Coventry North Transport Package: Outline Business Case

Appendices

Appendix I1 - Risk Register

RISK REGISTER DESIGN SERVICES

Project Title:	**Coventry North Transport Package**
Works Diary Code:	
Prepared By:	**Atkins (SFA)**
Date:	**28/01/21**

Category	Risk
Technical	Avoid
Strategic	Accept
Environmental	Transfer
Financial	Reduce
Health and Safety	Exploit

Risk Matrix

It is intended that this 'Risk Register' be used as part of the Project's Risk Management Procedures- to be reviewed, monitored, updated and amended as an on-going process. Do not delete risks - if risks are eliminated, then indicate them as 'Nil' or 'Included'. 'Mitigation' should identify those measures taken (or to be taken) that will either eliminate the risk, reduce the potential cost or reduce the probability of the event happening.

Ref	Risk Description There is a risk that...	Category	Cause As a result of...	Effect Leading to...	Risk Owner	GROSS risk		Risk Level	Proposed or completed actions	NET risk		Risk Level	Risk Response	Include? (Y/N)	Prob (%)	Min (£)	Mly (£)	Max (£)	ExV (£)	Quantification Notes
						Likelihood	Impact			Likelihood	Impact									
1	Prologis Park hinder Keresley Link Road planning/construction	**Strategic**	Link Road crossing disused railway line and linking into Prologis-owned property	Delays to delivery, or re-design required to mitigate impact on Prologis	CCC	2	3	6	Early engagement with Prologis	1	3	3	**Reduce**						N/A	
2	Network Rail hinder Keresley Link Road and Hawkesbury link aspects of scheme	**Strategic**	These schemes interact closely with the railway, and appropriate permissions required from Network Rail	Delays to delivery, or re-design required to mitigate impact on Network Rail	CCC	3	3	9	Early engagement and consistent management of relationship with Network Rail	2	2	4	**Reduce**							
3	Unexpected environmental constraints hinder construction	**Environmental**	Unforeseen environmental constraints (e.g. contaminated land) being discovered on site	Re-design or delays to construction	Design partner	2	3	6	Undertake detailed environmental surveys across all sites at detailed design stage	1	2	2	**Reduce**							
4	Interaction with developers at Keresley and Hawkesbury	**Strategic**	Developers refusing approval or delaying work	Delays to construction	CCC	2	4	8	Engage with developers throughout process	2	3	6	**Reduce**							
5	Landowner disputes at M6 J3 (North-East of Junction)	**Strategic**	Landowner refuses to release land for development	Re-design, delay or abandonment of free-flow slip element of design	CCC	2	3	6	Identify and engage early with landowner	1	3	3	**Reduce**							
6	Scheme-related traffic management causing local hostility to schemes	**Strategic**	Insufficient planning of traffic management, or poor phasing of construction at different sites	Unpopularity of scheme, reputational damage and significant negative traffic impacts	CCC/HE	2	3	6	Collaboratively plan traffic management with input from all stakeholders (incl. Highways England)	1	3	3	**Reduce**							
7	Interaction with Highways England at M6 J3 (Technical Approval required)	**Strategic**	Highways England refusing or delaying technical approval for works at J3	Delays or redesign of works at M6 J3	CCC	3	3	9	**Engage Highways England throughout process, ensuring buy-in and clear planning of construction**	1	3	3	**Reduce**							
8	Unexpected structural constraints at M6 J3 (Spans and levels unsuitable)	**Construction**	Lack of detailed surveys of structure prior to works.	Redesign of hamburger arrangement (potential loss of effectiveness of scheme)	Design partner	2	4	8	Undertake detailed surveys at detailed design stage	1	3	3	**Reduce**							
9	Interaction of free-flow slip with overhead pylon at M6 J3	**Technical**	Insufficient acknowledgment of constraints in design	Re-design, delay or abandonment of free-flow slip element of design	Design partner	2	2	4	Undertake detailed surveys at detailed design stage	1	2	2	**Reduce**							
10	Drainage risk requires additional design work at Hawkesbury underbridge	**Technical**	Unforeseen difficulties in drainage at site	Expensive or time-costly re-design or re-works	Design partner	3	2	6	Undertake detailed surveys and incorporate extra allowance for drainage in design at site. Consider also impact suring construction (pumping required)	2	2	4	**Reduce**							
11	Approvals for change in road space/width not granted for cycleways	**Strategic**	CCC not granting approval	Re-design or delays to construction	CCC	2	3	6	Ensure appropriate buy-in/approval from CCC early in process	1	3	3	**Reduce**							
12	Stopping up of Burbages Lane at Rowley's Green leads to scheme hostility	**Technical**	Lack of consultation/engagement with stakeholders	Potential blocking/redesign of scheme at Rowley's Green	CCC/Consultation partner	2	4	8	Ensure early and effective consultation with local residents and stakeholders regarding stopping up	2	2	4	**Reduce**							
13	Interaction with utilities (communication mast) at Rowley's Green	**Technical**	Insufficient acknowledgment of constraints in design	Re-design, delay or abandonment of free-flow slip element of design	Design partner	2	3	6	Undertake detailed surveys at detailed design stage	1	2	2	**Reduce**							
14	Design requires rework following planned WCC improvements at M6 J3	**Technical**	WCC improvements either not accounted for in design, or change, requiring new design	Re-design and delay to construction	CCC/WCC	2	2	4	Ensure full oversight and regular communication between all parties (including Highways England) at J3	1	2	2	**Reduce**							
15	Archaeological finds made on site	**Environmental**	Insufficient surveys of site	Delays in construction	Design partner	2	2	4	Ensure sufficient preperatory surveys undertaken at site, and sufficient time planned into programme for this work	1	2	2	**Reduce**							
16	Award of contract delayed due to tender process delays	**Financial**	Lack of interest from suppliers, or insufficent quality of applications	Delays in construction and scheme opening	CCC	2	3	6	Plan tender process sufficiently, ensuring market interest prior to process (workshops)	1	3	3	**Reduce**							

Appendix I2

Coventry North Transport Package

Feasibility Appraisal Report

Coventry City Council

29 September 2020

Notice

This document and its contents have been prepared and are intended solely as information for Coventry City Council Coventry City Council and use in relation to the Coventry North Feasibility Appraisal Report.

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Client signoff

Client	Coventry City Council
Project	Coventry North Transport Package
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Executive summary

Introduction

This Feasibility Appraisal Report details the design and environmental constraints of the shortlisted options for the Coventry North Transport Package, forming an important evidence base for the Options Appraisal process of this project. The Coventry North Transport Package is a study being undertaken by Atkins on behalf of Coventry City Council (CCC) to identify and assess a range of options for meeting future transport demand in the North Coventry area. The Transport Package will consider current and long-term transport challenges and opportunities for the area, incorporating both the aims of the Coventry Local Plan and West Midlands Combined Authority (WMCA) Local Transport Plan.

Following an initial drawing-up of a Long List of options for intervention in the area, with input from CCC and key stakeholders, a long list of options was refined to a shortlist for further assessment, in the form of both a traffic modelling assessment, and design and environmental feasibility appraisal. These separate exercises will feed into an Options Appraisal Report, which will summarise the evidence presented to arrive at a preferred package for final testing and appraisal, ahead of an Outline Business Case.

The purpose of this report is therefore to:

- Identify high-level design constraints and feasibility considerations for each of the shortlisted options;
- Identify high-level environmental constraints and considerations for each of the shortlisted options; and
- Present a summary table considering an outline appraisal of potential delivery timescales, costs, environmental constraints and acceptability, for incorporation into the OAR.

Outcome Objectives and Options Shortlist

As part of the appraisal process, a series of Outcome Objectives were prepared, reflecting the aims of both CCC's Local Plan, and the WMCA Local Transport Plan. These Outcome Objectives are the guiding principles behind both the choice of options that progressed from the Long List to the Shortlist, and the subsequent appraisal of the options contained in the shortlist, as documented in this report.

The Options Shortlist has been grouped into three key areas reflecting the priorities of CCC; Core options, Public Transport & Active Mode options, and Supporting options. In addition to the shortlisted options, this report also contains several additional 'alternative' options assessed for design feasibility at a high-level, to provide information and context for the options appraisal process.

The design and environmental assessments have been grouped into seven 'option areas', as follows.

Keresley Link Road

Building upon the work carried out for the Keresley Link Road Multi-Disciplinary Review, Alignment 2A (C-KLR-5) presents the most attractive option, considering likely timescales, costs, environmental impact and acceptability. Whilst the three assessed alignments all present similar cases, Alignment 2A avoids the requirement for purchasing third party land at Bennetts Road, and also adopts a smoother alignment, avoids a significant crossing of a Local High Pressure (LHP) gas main. Alignment 1, through the potential need for the purchasing of third-party land, would likely feature longer construction timescales than the other options, while the outline cost assessment prepared at this stage foresees no significant difference in costs between the options. Alignment 2A may, however, impact slightly more on the environment, namely Jubilee Woods.

M6 Junction 3

Of the three shortlisted options assessed as part of this report, both a Hamburger-style layout or J-Links (C-M6J3-3) or the addition of free-flow lanes to/from the M6 where possible (C-M6J3-4) present feasible options for delivery. Specifically, a hamburger arrangement would be feasible within the footprint of the existing junction, and a free-flow lane from the A444SB to the M6 EB would likely be feasible and achieve the stated Outcome Objectives. Both of these options would see moderate timescales and costs driven by relatively orthodox construction processes and an absence of significant constraints. Environmentally, neither option would impact significant environmental resources, with the hamburger arrangement impacting vegetation within the gyratory, and the free-flow lanes requiring a moderate widening of the carriageway.

The shortlisted option for a tunnel under Junction 3 for the A444 (C-M6J3-5) would feature a potentially lengthy, complex and costly construction, with the tunnel located in an area prone to flooding.

New M6 Junction 3 West

The delivery of a new junction on the M6 to the west of Corley Services (S-NM6J-1), plus an accompanying link road to the A45 would be viable, according to the high-level assessments carried out for this report. Specifically, a new junction located at Corley Services itself would be complex but potentially deliverable, resulting in some loss of habitat and woodland resulting from the link road to the A45, as well as some disruption to local traffic during construction. Alternatively, a junction on a new greenfield site along that span of motorway (S-NM6J-4) would require a simpler construction and therefore timescales, and would likely be the least disruptive option for local communities.

The use of the existing bridges at the B4098 or B4102 (S-NM6J-2 and 3) for new junctions are not considered viable, given the insufficient width of the existing tunnels would require significant remodelling and resulting high costs.

Hawkesbury Level Crossing

Of the assessed shortlisted options for the Hawkesbury Level Crossing, the offline highway diversion via the existing tunnel on Stephenson Road (C-HLC-3) presents the most feasible option from a design and environmental perspective, avoiding the visual intrusion and risk of an overbridge on Blackhorse Road (C-HLC-2). However, this option would still feature high costs and land requirements, and the existing Stephenson Road Bridge is inadequate in its current state and would require significant amendments.

The best 'alternative' option presented as part of this report (not shortlisted) is for an offline highway diversion that tunnels under the railway (C-HLC-3b). This option would provide a simpler method for crossing the railway than C-HLC-3, with similar timescales and potentially reduced costs.

Cycle Improvements

The three shortlisted cycle improvements assessed as part of this report are all feasible in their delivery, with a couple of specific points to note. Firstly, the Coundon Cycle Route (P-PCS-1) may feature higher costs due to the potential for utilities to be affected along the route length. The link from Keresley to this Coundon route (P-PCS-2) is deliverable with moderate time, cost and environmental implications. Finally, a preferred alignment for the Eastern Green route (P-PCS-3) is presented, favouring a route via Holyhead Road, which avoids Pickford Brook and private accesses as much as possible along the route length.

An additional route, from Holyhead Road to Long Lane (P-PCS-4), would be a relatively simple addition to this suite of route, albeit not a shortlisted option for the scope of this study.

Rowley's Green

In terms of the assessed, shortlisted options at the A444-Rowley's Green junction, a free-flow lane from Winding House Lane to the A444 NB (S-RGI-1) presents one potentially feasible option, with an expected low cost and environmental impact. Similarly, the conversion of the nearby disused rail line into a facility for some form of Mass Rapid Transit (Very Light Rail or Bus Rapid Transit) (S-RGI-4/5) would be an achievable option with potential benefits for sustainable travel in the city. The option of a flyover at the junction for the A444 mainline is not considered particularly feasible, given the likely high cost of the required long-span structure.

An alternative suggested option to utilise the disused rail line as a cycleway would be a low-cost, achievable option.

