary A superficial deposits aquifer and fully underlain by a Secondary B bedrock aquifer.

It has been indicated by WCC that the northern section of the proposed route would be elevated wherever it is within the floodplain. The proposed route could cause adverse impacts to water quality and may affect flood risks, however, this cannot be substantiated without further assessment on water environment as well as flood modelling.

3.4. Option 4: Eastern route- Partial (via graded B4086 to A429)

3.4.1. Site Description

Route Option 4 is largely similar to Route Option 3 in the southern section, the deviation starts at Pimlico Lane. Route Option 4 is 5.93 km in length. In this proposed route, the alignment would continue along the Pimlico Lane until the junction with B4086 Wellesbourne Road at Alveston. It is envisaged

that the section of B4086 between Alveston and Wellesbourne will be improved. This route option is proposed to provide access for traffic from the south to the east of the region, this would forgo the requirement of travelling into the town centre of Stratford-upon-Avon.

Route Option 4 would encompass a new road section between the A422 and the Pimlico Lane. It is anticipated that the environmental impacts of the southern section of the route would be identical to Route Option 3.

Route Option 4 is situated in a rural environment with sensitive receptors such as residential properties, a school, a youth hostel and the River Avon.

3.4.2. Noise

The new road section of the proposed route would introduce a new noise source to the surrounding receptors, notably Cherry Orchard cottage, Alveston Hill Farm and Bungalows and Alveston Hill House. This could result in an increase to noise levels experienced by some receptors. The northern section of Route Option 4 consists of existing roads such as the B4086 Wellebourne Road and Stratford Road. These roads are currently the main access route for traffic between the village of Wellesbourne and Stratford-upon-Avon. Depending on how the link road could impact the traffic flows, sensitive receptors on Alveston Hill, Pimlico Lane and Church Lane could also experience some increase in noise levels.

Subject on traffic flows, in the wider area there could be some improvement to noise levels associated with reductions to traffic flows on existing routes, however this cannot be substantiated without traffic and subsequent noise modelling.

3.4.3. Air Quality

Route Option 4 does not lie within an AQMA. There are no Special Areas of Conservation, Special Protection Areas, and Ramsar sites within 2 km of this route option.

This proposed route uses existing access roads such as Pimlico Lane, Wellesbourne Road and Stratford Road to provide connection to south Stratford-upon-Avon. Without knowing the potential difference in vehicle numbers, it is not possible determine if local air quality could be affected by this proposal. In the wider area, this route option could improve traffic flow and reduce vehicle congestion in the centre of Stratford-upon-Avon, which may subsequently improve local air quality for the AQMA, however this cannot be substantiated without traffic and subsequent air quality modelling.

3.4.4. Landscape & Townscape

Route Option 4 is situated in a rural environment, east of Stratford-upon-Avon. This route option is located within the Severn and Avon Vales national character area. The surrounding landscape is predominately arable fields, residential properties, woodland and the River Avon floodplain.

Route Option 4 will introduce a new linear transport corridor near Alveston Hill and could result in adverse landscape impacts. Where the new linear corridor is proposed, the visual amenity of adjacent receptors are likely to be affected. However, the visual amenity impact to sensitive receptors on Pimlico Lane, B4086 Wellesbourne Road and Stratford Road are perceived as less in comparison due to the use of existing roads. Overall, the route could affect the landscape and may impact the townscape of Stratford-upon-Avon, however, this cannot be substantiated without a landscape and townscape assessment.

3.4.5. Historic Environment

There are nine Grade II listed buildings but no scheduled ancient monuments or world heritage sites within the study area. The listed buildings are concentrated in several areas - Baraset House south of

B4086 Wellebourne Road, three in Alveston Hill Farm (Alveston Hill Farm, the barn and cart shed), two along Church Lane in Alveston (Hemingford House and Church of St James), and two along the B4086 near Charlecote (West Lodge to Charlecote Park and West Gate to Charlecote Park). Of which, Hemingford House and the west lodge and gate of Charlecote Park have the potential to be adversely affected by the proposed alignment. The village of Alveston and Charlecote have been designated as Conservation Areas, however, the proposed route itself is not within the designations. There are no registered battlefield or registered parks and gardens within the study area.

The proposed Route Option 4 could adversely affect the setting of the listed buildings within the study area. The route may cause adverse impact to any buried archaeology present along the route corridor. Introduction of a new linear transport corridor to an open landscape may degrade the setting of the listed buildings. Further heritage and archaeological assessments are recommended to confirm the potential effects to receptors.

3.4.6. Biodiversity

There are no statutory European or national designations within the study area. The River Avon LWS, the Croft Preparatory School Plantation and Charlecote Park pLWS, are within the study area. The proposed route alignment would cross the River Avon LWS at the B4086; the route also passes immediately adjacent to the Croft Preparatory School Plantation and Charlecote Park pLWS.

As shown on aerial photographs, the study area includes semi-improved grassland; arable fields; woodland; linear hedgerows; trees; and the River Avon. Considering the nature and landuse of the study area and the types of vegetation and habitats present, there are possibilities that protected and notable species and their habitats could be present.