A444 Newton Road Junction

The most feasible option for the addition of slip roads at the A444-Newtown Road would see the addition of relatively simple northbound merge and diverge slips (S-NRS-1a). This would provide the most feasible method of adding northbound access, avoiding potential signals and stop lines in the tunnel under the A444, as per the shortlisted option based upon a design sketched by Vectos for Warwickshire County Council (S-NRS-1). However, it should be noted that all options for northbound slips would likely incur a high environmental cost, with a loss of visual screening and noise pollutants to adjacent properties.

Summary of options

This report presents the design and environmental feasibility of the shortlisted options, and summarises the likely timescales, cost, environmental impact and acceptability of options at an outline level. The evidence presented will be an important factor in assessing the shortlisted options, and when combined with the separate traffic modelling assessment, will enable the choice of a final preferred package of options.

1. Introduction

1.1. Coventry North Transport Package

The Coventry North Transport Package is a study being undertaken by Atkins on behalf of Coventry City Council (CCC) to identify and assess a range of options for meeting future transport demand in the North Coventry area. Specifically, the study will identify options focused around the proposed Keresley Link Road, designed to serve the Keresley Sustainable Urban Extension (SUE) development in North-West Coventry, M6 Junction 3 and the nearby A444 corridor, and the potential removal of the Hawkesbury Level Crossing to increase rail capacity in the region.

As set out in the Coventry Local Plan, there is substantial planned residential and employment growth in the North Coventry area and this, combined with growth resulting from developments in the wider West Midlands region, such as the Midlands Engine Strategy and UK Central development near Solihull, are expected to present significant opportunities for economic development and regeneration in Coventry. However, the transport network in the area already experiences transport problems in several key areas and is expected to be placed under increasing pressure from these developments over the coming years. As such the Coventry North Transport Package is designed to enable Coventry to capitalise on these opportunities, supporting both the objectives of the CCC Local Plan and West Midlands Combined Authority (WMCA) Local Transport Plan:

- To support businesses to grow and underpin economic growth;
- To develop a dynamic city centre in Coventry;
- To improve access to opportunities by enhancing the accessible transport network; and
- To tackle climate change through reduced emissions, creating an attractive, cleaner and greener Coventry.

The Coventry North Transport Package therefore considers the current and long-term transport challenges and opportunities for the area, incorporating the aims and objectives of both CCC and WMCA, and fulfilling CCC's duty to cooperate in helping to unlock development opportunities, both in Nuneaton and Bedworth, and in the Solihull and wider WMCA area. The study will establish the case for investment in North Coventry based on the strategic and economic benefits of investing in the corridor. It will identify a long list of options that could meet the transport objectives and then undertake further, more detailed, appraisal on a package of options.

1.2. Report purpose

The overall study will encompass the following stages:

- Refreshing the Coventry North Masterplan describing the proposed alignment and impact of a Keresley Link Road;
- Producing a long list of options for alleviating transport constraints in the North Coventry area;
- These options will then be sifted and shortlisted according to agreed assessment criteria and in coordination with key stakeholders;
- Design feasibility study to assess the feasibility and risks of each option package, alongside an outline cost assessment to feed into an Option Appraisal Report;
- Traffic modelling and environmental appraisal to understand the impacts of the preferred option and development of an Outline Business Case for the Keresley Link Road, incorporating the best performing options from the previous stages; and
- A funding/delivery plan, detailing the means of delivering the preferred package of measures.

As such, this Feasibility Appraisal Report is an important deliverable in setting out evidence for the Options Appraisal Report (OAR). The purpose of this report is therefore to:

- Identify high-level design constraints and feasibility considerations for each of the shortlisted options;
- Identify high-level environmental constraints and considerations for each of the shortlisted options; and
- Present a summary table considering an outline appraisal of potential delivery timescales, costs, environmental constraints and acceptability, for incorporation into the OAR.

1.3. Study area

The area examined as part of this study encompasses the north-west of Coventry, plus the surrounding strategic highway network, and A444 corridor to Nuneaton. Specifically, as shown in Figure 1-1, within the Coventry city boundaries, the area west of Foleshill Road and north of Holyhead Road/A45, centred on the proposed Keresley SUE area and the Prologis Park industrial development, but also including the A444 and Rowley's Green junction, are included. M6 J3 (the Exhall Interchange) forms another key focus of the study, and the M6 west from J3 to where it crosses the B4102 will be examined for potential options. North of the M6, Hawkesbury Village, and specifically the level crossing on Blackhorse Road, is the third main focus of the study. North of this, the A444 corridor as far north as the Bermuda Park industrial development on the southern edge of Nuneaton completes the study area for the package.

There are substantial residential allocations in the Coventry North area as part of the Coventry Local Plan, and the area is forecast to experience significant housing growth over the forthcoming Local Plan period. The Keresley SUE is one of the largest proposed developments in Coventry, with approximately 3,100 homes, 2,500sq.m of retail space and a Primary School planned on the parcel of land between the B4098 Tamworth Road and Prologis Park. In addition, the Eastern Green development will see a further approx. 2,250 homes and 15 hectares of employment land developed adjacent to the A45, and, as part of the Nuneaton and Bedworth Borough Plan, land off Rowley's Green Lane will be developed with a further 200 homes and 18 hectares of employment land. A planning application for 212 dwellings to the north of Blackhorse Road has also been submitted in recent months.

These are in addition to further expansion of existing employment sites in the area. Prologis Park is a significant industrial development adjacent to the proposed Keresley SUE site, currently home to several major employers, including DHL and The Co-Operative, and with a further extension proposed on the northern edge of the site. Lyons Park on Coundon Wedge Drive is another significant industrial area, with Amazon and Jaguar Land Rover among employers on the site. Bermuda Park at the northern end of the A444 corridor is a further major employment growth site, hosting employers such as Dairy Crest, Hermes and DX. The employment growth in the local area will be boosted further by the UK Central development near Solihull, a major retail and business development attached to a High-Speed 2 (HS2) interchange, that will bring significant investment and jobs growth to the region.

The Coventry North area features two major A-Roads within the city itself; the A45, which runs west from the south of the city towards the M42/Birmingham Airport/the National Exhibition Centre, and the A444, which runs north from the city centre towards M6 Junction 3, Bedworth and Nuneaton. Both routes were included in the DfT's indicative Major Road Network (MRN) in 2017[1], and the WMCA's Key Route Network (KRN), indicating their status as heavily-trafficked, economically important routes. The A45 is a two-lane dual carriageway with grade-separated junctions and, west of Coventry, a national speed limit of 60mph. The A444 is also largely a two-lane dual-carriageway, with some sections of three lanes close to major junctions. In the Coventry North area it passes through a junction with Holbrook Way, and a major at-grade signalised roundabout at Rowley's Green, next to the Ricoh Arena. It meets the M6 at the Exhall Interchange, a signalised roundabout. Between these two key strategic links in the city, there is no orbital route, meaning traffic wishing to travel between the A45 and A444 must use unsuitable local routes, such as Long Lane, Tamworth Road and the Scotchill.

The strategic road network in the area consists of the M6, which runs East-West, connecting the M1 near Rugby to Birmingham and the north-west and north Wales. M6 Junction 3 features two or three-lane slip roads onto a grade-separated signalised roundabout with the A444 and B4113, two miles west of this junction is Corley Services.

Running parallel to the A444 corridor between Coventry and Nuneaton is a railway line connecting Coventry to Bedworth, Bermuda Park and Nuneaton stations, with onward journeys to Leicester and Tamworth available from

[1] Proposals for the Creation of a Major Road Network – Consultation; Department for Transport, December 2018

Nuneaton. This line passes through the Hawkesbury estate just north of the M6, crossing Blackhorse Road at a level crossing.

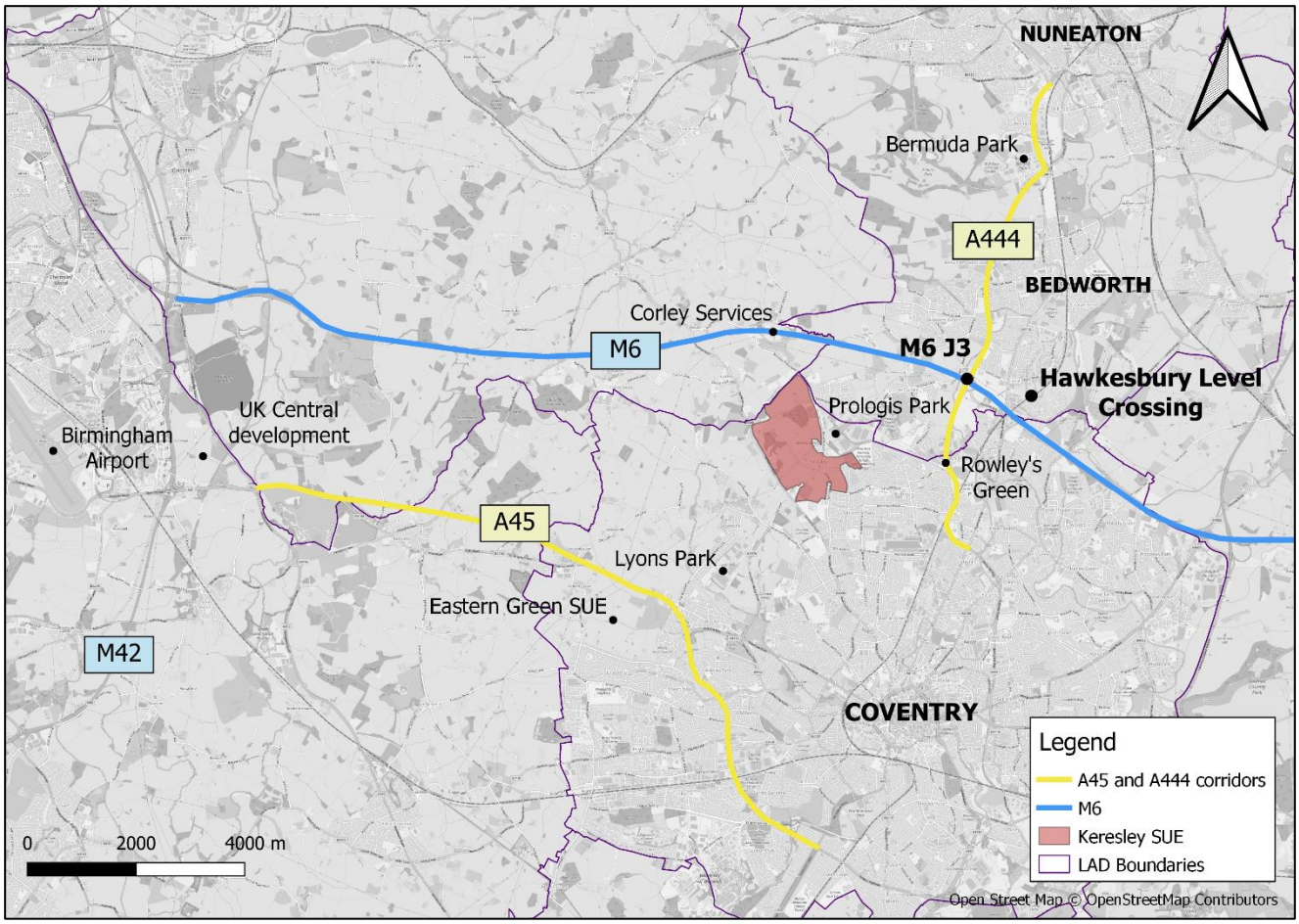

Figure 1-1 - Coventry North Study Area

1.4. Document Structure

The rest of this document is structured as follows:

- Section 2 provides background on the project Outcome Objectives and the schemes that make up the Option Shortlist;
- Sections 3-9 each cover the design and environmental feasibility appraisal for a single option 'area' (for example M6 Junction 3), which contains several related options; and
- Section 10 provides a summary table of each of the options.

2. Outcome Objectives and Option Shortlist

2.1. Study Outcome Objectives

The study's Outcome Objectives reflect the aims of both CCC's Local Plan, and the WMCA Local Transport Plan, as set out in Section 1.1. These objectives are shown in Table 2-1 alongside an indication of how they support the CCC and WMCA objectives.