The habitats and species within the Croft Preparatory School Plantation and Charlecote Park, pLWS, could be adversely affected by increases in traffic volume. Protected and notable species and their habitats are likely to be affected by the proposed route. Route Option 4 is predicted likely to cause adverse impacts to local biodiversity.

3.4.7. Water Environment

The northern section of the proposed route along the B4086 is identified as flood zone 3; part of the River Avon floodplain. There is one groundwater source protection zone adjacent to Alveston Hill. The proposed route crosses a Secondary A superficial deposits aquifer and is underlain by a Secondary B bedrock aquifer.

The proposed route could cause adverse impacts to water quality and may increase flood risks, however, this cannot be substantiated without further assessment on water environment as well as flood modelling.

3.5. Option 5: Combination of western extended route (Option 2) and full eastern route (Option 3)

The relevant environmental impacts of the western extended route (Option 2) and the full eastern route (Option 3) have been discussed in Section 3.2 and 3.3.

The combined option of the western extended route and the full eastern route would have the combined environmental effects of each individually with the potential for additional cumulative effects.

3.6. Option 6: Combination of western extended route (Option 2) and partial eastern route (Option 4)

The relevant environmental impacts of the western extended route and the partial eastern route have been discussed in Section 3.2 and 3.4. This combined option would have the combined environmental effects of each individually with the potential for cumulative effects to be greater than their simple sum.

3.7. Option 7: Reference case with preferred scheme for Birmingham Road, closure of Clopton Bridge and pedestrian priority in Bridge Street/ High Street

Environmental impacts of the Route Option 1 (also known as reference case) are discussed in Section 3.1.

Route Option 7 is similar to Route Option 1 with additional traffic calming measures being implemented in Stratford-upon-Avon town centre. It is envisaged that with the additional measures, beneficial impacts to local air quality and noise within the town centre would be more evident than in Route Option 1. Nevertheless, traffic, noise and air quality modelling would be required to confirm the effects of the route option.

It is also considered that all other environmental impacts in relation to Route Option 1 would apply to Route Option 7.

4. Conclusions

In order to assist with the option selection process, the following tables have been produced to provide a brief summary of the key environmental issues relevant to Route Options 1 to 4.

4.1. Route Option 1

Noise	Sensitive residential receptors are located within the study area.
Air Quality	Part of the proposed route is within an AQMA. Sensitive residential receptors are located within the study area.
Landscape & Townscape	The proposed route would introduce a new linear transport corridor to an open landscape. Sensitive residential receptors are located within the study area.
Historic Environment	One Grade I and seven Grade II listed buildings are located within the study area. Shottery Conservation Area and the Grade I Listed Building (Anne Hathaway's Cottage) are positioned approx. 200m from the proposed route.
Biodiversity	Cadle Pool Farm Meadow LWS is crossed by the proposed route alignment. There are a further four LWSs within the study area.
Water Environment	The route option crosses the floodplain of Shottery Brook.

4.2. Route Option 2

Noise	Sensitive residential receptors are located within the study area.
Air Quality	Part of the proposed route is positioned within an AQMA. Sensitive receptors within the study area include residential properties and Stratford Racecourse SSSI.
Landscape & Townscape	The proposed route would introduce a new linear transport corridor to an open landscape. Sensitive residential receptors are located within immediate vicinity of the route alignment.
Historic Environment	One Grade II listed building is positioned approximately 60m from the proposed route.
Biodiversity	Racecourse Meadow, a SSSI is positioned approx. 20m east of the proposed route. Two LWS and one pLWS are crossed by the proposed route alignment.
Water Environment	The route option crosses the floodplains of Shottery Brook and the River Avon.

4.3. Route Option 3

Noise	Sensitive residential receptors are located within the study area.
Air Quality	Sensitive residential receptors are located within the study area.
Landscape & Townscape	The proposed route would introduce a new linear transport corridor to an open landscape. Sensitive residential receptors are located within immediate vicinity of the route alignment. A section of this route will utilise the existing Pimlico Lane.
Historic Environment	Ten Grade II listed buildings are positioned within the study area, of which, the nearest listed building is Hemingford House located approx. 200 m west of the proposed route. The village of Alveston has been designated as a Conservation Area (located approx. 280m away).
Biodiversity	River Avon LWS is crossed by the proposed route alignment. One pLWS is positioned immediately adjacent to proposed route.
Water Environment	The route option crosses the floodplain of the River Avon. There are three groundwater source protection zones within the study area, all of which are designated as Inner zone.

4.4. Route Option 4

Noise	Sensitive residential receptors are located within the study area.
Air Quality	Sensitive residential receptors are located within the study area.
Landscape & Townscape	The proposed route would introduce a new linear corridor to an open landscape. Sensitive residential receptors are located within the study area. A section of this route will utilise the existing Pimlico Lane, B4086 Wellesbourne Road and Stratford Road.
Historic Environment	Nine Grade II listed buildings are positioned within the study area, of which, the nearest listed buildings, Hemingford House and the west lodge and gate of Charlecote Park are positioned approx. 20m from the proposed route.
Biodiversity	Two pLWS are positioned immediately adjacent to the proposed route.
Water Environment	The route option crosses the floodplain of the River Avon. There is one groundwater source protection zone within the study area, and it has been designated as Inner zone.