Table 2-1 - Coventry North Transport Package Outcome Objectives

Outcome objective	CCC Local Plan Objectives									WMCA LTP Objectives				
	Supporting businesses to grow	Enabling the right infrastructure for the city	Developing a dynamic city centre	Raising the profile of Coventry	Creating an attractive, cleaner and greener city	Maintaining and enhancing an accessible transport network	Housing that meets the needs of all people	Improve the health and wellbeing of local residents	Support safer communities	Underpin growth and economic regeneration	Tackle climate change through reducing emissions	Improve the health, personal security and safety of people travelling in West Midlands	Tackle deprivation and improve opportunities by improving access	Enhance wellbeing and quality of life in the West Midlands
National														
Help unlock opportunities created by national schemes and events (HS2 and UK Central)	✓✓✓	✓		✓✓✓				✓✓		✓✓✓		✓	✓✓	✓✓
To improve the efficiency and operation of the Strategic Road Network, specifically the M6	✓✓	✓✓				✓✓✓				✓✓			✓	
Sub-Regional														
To improve connectivity between A45 and M6	✓	✓✓✓				✓✓✓		✓		✓✓		✓	✓	✓
Improve journey resilience along A444 corridor connecting Coventry to Nuneaton and Bedworth	✓✓	✓✓✓	✓✓	✓		✓✓✓	✓	✓	✓	✓✓		✓	✓✓	✓✓
Enable greater rail connections along Leamington Spa-Leicester rail corridor	✓✓	✓✓	✓	✓	✓	✓✓				✓✓✓	✓✓	✓	✓✓	✓
To provide greater access to growth sites (eg: universities and employment sites) in area	✓✓✓	✓✓	✓	✓		✓✓	✓	✓	✓	✓✓✓		✓	✓✓✓	✓✓
Local														
Reduce local vehicle congestion on nearby highways	✓✓	✓✓✓	✓✓		✓✓	✓✓✓		✓	✓	✓✓	✓	✓	✓	✓
Enhance mass-transit network in North Coventry area	✓	✓✓	✓	✓✓	✓✓	✓✓✓		✓	✓	✓✓	✓✓			
Support and enable strategic housing growth sites and other local plan allocations		✓	✓		✓	✓✓	✓✓✓	✓✓	✓✓	✓✓	✓	✓	✓	✓
Improve health and wellbeing via greater active travel		✓✓	✓	✓	✓✓	✓		✓✓✓			✓✓	✓✓✓		
Mitigate impact of traffic on local communities		✓			✓✓	✓	✓	✓✓✓	✓✓✓			✓✓✓		✓✓✓
Reduce environmental impact of traffic		✓		✓	✓✓✓	✓		✓✓	✓✓		✓✓✓			✓✓

2.2. Work undertaken so far

2.2.1. This Project

Full details of the appraisal process for the project, as well as details of previous tasks, can be found in the Options Appraisal Report. A summary is provided here for convenience.

- Once the Outcome Objectives had been established, a Long List of Options was developed with the assistance of CCC and relevant stakeholders, to establish schemes (and scheme options) that would help achieve the stated objectives. The Long List was split into three broad areas to best reflect the priorities of CCC in potential solutions to the challenges facing transport in North Coventry; Core options, Public Transport & Active Mode options, and Supporting options.
- The options in the Long List were then sifted against a set of criteria that reflected the agreed Outcome Objectives, determining whether each option in isolation should be retained for further consideration in this study, or not be taken further. At this stage, the aim was not to significantly reduce the number of options (as there is insufficient evidence to do so at this stage in the option appraisal process) but to remove those options which were not considered to sufficiently support the agreed Outcomes Objectives.

Through this process, a short list of options was established.

2.2.2. Existing Design Sources

Where relevant and appropriate, this report draws upon findings from separate studies, such as:

- Coventry City Council Keresley Link Road Multi-Discipline Review and Design Development, Atkins (2020); and
- Warwickshire County Council Hawkesbury Level Crossing Study, Atkins (2018)

In relation to the Keresley Link Road Multi-Discipline Review and Design Development, Atkins has undertaken the following work for the Keresley Link Road to date:

- A multi-disciplinary desktop review along a 2km wide corridor between Tamworth Road and Central Boulevard involving inputs from geotechnical, environmental, ecological, arboriculture and drainage specialists. The multi-disciplinary review was used to identify the varying impacts of the three alignment options and hence establish the preferred alignment.
- Opensource LiDAR data was used to produce the ground model allowing the assessment of the vertical alignment of the link road. The schematic alignment drawings show the long section profiles of the alignment as well as cross sections at key locations along the alignment options. The schematic alignment drawings are provided in the Multi-Discipline Review and Design Development Technical Note. Traffic modelling has been undertaken to identify suitable junction types for alignment option 1; the traffic modelling at Tamworth Road and Central Boulevard applies to alignment options 2 and 2A however, additional modelling is required at Bennetts Road for options 2 and 2A.
- Cost estimates for alignment options 1, 2 and 2A can also be found in the Multi-Discipline Review and Design Development Technical Note.
- Regarding Hawkesbury Level Crossing, Atkins used the results of a survey by MDS Transmodal to establish that Blackhorse Road experiences high levels of congestion causing environmental issues, a major impact on journey times and frustration to residents. Crash Map was consulted to identify the number and severity of accidents over a 5-year duration from 2014 to 2018. Atkins undertook an option identification and appraisal task to identify five potential options involving the positive and negative impacts of each option. Note, preferred options identified would need detailed study and liaison with Network Rail to confirm their feasibility. Please refer to Hawkesbury Lane Level Crossing Technical Note study for more information.

2.3. Options Shortlist

The outcome of the sifting process was the removal of three options from the Long List, and the formation of the resulting Options Shortlist, as shown in summary in Table 2-2. Note the rationale listed is a summary, with full details of qualitative scores against each criterion displayed in the full Options Appraisal Report.

Table 2-2 - Options Shortlist Summary

Reference	Option name	Option retained?	Rationale
C-KLR-1	Keresley Link Road: No Link Road Option	×	Would provide no link for the proposed Keresley SUE, preventing any distribution of traffic or active routes through NW of city
C-KLR-2	Keresley Link Road: Partial Link Road Option	✓	Provides link with Keresley SUE, improving connectivity in area
C-KLR-3	Keresley Link Road: Alignment 1	✓	Provides link with Keresley SUE, improving connectivity in area
C-KLR-4	Keresley Link Road: Alignment 2	✓	Provides link with Keresley SUE, improving connectivity in area
C-KLR-5	Keresley Link Road: Alignment 2A	✓	Provides link with Keresley SUE, improving connectivity in area
C-M6J3-1	M6 J3: No improvement	✓	Improvement may not be required if alternative (new) junction provided
C-M6J3-2	M6 J3: Optimising traffic signals on gyratory	✓	Provides means of meeting future demand at junction
C-M6J3-3	M6 J3: Hamburger layout for A444	✓	Provides means of meeting future demand at junction
C-M6J3-4	M6 J3: Segregated left turn slips	✓	Provides means of meeting future demand at junction
C-M6J3-5	M6 J3: Tunnel for A444	✓	Provides means of meeting future demand at junction
C-M6J3-6	M6 J3: Flyover for A444	×	Likely to be unacceptable to both authorities and local residents, given likely environmental cost
C-M6J3-7	M6 J3: Removal of B4113 at roundabout	✓	Provides means of meeting future demand at junction
C-M6J3-8	M6 J3: Improvements to signals/lane allocations on gyratory	×	Not carried through, given close overlap with C-M6J3-2
C-HLC-1	Hawkesbury Level Crossing: No improvement	✓	Improvement only possible if viable alternative in place; if not, no improvement may be best option
C-HLC-2	Hawkesbury Level Crossing: Blackhorse Rd bridge	✓	Helps rail corridor and local congestion without causing significant re-routing of traffic
C-HLC-3	Hawkesbury Level Crossing: Stephenson Road new link	✓	Helps rail corridor and local congestion, as well as helping to enable Hawkesbury Golf Course Land development
C-HLC-4	Hawkesbury Level Crossing: Optimise level crossing operation	✓	Improves current situation with minimal intervention beyond direct rail upgrade
P-PCS-1	City centre to Westhill Rd Cycleway	✓	Provides useful cycleway into north-west of city, encouraging active travel
P-PCS-2	Westhill Rd to Keresley Cycleway	✓	Provides useful cycleway into north-west of city, encouraging active travel

Reference	Option name	Option retained?	Rationale
P-PCS-3	City centre to Eastern Green Cycleway	✓	Provides useful cycleway into north-west of city, encouraging active travel
P-BPR-1	Bus Park & Ride services between Bermuda Park and Keresley	✓	Would likely support growth along A444 corridor, and reduce traffic
P-SAI-1	Coventry/Nuneaton Station accessibility improvements	✓	Helps to support growth in area through encouraging sustainable transport
S-RGI-1	Rowley's Green: Free-flowing lane NB from Winding House Lane to A444	✓	Helps to support growth by improving travel along A444 corridor
S-RGI-2	Rowley's Green: Mainline A444 north-south flyover	✓	Helps to support growth by improving travel along A444 corridor
S-RGI-3	Rowley's Green: Mainline A444 north-south hamburger layout	✓	Helps to support growth by improving travel along A444 corridor
S-RGI-4	Rowley's Green: Incorporation of Very Light Rail	✓	Helps to support growth by improving travel along A444 corridor
S-RGI-5	Rowley's Green: Incorporation of Bus Rapid Transit scheme	✓	Helps to support growth by improving travel along A444 corridor
S-NM6J-1	New M6 Junction: at Corley Services	✓	Provides alternative means of improving connections to SRN
S-NM6J-2	New M6 Junction: at B4098 tunnel	✓	Provides alternative means of improving connections to SRN
S-NM6J-3	New M6 Junction: at B4102 tunnel	✓	Provides alternative means of improving connections to SRN
S-NM6J-4	New M6 Junction: at greenfield site	✓	Provides alternative means of improving connections to SRN
S-NM6J-5	New M6 Junction link road: to A45 at Eastern Green	✓	Provides alternative means of improving connections to SRN
S-NM6J-6	New M6 Junction link road: to A45 at Meriden	✓	Provides alternative means of improving connections to SRN
S-NRS-1	A444-Newtown Road junction: north-facing sliproads	✓	Helps to support growth by improving travel along A444 corridor

Where applicable, this report draws upon existing work and reports relating to the feasibility and deliverability of the shortlisted options. This is relevant to the Keresley Link Road in particular (see Section 3), given the more progressed nature of that option area, but applies to several other option areas as well. This means that the feasibility of different option areas are assessed and discussed to differing levels of detail in this report, depending upon the progress of the schemes in question.

It should also be noted that the options assessed in this report neither include every option shortlisted, nor are limited to those options on the shortlist. In certain cases, namely where significant new infrastructure would not be required as part of the scheme (for example options B-BPR-1 and P-SAI-1), these schemes have been excluded from the design feasibility assessment. However in a few other cases, Atkins have proposed potential alternative options that were not shortlisted, that may be feasible and still achieve the stated Outcome Objectives, for information purposes.

As a result, the options discussed in this report can be split into three areas; those shortlisted options with significant required infrastructure assessed on both a design and environmental basis, those options not assessed, either because less significant infrastructure would be required for their delivery or the option has not

been shortlisted, and finally, some additional alternative (non-shortlisted) options proposed as part of the design feasibility assessment, included for information, and not subject to an environmental assessment. These three areas are shown in Table 2-3 to Table 2-5.

Table 2-3 - Shortlisted options assessed for both design and environmental constraints

Reference	Option
C-KLR-3	Keresley Link Road: Alignment 1
C-KLR-4	Keresley Link Road: Alignment 2
C-KLR-5	Keresley Link Road: Alignment 2A
C-M6J3-3	M6 J3: Hamburger layout for A444
C-M6J3-4	M6 J3: Segregated left turn slips
C-M6J3-5	M6 J3: Tunnel for A444
C-HLC-2	Hawkesbury Level Crossing: Blackhorse Rd bridge
C-HLC-3	Hawkesbury Level Crossing: Stephenson Road new link (existing tunnel)
P-PCS-1*	City centre to Westhill Rd Cycleway
P-PCS-2*	Westhill Rd to Keresley Cycleway
P-PCS-3*	City centre to Eastern Green Cycleway
S-RGI-1	Rowley's Green: Free-flowing lane NB from Winding House Lane to A444
S-RGI-2	Rowley's Green: Mainline A444 north-south flyover
S-RGI-4	Rowley's Green: Incorporation of Very Light Rail
S-RGI-5	Rowley's Green: Incorporation of Bus Rapid Transit scheme
S-NM6J-1	New M6 Junction: at Corley Services
S-NM6J-2	New M6 Junction: at B4098 tunnel
S-NM6J-3	New M6 Junction: at B4102 tunnel
S-NM6J-4	New M6 Junction: at greenfield site
S-NM6J-5	New M6 Junction link road: to A45 at Eastern Green
S-NM6J-6	New M6 Junction link road: to A45 at Meriden
S-NRS-1	A444-Newtown Road junction: north-facing sliproads

* Note: Options not assessed from environmental perspective as expected impact not significant.

Table 2-4 - Options not assessed for design or environmental constraints

Reference	Option	Reason for non-inclusion
C-KLR-1	Keresley Link Road: No Link Road Option	Option not shortlisted
C-KLR-2	Keresley Link Road: Partial Link Road Option	Overlap with other assessed option (C-KLR-3)
C-M6J3-1	M6 J3: No improvement	No significant infrastructure required
C-M6J3-2	M6 J3: Optimising traffic signals on gyratory	No significant infrastructure required
C-M6J3-7	M6 J3: Removal of B4113 at roundabout	No significant infrastructure required
C-M6J3-8	M6 J3: Improvements to signals/lane allocations on gyratory	Option not shortlisted
C-HLC-1	Hawkesbury Level Crossing: No improvement	No significant infrastructure required
C-HLC-4	Hawkesbury Level Crossing: Optimise level crossing operation	No significant infrastructure required
P-BPR-1	Bus Park & Ride services between Bermuda Park and Keresley	No significant infrastructure required
P-SAI-1	Coventry/Nuneaton Station accessibility improvements	No significant infrastructure required
S-RGI-3	Rowley's Green: Mainline A444 north-south hamburger layout	Overlap with other assessed option (S-RGI-2)

Table 2-5 - Additional 'alternative' design options presented for information

Reference	Option
C-M6J3-6	M6 J3: Flyover for A444
C-HLC-2a	Hawkesbury Level Crossing: Blackhorse Rd underpass
C-HLC-3a	Hawkesbury Level Crossing: Stephenson Road link over railway
C-HLC-3b	Hawkesbury Level Crossing: Stephenson Road link under railway
C-HLC-5	Hawkesbury Level Crossing: Closure of Blackhorse Rd
P-PCS-4	Holyhead Rd to Long Ln Cycleway
S-RGI-6	Rowley's Green: Incorporation of Cycleway
S-NRS-1a	A444-Newtown Road junction: Vectos-design NB slip
S-NRS-1b	A444-Newtown Road junction: Sutherland Drive off-slip

3. Keresley Link Road

3.1. Overview

As part of the Coventry North Package, Coventry City Council (CCC) are incorporating a Link Road to facilitate the Keresley Sustainable Urban Extension (SUE). Three alignment options have been identified; Option 1, 2 and 2A (all approximately 2,400m) for the Link Road situated in the north west of Coventry which will connect Tamworth Road and Long Lane in the west to Central Boulevard in the east. Atkins undertook a multi-disciplinary desktop review in 2019 along a 2km wide corridor between Tamworth Road and Central Boulevard, the review was used to identify the varying impacts of the three alignment options and hence establish the preferred alignment. A 500m section of the western part of the Link Road had a fixed alignment due to land plans previously agreed for the SUE development of approximately 3,100 homes and 2,500sq.m of new retail space. Overview alignment drawings for options 1, 2 and 2A can be found in Appendix A.1.

All three alignment options pass mainly through open agricultural farmland and will connect Central Boulevard in the north east to Bennetts Road and Watery Lane in the centre of the site and Tamworth Road in the west.

The eastern section of the proposed Keresley Link Road is located to the south of a large Industrial Park (ProLogis Park), once the site of Coventry Colliery, and to the north of President Kennedy School grounds and Keresley Jubilee Wood. In this area, the alignment options cross a disused railway which formerly connected the colliery to the wider rail network.

The central part of the proposed Keresley Link Road alignment options is located within open farmland with occasional farm structures to the north. In this section the alignments cross a minor watercourse (Hall Brook) to the west of Bennetts Road.

The western part of the proposed Keresley Link Road alignment options pass to the north of the Royal Court Hotel adjacent to Tamworth Road.

Figure 3-1 - Keresley Link Road - Location Overview (Background taken from Google Imagery 2019)

3.2. Environmental Constraints

A Stage 1 Environmental Review has been undertaken for the scheme area, and is shown in Appendix B. Given the more advanced nature of the proposals for the Keresley Link Road (when compared with the other scheme areas in this report), a more detailed environmental assessment of this scheme has already been undertaken as

part of the Multi-Discipline Review and Design Development Technical Note. This is summarised below for convenience.

An arboriculture desk study confirms that there are no trees subject of a Tree Preservation Order (TPO) along the three proposed alignment options. The closest TPO trees are those growing along the front of the Royal Court Hotel on the Tamworth Road. Equally, there are no conservation areas near the road alignments. However, all three-alignment options conflict with trees or hedges at various points along the corridor. The desktop assessment provides a brief overview of arboricultural constraints, at the next design stage a full arboricultural survey in accordance with the British Standard 5837:2012 would provide a more detailed assessment.

All three proposed Link Road alignment options cross the Hall Brook (small river), this river crosses the proposed corridor alignment and is therefore, unavoidable. At the current design stage, the size of the structure required to cross the Hall Brook hasn't been confirmed, it is recommended fluvial hydraulic modelling is undertaken at the next design stage. Based on Ordnance Survey 1:25,000 scale mapping and Environment Agency Flood Maps, the proposed Link Road alignment options do not cross any further watercourses. All three proposed Link Road alignment options generally lie in Flood Zone 1 (less than 1 in 1000 / 0.1% annual probability of river flooding) but where the proposed highway alignments should cross the Hall Brook lie in Flood Zone 3b (land which would flood with an annual probability of less than 1 in 20 / 5%). It is recommended a 2400m^2 / 720m^3 flood compensation area is allowed for immediately adjacent to the Hall Brook to ensure no loss of flood plains.

British Geological Survey (BGS) maps indicate that the proposed Link Road alignment options are underlain by the Keresley Member Sandstone with 1.5m of made ground. Insitu infiltration testing and groundwater monitoring should be undertaken at the next design stage to confirm its infiltration suitability. If the sandstone is found to be unsuitable then it is recommended that allowance is made for 5m wide swales in the typical highway cross section and accommodation of a 1375m^2 1.5m deep pond adjacent to Hall Brook but outside of the floodplain. Accommodation of an attenuation pond at the eastern end of the proposed Link Road alignment options, which is the low point of the proposed alignments, should also be incorporated.

A desk study undertaken as the initial step by the ecology team identified several parcels of ancient woodland within 2km of the site between Tamworth Road and Watery Lane. A priority habitats desk study found there are 20 parcels of deciduous woodland and two parcels of traditional orchard within 1 km of the proposed Link Road alignment options between Tamworth Road and Watery Lane and 11 parcels of deciduous woodland within 1 km of Watery Lane and Central Boulevard.

An Environmental desk study identified the following constraints with all three of the proposed Link Road alignment options:

- Source Protection Zone (SPZ) – The entire route (except north of the railway line) is within a Zone 3 (total catchment). An SPZ (zone 2) has been identified along the north and middle of the current alignment and is considered an environmental constraint. This would primarily affect excavations within this SPZ and any dewatering required would require regulatory consultation.
- Railway – the private railway which connects the Coventry-Nuneaton railway line with Prologis Park was constructed as part of the construction of Coventry Colliery in the 1910s. It is expected that Made Ground will be associated with the railway and could contain contaminative sources (herbicides/pesticides, potential coal contamination from wagons) where the routes cross the railway line (if railway is not redundant) and a level crossing is constructed.

A geotechnical desk study review found the following geological risks:

- Variable rock head - The depth to competent bedrock is both variable and unpredictable due to the preferential weathering of the Keresley Member. Deeper weathering is likely to exist along a mapped fault below the western section of the alignment.
- Evidence of coal bearing strata at depth - The Keresley Member does not typically contain coal seams. However, the Coal Measures do exist at depth and have been extensively worked in the region. Two mine shafts have been identified to the north of the site as well as infilled former tailing ponds.
- Material variability in glacial deposits - Existing exploratory hole data indicates that the glacial deposits are highly variable and may lead to differential settlement and drainage issues.
- Possible pre-existing shear surfaces in glacial deposits - The possibility of pre-existing shear surfaces are anticipated and these may lead to a significantly reduced shear strength.
- Localised alluvial deposits - The alignments cross two wide depressions containing Alluvium. Alluvium can be soft and compressible and highly variable. Construction over these deposits could lead to localised settlement or stability issues if the deposits are not suitably identified and characterised.

- High groundwater - Several surface water bodies have been identified in the vicinity of the proposed Link Road alignment options and may be associated with high groundwater. High groundwater may lead to issues during construction.
- UXO – The proposed Link Road alignment options are mostly located in an area delineated as low risk to UXO. However, the corridor is located close to Coventry, a city bombed heavy during WWII, and the possibility of undocumented UXOs is considered to be high. According to the preliminary Zetica UXO risk map, much of the Link Road corridor is designated as Low Risk to UXO, with a small area designated as Medium Risk in the easternmost part of the proposed alignment options. However, as the site is near a known Luftwaffe target 1.5km to the southeast of the proposed Link Road alignment options, a detailed UXO desk study and risk assessment is recommended. Furthermore, given the site is near to a designated Luftwaffe target then additional detailed research may be necessary.

3.3. Design Options

All three proposed Link Road options follow a similar alignment due to the constraints outlined in Section 3.2 and the fixed alignment previously agreed for the SUE development. All three alignment options explored the adoption of a large 4-arm roundabout or two smaller joint 3-arm roundabouts for the connection to Tamworth Road in the west of the alignment. The alignments differ where they connect to Bennetts Road and travel east towards the connection with Central Boulevard.

The cross-sectional requirements of the link road were provided to Atkins by CCC on 7th February 2020 to be:

- 7.3m carriageway – 3.65m lanes to accommodate HGV's and buses which are expected to regularly use the route.
- 3m verges
- 0.6m allowance for hedgerows
- Fencing
- 3m shared use footway (+ vertical clearance of 1m) resulting in a 4m wide facility. The allowance for vertical clearance is based upon the assumption that both the hedge and fence are above 600mm in height. Refer to Table 7.4 in Local Transport Note 1/12.

Options 2 and 2a show a reduced cross section in the vicinity of central boulevard in order to minimise the impact on the properties to the south in this location. The cross-section on the north side of the carriageway is consistent with the rest of the scheme, the cross section to the south of the carriageway has been reduced to comprise of:

- 7.3m carriageway – 3.65m lanes to accommodate HGV's and buses which are expected to regularly use the route.
- Boundary fence
- 3m shared use footway (+ vertical clearance of 0.7m) resulting in a 3.7m wide facility. The allowance for vertical clearance is based upon the assumption that the fence is above 600mm in height and the kerb is up to 150mm in height. Refer to Table 7.4 in Local Transport Note 1/12.

It should be noted at this stage that all options have elements which are not compliant with DMRB standard and would require a Departure from Standard submission. This is to be assessed and confirmed at detailed design stage.

As part of the Keresley Link Road Multi-Disciplinary Review, an initial cost estimate was provided by Faithful & Gould for the Link Road. This estimate, that applies to Alignments 1, 2 and 2a given the similarity between the options, was **£15.49m**.

In addition to the proposed alignment options 1, 2 and 2A, two further options were not analysed further; C-KLR-1 (no link road) was not progressed from the Long List to the Shortlist, and C-KLR-2 (partial link road) features significant overlap with the proposed alignments, and as such was not assessed.

3.3.1. Option 1 (C-KLR-3):

This option (west to east) ties into Bennetts Road from a four-arm roundabout located south west of the existing Bennetts Road / Watery Lane junction (refer to Figure 3-2). The route impacts upon the properties in the south west corner of the junction and partially follows the existing alignment of Watery Lane, forming a three-arm roundabout where the existing carriageway currently takes a southern direction to facilitate the connection of the Link Road to the north east. Option1 follows the alignment of a Localised High Pressure (LHP) gas main along

Watery Lane. This option alignment also impacts upon third party land within the vicinity of the railway line. The design speed of this alignment option was agreed to be 40mph.

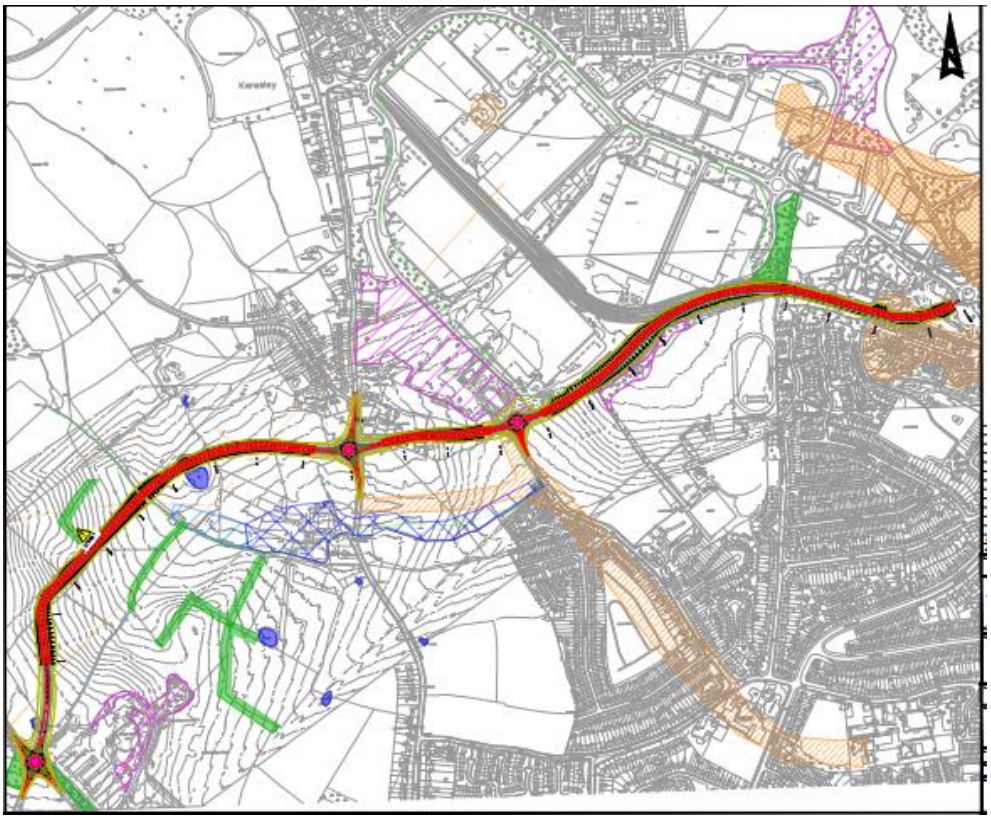

Figure 3-2 - Keresley Link Road - Option 1

3.3.2. Option 2 (C-KLR-4):

This option (west to east) ties into Bennetts Road south of the existing junction of Bennetts Road / Watery Lane to form a four-arm signalised junction, which mitigates the impact upon the properties at the existing junction of Bennetts Road/ Watery Lane (refer to Figure 3-3). The alignment heads north and crosses Watery Lane where the existing carriageway currently takes a southern direction. As this option does not follow the alignment of Watery Lane, it minimises the impact upon the LHP gas main. The design speed for this option was requested by CCC to be 30mph west of Jubilee Woods and 40mph east of Jubilee Woods.

This alignment option also impacts upon third party land within the vicinity of the railway line however, the cross section of the Link Road has been reduced in this vicinity to minimise the impact upon this third-party land.

The cross section of the Link Road in the region of Prologis Park has been reduced to remove impact with Prologis Estate Management Centre. The following geometric amendments have been made in order to achieve this:

- Horizontal alignment moved approx. 1m north;
- Vertical profile lifted approx. 0.5m;
- Verge and footpath width on the southern side has been reduced to 3.5m (3m shared use path and 0.5m separation);
- Reduced footpath cross-section has been maintained until the end tie-in with existing roundabout.

Further amendments to the cross section in this location could be explored during the next stages of the design, when topographical survey is available.

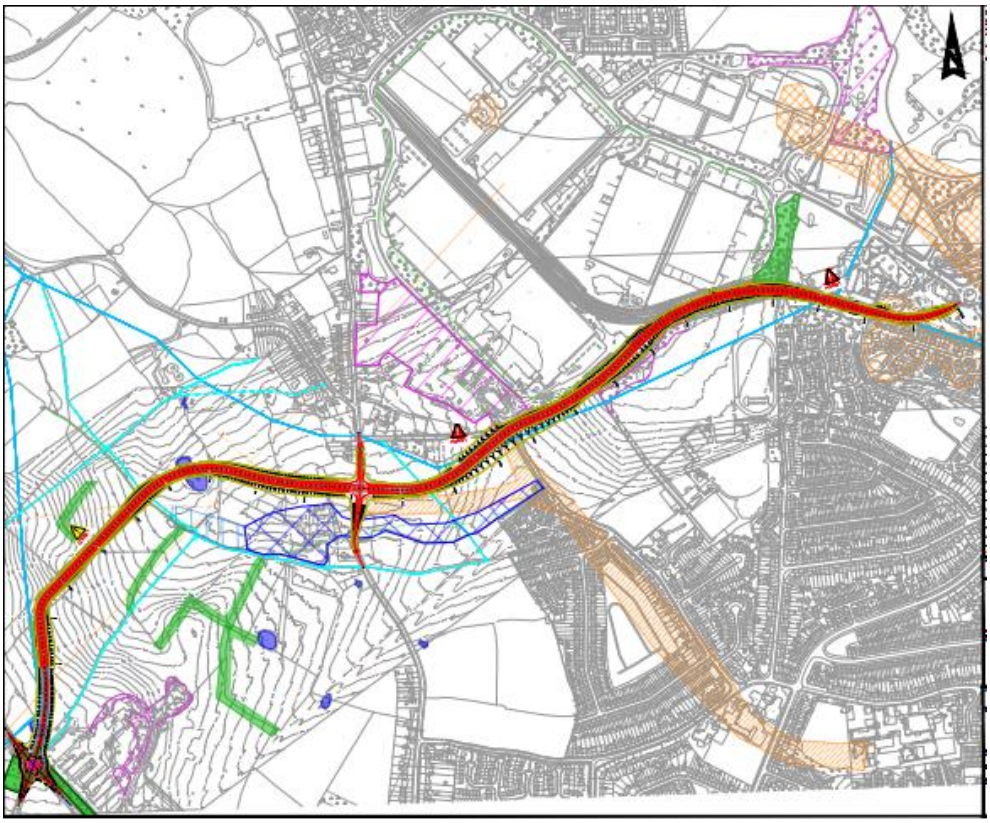

Figure 3-3 - Keresley Link Road - Option 2

3.3.3. Option 2A (C-KLR-5):

In order to remove the 'S bend' in the alignment of Option 2 in the vicinity of Watery Lane, and provide a smoother alignment for the Link Road, Option 2a was considered (refer to Figure 3-4). The alignment in this option (west to east) ties into Bennetts Road south of the existing junction of Bennetts Road / Watery Lane to form a four-arm signalised junction. The alignment heads north and crosses Watery Lane south of where the existing carriageway currently takes a southern direction. The smoother alignment of Option 2A results in the alignment impacting upon the north west section of Jubilee Woods. The design speed for this option was requested by CCC to be 30mph west of Jubilee Woods and 40mph east of Jubilee Woods.

Options 2 and 2A explore two alternative options for the junction type at Bennetts Road; a compact roundabout and a conventional roundabout. Traffic modelling will be undertaken at the next design stage to establish the preferred junction type.

The cross section of the Link Road in the region of Prologis Park has been reduced to remove impact with Prologis Estate Management Centre. The following geometric amendments have been made in order to achieve this:

- Horizontal alignment moved approx. 1m north;
- Vertical profile lifted approx. 0.5m;
- Verge and footpath width on the southern side has been reduced to 3.5m (3m shared use path and 0.5m separation);
- Reduced footpath cross-section has been maintained until the end tie-in with existing roundabout.

Further amendments to the cross section in this location could be explored during the next stages of the design, when topographical survey is available.

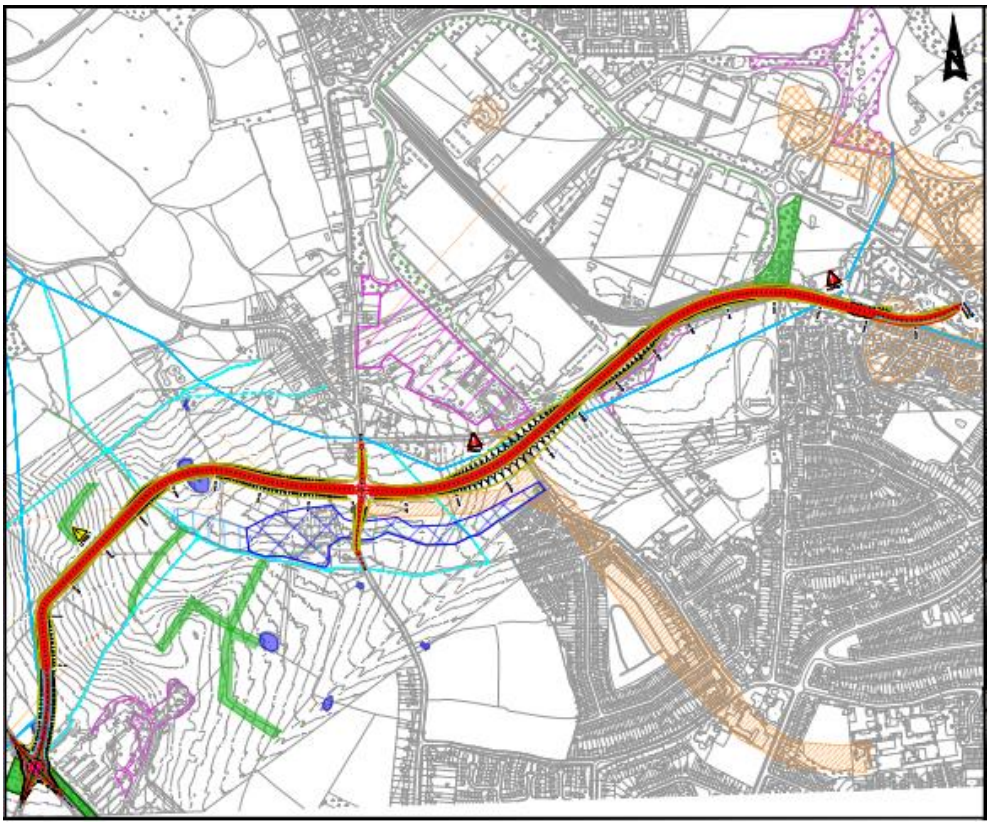

Figure 3-4 - Keresley Link Road - Option 2A

Please refer to the Keresley Link Road Multi-Discipline Review and Design Development Technical Note for more information and option alignments drawings (see Appendix A1).

3.4. RAG Summary Table

Comparison Heading	Option 1 (C-KLR-3)	Comment	Option 2 (C-KLR-4)	Comment	Option 2A (C-KLR-5)	Comment
Timescales		Impacts upon several third-party land which may extend project time scale.		Impacts upon third party land at Bennetts Road removed.		Impacts upon third party land at Bennetts Road removed.
Cost		Impacts upon LHP gas main over a large section and incorporates an additional junction. Initial cost estimate: £15.5m		Doesn't utilise existing alignment of Watery Lane. Initial cost estimate: £15.5m		Doesn't utilise existing alignment of Watery Lane. Initial cost estimate: £15.5m
Environmental Impact		Less impact upon Jubilee Woods		Less impact upon Jubilee Woods		Has a greater impact upon Jubilee Woods
Acceptability		Impacts upon more third-party land and LHP gas main over a greater distance.		Adopts an undesirable 'S-bend' in the alignment		Has a greater impact upon Jubilee Woods

The above table is a summary of the detailed comparison in the Keresley Link Road Multi-Discipline Review and Design Development Technical Note.

4. M6 Junction 3

4.1. Overview

The M6 Junction 3 is a grade separated motorway junction located over a large signalised gyratory roundabout with exits to the A444 to the north and the B4113 and A444 to the south. The gyratory is approximately 250m diameter with four lanes running throughout the gyratory. The M6 motorway has recently been upgraded to a D4 smart motorway, with east and west merge and diverge slip roads accessing the junction. The motorway passes over the gyratory with a 300m viaduct, in a series of spans on the west side, and a more traditional structure for the east side of the gyratory. Church Lane passes beneath the motorway and slip roads, through one of the spans, to the west of the gyratory.

It is assumed no further widening works on the motorway would take place, i.e. it would remain a 4-lane All-Lane Running (ALR) motorway. The volume of traffic predicted to use the slip roads is assumed to grow, however at this stage we assume that improvements would mainly focus on the gyratory and surrounding roads, and the slips would remain as two lanes plus a hard shoulder, in accordance with CD 127 Cross-sections and Headrooms.

A number of improvements have been proposed for this gyratory to improve capacity. The following options have been considered for further investigation to enhance the capacity:

- Option 1, 'J' links or hamburger link road through the junction (C-M6J3-3);
- Option 2, Segregated free-flow lanes on the gyratory (C-M6J3-4);
- Option 3, A444 tunnel under the junction (C-M6J3-5); and

An additional option considered from a design perspective, to provide extra information:

- Option 4, A444 north to south flyover (C-M6J3-6)

4.2. Environmental Constraints

A Stage 1 Environmental Review has been undertaken for the scheme area, and is shown in Appendix C. Note this review did not appraise Option C-M6J3-6, given it was not shortlisted in the previous stage of the appraisal process and has only been included in the design assessment for information. Table 4-1, below, provides a summary of the key findings of the review.

Table 4-1 - M6 J3 - Key Environmental Constraints

Topic	Constraint	Comment	Further Actions Likely Required
Air Quality	There are several sensitive receptors near the Scheme, including residential properties, places of worship, care homes and schools. Coventry AQMA is also located approximately 180m south.	Temporary impacts to air quality likely to cooccur during construction. Options C-M6J3-3, -4 and -5, may also result in changes to the current traffic flow and therefore, result in long-term changes to air quality.	As the Scheme progresses, a suitably qualified specialist is recommended to screen the Scheme against the Institute of Air Quality Management criteria to recommend the need for further assessment.
Cultural Heritage	Nine Listed Buildings and a Scheduled Monument are located between 100-300m form the Scheme area.	It is not anticipated that the current proposed options would result in direct or indirect impacts to nearby heritage assets.	As the Scheme progresses, any proposed design options should consider direct and indirect impacts to these heritage assets, including potential setting impacts from any cleared vegetation screening. HER data for both designated and non-designated historic environment assets and investigations should be purchased, in order to better understand the heritage assets in the area, including the potential for buried archaeology within the main Scheme boundary.
Landscape and Visual Effects	Visual receptors located in the wider surrounding area. Scheme located in Birmingham Greenbelt land.	Vegetation along the Scheme boundary is currently believed to be screening views of from surrounding visual receptors in the surrounding area. The landscape and visual sensitivity of the Scheme area is deemed to be low.	Vegetation clearance should be kept to a minimum and landscaping reinstatement should be considered during the design stage. One extents of vegetation clearance are better known, an arboriculturist should be consulted to determine if trees have any statutory protections and recommend any suitable RPZs.

Topic	Constraint	Comment	Further Actions Likely Required
Biodiversity	Habitats and structures within and directly adjacent to the Scheme extent have the potential to support protected species. Deciduous woodland (habitat of principal importance) located in the southern section of the roundabout and to the west of the Scheme extent.	Scheme options (particularly options C-M6J3-3, -4 and -5) have the potential to cause disturbance and destruction of protected species and their habitats. Options C-M6J3-3 and -5 would likely result in the loss of deciduous woodland, which is a habitat of principal importance.	As the Scheme progresses, Scheme options should be reviewed and the need to undertake further ecological survey and assessment should be determined. If clearance of deciduous woodland cannot be avoided, then a mitigation strategy to reinstate this lost habitat would likely be required.
Geology and Soils	The Scheme extent is underlain by a principal aquifer and within an area of high groundwater vulnerability. The presence of onsite contaminants is not known however, potential contaminants include onsite made ground, asbestos and contaminants associated with the operation of the highway e.g. coal-tar and diesel.	C-M6J3-5, which proposes tunnelling under the currently junction alignment, would likely result in the greatest increased risk to groundwaters.	As the Scheme progresses, input from a suitably qualified specialist should be sought, to prepare a scope for further detailed assessments where necessary e.g. Phase 1 ground survey and ground water risk assessment.
Material Assets and Waste	The proposed Scheme will likely result in the generation of CDEW. There is also potential for hazardous waste to be generated.	Options C-M6J3-3, -4 and -5 would likely require greatest material use and generate largest waste streams.	It is recommended that further assessment is undertaken as early as possible to more accurately estimate the types and quantities of potential waste arisings, and consideration as to how these will be managed.
Noise and Vibration	Three NIAs within the Scheme extent. Number of receptors sensitive to noise and vibration within the surrounding area.	Options C-M6J3-3, -4 and -5 would likely result in the greatest impacts.	As the Scheme progresses and more detail on the Scheme and construction methodology is known, then proposed Scheme should be reviewed by a noise specialist, to determine if a noise impact assessment would be required and where necessary and to liaise with the local EHO.

Topic	Constraint	Comment	Further Actions Likely Required
Population and Human Health	Several residential areas, community assets and businesses within surrounding area. Number of PRoW surrounding the Scheme extent.	Temporary disruption anticipated during construction, which will be managed by principal contractor.	During the design, land ownership records should be checked to ensure the correct permissions are obtained where necessary, to access land parcels and complete works associated with the proposed Scheme
Road Drainage and the Water Environment	Breach Brook, which is a designated main river, passes beneath the M6 to the east at J3. The Scheme is primarily located within in Flood Zone 1 however, areas of flood zone 2 & 3 and flood defences are in place around Breach Brook. The Scheme area is underlain by a principal aquifer within high groundwater vulnerability.	Scheme options not anticipated to directly alter surface water. Options C-M6J3-3, -4 and -5 are likely to require the need for increases in impermeable surface are, so may result in changes to drainage and flood risk.	As the Scheme progresses, further assessment relating to flood risk and groundwater protection may be required.

4.3. Design Options

Eight options were featured on the Long List to improve capacity around the M6 Junction 3. Three of these options, which were shortlisted as feature significant expected infrastructure, have been analysed in more detail by the Highway Engineering team; C-M6J3-3, C-M6J3-4, C-M6J3-5 as detailed below. One option, C-M6J3-6, was not shortlisted, but has been presented here for information.

The remaining four options C-M6J3-1 (no improvement), C-M6J3-2 (Optimise Traffic Signals), C-M6J3-7 (removal of B4113 link interchange) and C-M6J3-8 (signal and lane allocation changes) have not been analysed further by the Highway Engineering team either because they were not shortlisted or would not feature significant physical infrastructure.

4.3.1. Option 1 (C-M6J3-3) - 'J' links and Hamburger arrangement

A 'J' link or 'hamburger' type 'through' link would be feasible at this junction, and could relieve queuing within sectors of the circulatory, but would not relieve the junction entirely. There is a generous amount of space within the gyratory to provide a link, although part of this is currently being used as a compound for material storage to the south of the motorway.

J Links

J links under the motorway, passing through one of the viaduct spans would be possible in any of the following areas;

- M6 Eastbound (EB) diverge slip to A444 Southbound (SB)
- A444 SB to M6 EB merge slip
- M6 Westbound (WB) diverge to A444 NB
- A444 NB to M6 WB merge slip.

Only one or possibly two J links options could be provided simultaneously, as they would not be able to cross one another, as such the A444 NB to M6 EB in combination with A444 SB to M6 WB merge may be possible (see Figure 4-1), but this would need to be checked in detail to determine if the spans in the viaduct make this scenario possible. The J link carriageway would consist of 2 standard lane widths.

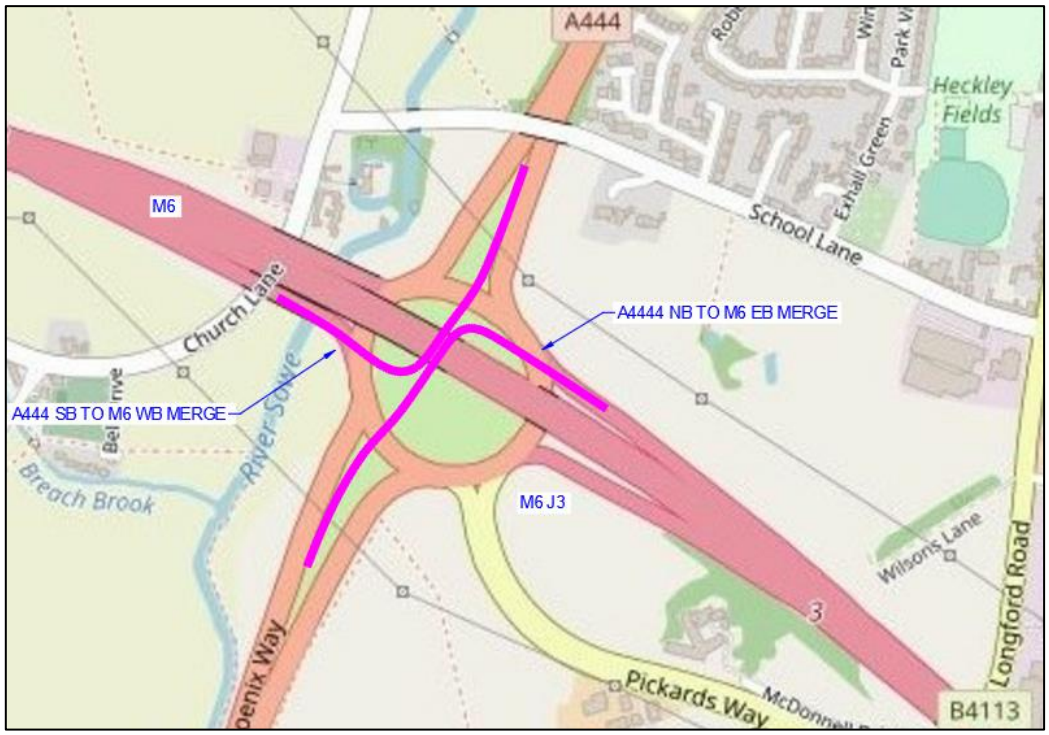

Figure 4-1 - Option 1 A444 North Bound to M6 East Bound merge and A444 South Bound to M6 West Bound merge Sketch

Figure 4-2 – Option 1 M6 East Bound Diverge to A444 South Bound Only

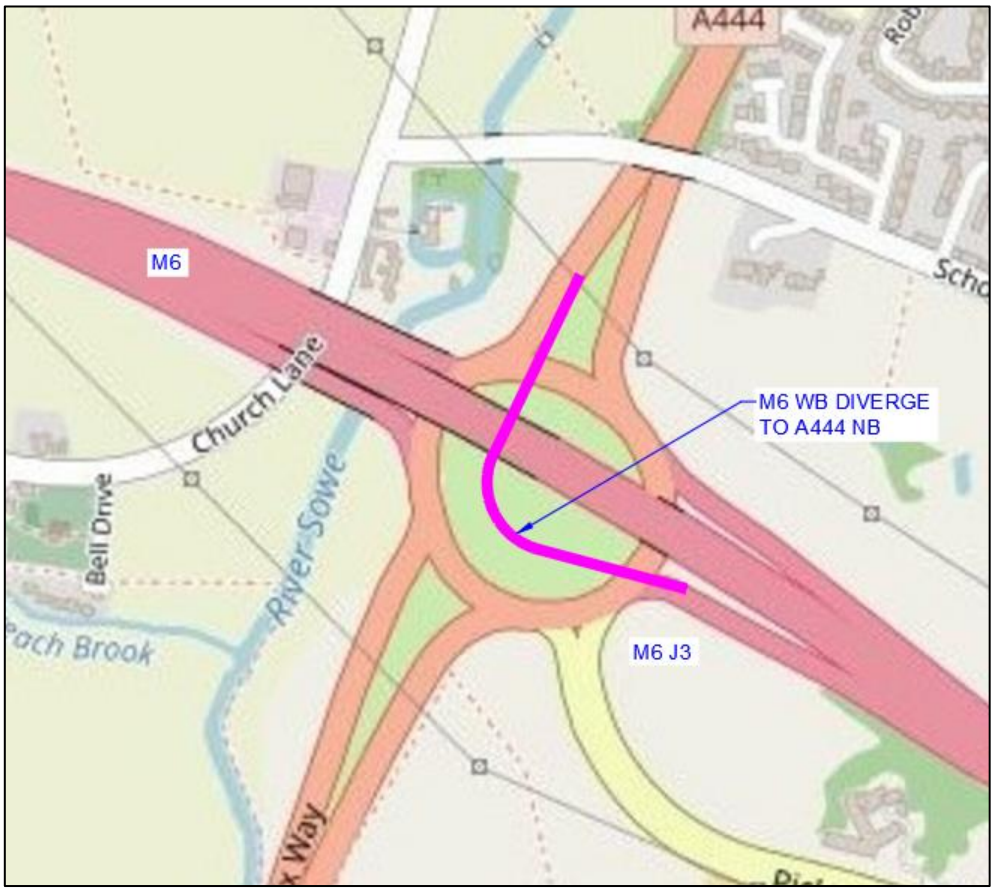

Figure 4-3 – Option 1 M6 West Bound Diverge to A444 Northbound Only

Hamburger or Through links

These would pass under the motorway between the A444 north and southbound carriageways. The links would commence from the offside of the A444 carriageway using the available space between the north and southbound carriageways as they approach the gyratory, and would consist of two-lane carriageways with additional signalisation at the gyratory. The existing A444 lanes would need to be re-configured to tie back into the through lanes to the north and south, merging back in on the nearside.

The through link would cut though the centre of the compound within the gyratory, but there could be space to re-configure this compound. The levels and spans would appear to make these feasible options, using orthodox road construction, but would need to be checked in more detail to ensure that the spans and levels are suitable.

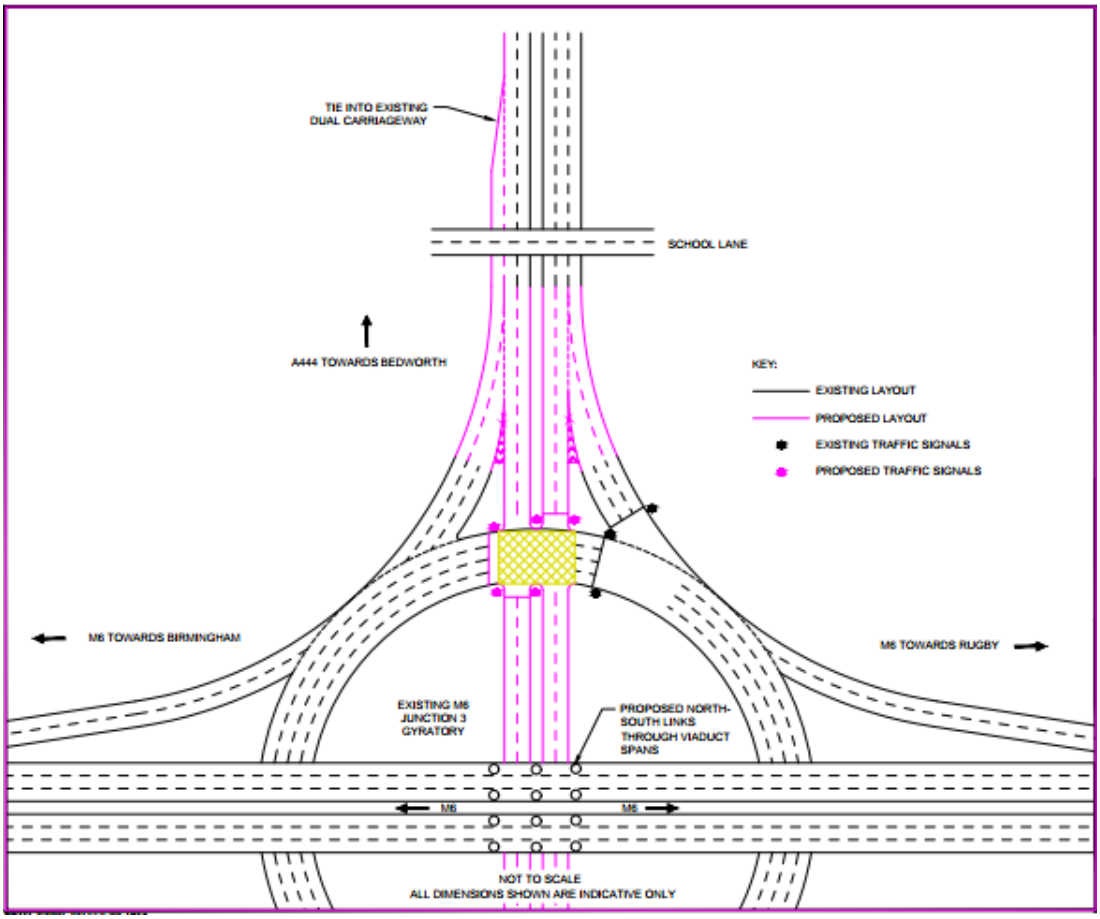

Figure 4-4 - Option 1 (C-M6J3-3) Through Link Schematic (J3 north side)

4.3.2. Option 2 (C-M6J3-4) - Free-flow lanes on the gyratory

The provision of a free-flow lane on the approach to the gyratory would relieve some of the traffic at the roundabout and the viability of each of the slip road options is provided below (refer to Figure 4-5). The tapers would be designed to CD116 Geometric design of roundabouts. The layout of the junction, slip roads and tapers would have been modified to align with the smart motorway layout, however this would not preclude the implementation of free-flow lanes, where suitable.

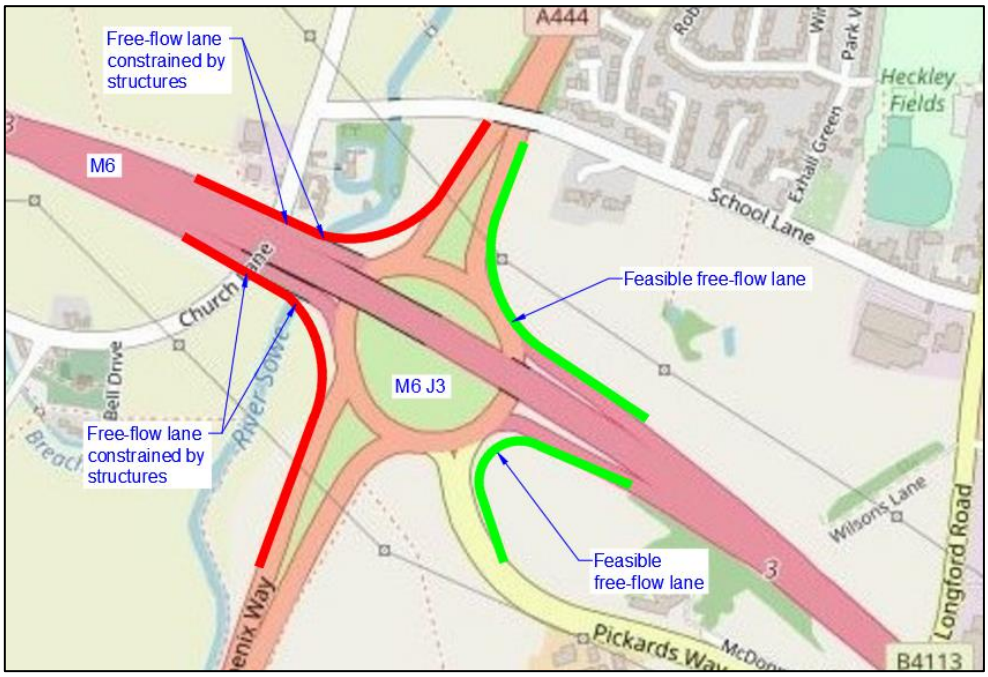

Figure 4-5 - Option 2 (C-M6J3-4) Sketch

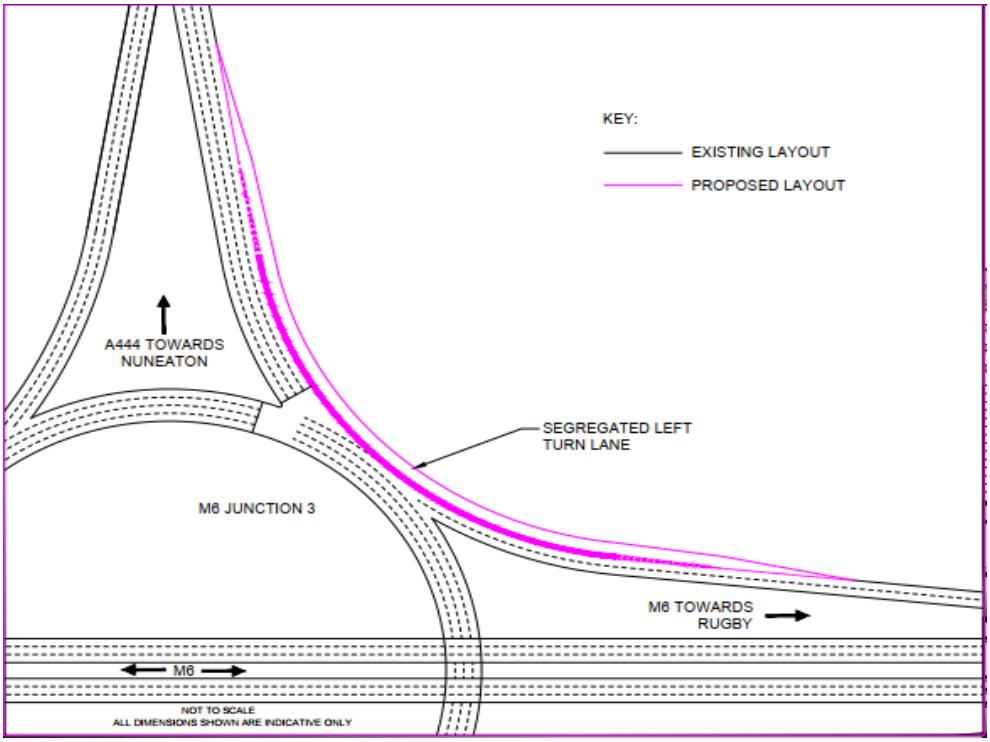

Figure 4-6 - Option 2 (C-M6J3-4) Free-flow Schematic

To the north-east of the junction, a free-flow lane between the A444 southbound and the M6 eastbound merge slip is feasible and may achieve some benefits. An overhead pylon is located close to this corner of the junction and this would need to be assessed to ensure that adequate clearance and protection can be provided to the pylon base.

Options on the west side of the gyratory are constrained by the motorway viaduct structure and the separate slip road structures which would limit the extents of the free flow diverge and merge lanes. The provision of free flow lanes is also constrained by properties on Church Lane to the north of the junction. The existing slip road

structures over the River Sowe would require extending so that the merge lane could tie into the slip road carriageways.

A free-flow diverge to the B4113 maybe possible but it offers limited benefits in terms of easing congestion. A free flow to A444 southbound would not be possible due to the location of the B4113.

Taking into account the constraints of the west side of the junction, it is likely that the A444 SB link to the M6 EB merge slip would be the most feasible, and easiest free-flow lane to construct and could provide some limited benefit to traffic at the junction.

4.3.3. Option 3 (C-M6J3-5) - A444 Tunnel

Figure 4-7 - Option 3 (C-M6J3-5) Sketch

To relieve some of the traffic on the A444 from the gyratory, the north and southbound traffic could pass beneath the gyratory on both sides of the junction with the remaining lanes using the circulatory as existing. The north-south link would diverge from the offside of the existing A444 with two lanes travelling in both directions. The remaining lanes would merge back into the new link on the nearside to the north and south of J3 (refer to Figure 4-7). The tunnelled lanes would need to diverge from the A444 a minimum of 250m from the tunnel portal in order to create the required level difference. This distance would be available on the south side of J3 however, the School Lane overbridge constrains the north side, and this would need to be re-constructed, or diverted, to enable the tie-in to be configured.

The tunnel would need to extend the full length of the gyratory, descending to approximately 8m beneath the circulatory, and climbing down further to ensure that the tunnel would not impact upon the viaduct foundations. Construction would either be a bored tunnel, or possibly a cut and cover with diaphragm walls, capped upon completion. A further option could be to construct a separate motorway structure offline, spanning the equivalent

of three existing spans. This could be cut into and replace an equivalent length of motorway to provide a wider span in which to construct the tunnel.

The presence of the River Sowe west of the roundabout also suggests that there is a high-water table and has been identified by the Environmental Agency as an area that is prone to flooding. Consequently, boring for the tunnel may require pumping within the vicinity of the retained earthworks which could compromise the stability of the ground. Further analysis of the surrounding geology will need to be undertaken to determine the risk of undermining the foundations.

Although all these options are technically feasible, they would present severe challenges in terms of buildability, costs, disruption to the existing network and create assets that would require significant long-term maintenance. It should be noted that the cost of tunnel maintenance can exceed construction costs. Detailed investigation would need to be carried out to determine whether the accrued benefits justify the costs and disruption.

4.3.4. *Alternative:* Option 4 (C-M6J3-6) – A444 Flyover

The route for flyover options would either be directly though the centre of the gyratory or separate carriageways taken either side of the junction (refer to Figure 4-8). In either case, it would contain a significant number of constraints, in particular the linear length required to achieve the vertical clearance over the M6 Motorway viaduct as well as substantial construction costs.

For any new structure, it would be desirable to span the entire motorway without the need for support within the central reserve as the existing central reserve would not be wide enough to accommodate a pier, and additionally working within a live motorway would pose a hazard to construction and maintenance workers.

A bridge over the motorway would also create challenges with levels at it would need to rise up a minimum of 16m above the gyratory in order to provide adequate headroom over the motorway, and then descend to tie back into the A444. The approach ramps needed to rise up from the A444 to cross over the motorway would exceed 400m in length on either side. On the north side, School Lane overbridge would constrain the tie-in of the alignment back into the A444 and would need to be re-built or relocated.

Lines of high voltage overhead pylons are located to the north and south of the junction, which would clash directly with any of the flyover options and would need to be diverted as part of the works. Options routing the north-south flow would likely require separate flyovers to the east and west of the junction, to avoid the need for further crossover structures at the tie-ins to the north and south. The southbound flyover would likely require the loss of properties to the corner plots within Bedworth close to School Lane, which itself would require diversion.

In addition to the severe physical constraints to construction, and excessive costs incurred, all the flyover options would provide severe noise and visual intrusions to the surrounding residential areas. It is therefore not likely to be considered as a viable option to be taken forward.

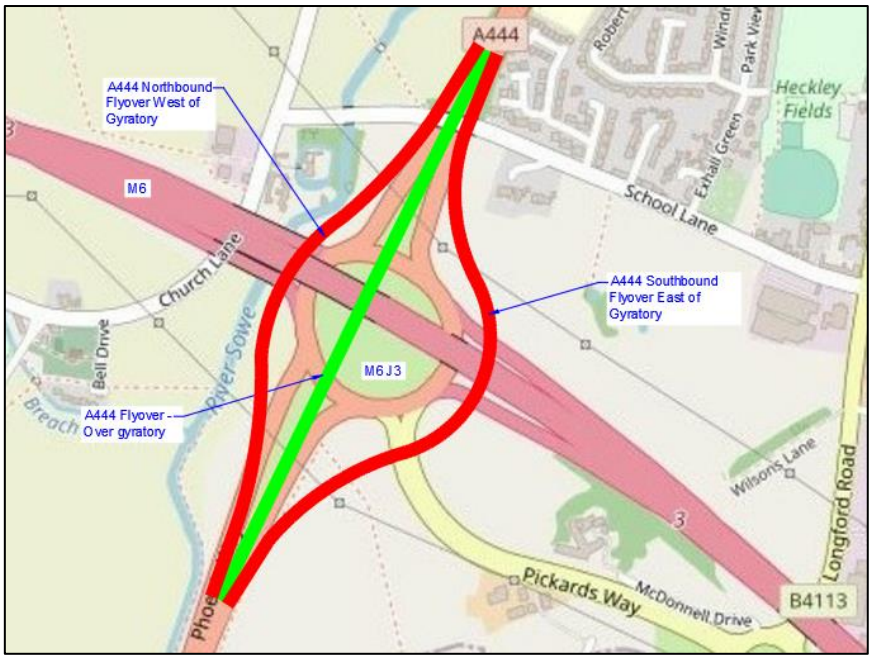

Figure 4-8 - Option 4 (C-M6J3-6) Sketch

4.4. RAG Summary Table

Comparison Heading	Option 1 (C-M6J3-3)	Comment	Option 2 (C-M6J3-4)	Comment	Option 3 (C-M6J3-5)	Comment	*Alternative:* Option 4 (C-M6J3-6)	Comment
Timescales		Within highway boundary		Adjacent land required		Complex construction, but within highway boundaries		Complex construction, some land acquisition
Cost		Orthodox road construction		Costs associated with widening existing slip roads structures.		Lifetime operation and maintenance may exceed construction costs.		Lifetime operation and maintenance may exceed construction costs. Pylons diversions
Environmental Impact		Some impact upon existing vegetation and screening within gyratory		NW of J3 – widening in vicinity of structures. River Sowe.		Tunnel would be located within area prone to flooding		Significant impact caused by construction, noise and visual intrusion
Acceptability		Proposal within footprint of existing gyratory. Impact upon existing compound within gyratory		A444 SB to M6 EB merge most feasible.		Very high cost to construct and maintain		Very high construction costs, loss of property and disruption

5. New M6 Junction 3 West

5.1. Overview

Options for a new junction on the M6 are focussed on Corley Services, as well as other locations further to the west. The M6 motorway has recently been upgraded to a D4 All Lane Running (ALR) smart motorway and the slip accesses in/out of Corley Services have also been modified to tie-in to the new lane 1. As the Keresley Link Road would not be able to function as an orbital route if the Keresley Sustainable Urban Extension was developed, the intention of a new motorway junction would be to create a link road between the A45 and the M6.

The following options have been considered for the development of a new junction to the west of the existing J3:

- M6 motorway re-using Corley Services as a junction (Option 1- S-NM6J-1), refer to Figure 5-1;
- M6 motorway / West of Corley Services / B4098 Tamworth Road (Option 2 - S-NM6J-2) refer to Figure 5-3;
- M6 motorway / West of Corley Services / B40102 Meriden Road (Option 3 - S-NM6J-3), refer to Figure 5-5; and
- M6 motorway / West of Corley Services / Greenfield Site (Option 4 - S-NM6J-4), refer to Figure 5-7.

In addition, there are two options featuring a Link road between the new junction and proposed Eastern Green junction of the A45 (S-NM6J-5) and a Link road between the new junction and A45 at Meriden (S-NM6J-6).

The scale of the proposed junction would need to be assessed using the predicted traffic flows, but it is likely that the slip roads would require two lanes and the link road across the M6 would need to be two lanes in each direction. Four options have been considered as outlined below; note, the preferred options identified would need detailed study and liaison with Highways England to confirm their acceptability. Any new junctions on the Strategic Road Network will require Secretary of State approval.

The new junction would connect traffic from the M6 towards to the A45 directly, and there is potential for a significant proportion of traffic heading towards Birmingham to use this route instead. The precise route shown in the four options between the M6 and the A45 are indicative only. These routes would be determined after many phases of optioneering and consultation, as there are numerous constraints along the route including overhead pylons, dense woodland and residential areas.

The M6 to A45 link would be assumed to be to expressway standard, i.e. dual two-lane carriageway to national speed limit, with the horizontal and vertical alignments conforming to appropriate high speed standards. The link would only contain one interim grade separated junction – a connection to the B4098 Tamworth Road, if feasible, with bridges over and under the remaining side roads.

The tie-in to the A45 would link up with a proposed development (Eastern Green SUE) to the south of the A45 at Pickford Green. The junction, linking two dual carriageways as well the large residential and commercial development, would need to be a full grade separate junction, with either a dumb-bell roundabout or two-bridge gyratory over the A45 carriageway.

5.2. Environmental Constraints

A Stage 1 Environmental Review has been undertaken for the scheme area, and is shown in Appendix D. Table 5-1, below, provides a summary of the key findings of the review.

Table 5-1 - New M6 Junction - Key Environmental Constraints

Topic	Constraint	Comment	Further Actions Likely Required
Air Quality	Coventry City-Wide Air Quality Management Area (AQMA) is located to the south west, which partially covers the Scheme options. There are multiple sensitive receptors in immediate/close proximity to the Scheme, including residential properties, places of worship and places of leisure.	Temporary impacts to air quality likely to cooccur during construction. The introduction of a new link road will likely result in changes to the current traffic flow and therefore, result in long-term changes to air quality.	As the Scheme progresses, a suitably qualified specialist is recommended to screen the Scheme against the Institute of Air Quality Management criteria to recommend the need for further assessment.
Cultural Heritage	All Scheme options are in close proximity (within 300m) to several designated heritage assets, including listed buildings. There is increased potential for unknown buried archaeology to be present in the undeveloped agricultural land parcels required for the link roads.	Scheme works may result in direct or indirect impacts to nearby heritage assets.	As the Scheme progresses, any proposed design options should consider direct and indirect impacts to these heritage assets, including potential setting impacts from any cleared vegetation screening. HER data for both designated and non-designated historic environment assets and investigations should be purchased, in order to better understand the heritage assets in the area, including the potential for buried archaeology within the main Scheme boundary
Landscape and Visual Effects	Visual receptors located in the wider surrounding area. The land within the area of proposed links roads, is primarily made up of undeveloped agricultural land.	The Scheme would likely change the character of the local landscape through the introduction of new and altered structures and infrastructure, and topographical changes. Requirements for vegetation clearance would further result in impacts on landscape and visual amenity.	The Scheme is likely to require appropriate landscape mitigation proposals to be included within an Environmental Master Plan. Vegetation clearance should be kept to a minimum and landscaping reinstatement should be considered during the design stage. One extents of vegetation clearance are better known, an arboriculturist should be consulted to determine if trees have any statutory protections and recommend any suitable RPZs. The need for further LVIA should also be considered and undertaken as necessary.

Topic	Constraint	Comment	Further Actions Likely Required
Biodiversity	There are several areas of ancient and deciduous woodland within the immediate vicinity of the proposed link roads. Habitats and structures within and directly adjacent to the Scheme extent have the potential to support protected species.	The Scheme has the potential to cause disturbance and destruction of protected species and their habitats. The introduction of a new link road would likely result in the loss of ancient and deciduous woodland (habitat of principal importance). The loss of ancient woodland would be considered as a major adverse effect, which is significant in EIA terms and cannot be mitigated.	The Scheme is likely to require appropriate ecological mitigation proposals to be included within and Environmental Masterplan to be developed through the design stages to carefully consider a strategy to mitigate any predicted biodiversity effects on sensitive receptors. As the Scheme progresses, Scheme options should be reviewed and further ecological survey and assessment should be undertaken as necessary. If clearance of woodlands cannot be avoided, then a mitigation strategy to reinstate this lost habitat would likely be required.
Geology and Soils	The Scheme extent is underlain by a Principal Aquifer and within an area of medium-high groundwater vulnerability. The wider area has been classified as moderate-good agricultural land. There are two historic landfill sites located within the search area of option S-NM6J-6. The presence of onsite contaminants is not known however, potential contaminants include onsite made ground, asbestos and contaminants associated with the operation of the highway e.g. coal-tar and diesel and historic landfill sites.	The Scheme could introduce increased risk to groundwater quality. There is potential to impacts to soil quality as a resource if undeveloped agricultural land is used.	As the Scheme progresses, input from a suitably qualified specialist should be sought, to prepare a scope for further detailed assessments where necessary e.g. Phase 1 ground survey and ground water risk assessment.

Topic	Constraint	Comment	Further Actions Likely Required
Materials Assets and Waste	The proposed Scheme will likely result in the generation of CDEW. There is also potential for hazardous waste to be generated.	The introduction of a new link road would likely require greatest material use and generate largest waste streams.	It is recommended that further assessment is undertaken as early as possible to more accurately estimate the types and quantities of potential waste arisings, and consideration as to how these will be managed. Impacts arising from material use and waste should be mitigated through good design and construction / demolition good practices.
Noise and Vibration	Two NIAs are within the Scheme extent. Multiple receptors sensitive to noise and vibration within the surrounding area.	The introduction of S-NM6J-3 and S-NM6J-6 would have the greatest impacts due to the close proximity of NIAs.	As the Scheme progresses and more detail on the Scheme and construction methodology is known, then proposed Scheme should be reviewed by a noise specialist, to determine the scope for further noise assessment and inform appropriate mitigation measures, such as noise barriers or low noise surfacing, if required. It is likely that detailed noise modelling would be required to predict the noise levels generated by the scheme during operation.
Population and Human Health	Several residential areas, community assets and businesses within surrounding area. Number of PRoW surrounding the Scheme extent.	Temporary disruption anticipated during construction, which would be managed by principal contractor. Additional land take required for the link roads may result in negative impacts to local community, particularly if new infrastructure is positioned in close proximity to receptors and significantly impacts on the surrounding local environment.	During the design, appropriate stakeholder consultations should be undertaken, and land ownership records should be checked to ensure the correct permissions are obtained where necessary, to access land parcels and complete works associated with the proposed Scheme

Topic	Constraint	Comment	Further Actions Likely Required
Road Drainage and the Water Environment	There are three main watercourses within the Scheme search areas. The Scheme is primarily located within in Flood Zone 1 however, areas of Flood Zone 2 and 3 exist within the search area of S-NM6J-1, S-NM6J-4 and S-NM6J-5. The Scheme area is underlain by a Principal Aquifer within medium-high groundwater vulnerability.	N/A	As the Scheme progresses, once more detail on the design options and potential construction methodology is known, a suitably qualified specialist should review preferred options to determine the scope of further assessment including Flood Risk Assessment and consultation with the EA.

5.3. Design Options

Atkins identified six potential options for the new M6 junction, encompassing four different options for new junctions, plus two alternative alignments of a link road between the new junction and the A45; either connecting the proposed Eastern Green junction of the A45 (S-NM6J-5) or a link road between the new junction and A45 at Meriden (S-NM6J-6).

5.3.1. Option 1 (S-NM6J-1) - Re-using Corley Services as a junction

A new junction to the east of the existing Corley Services would be constrained by the close succession of the west facing slip roads at J3, which would produce below standard weaving distances between the two junctions. Furthermore, the slips on the west side of a J3W junction would clash with the existing Corley Services. The slip roads to the Services, and part of the services buildings would need to be re-configured to suit the new junction.

The existing slip roads lead directly into the Services only and would not be of a suitable standard to cater as a motorway grade separated junction, in addition to the difficulty in siting a junction and link road within the Services compound (refer to Figure 5-1 and Figure 5-2). To locate a junction on the site of the existing Services would require a complete re-modelling of the slip roads, side roads, buildings and compounds.

Due to the cost and complexity of the above variants to Corley Services, these option locations have been omitted.

There is greater scope to provide a new junction immediately west of Corley Services creating a link between the A45 Birmingham Road, towards the proposed Eastern Green SUE.

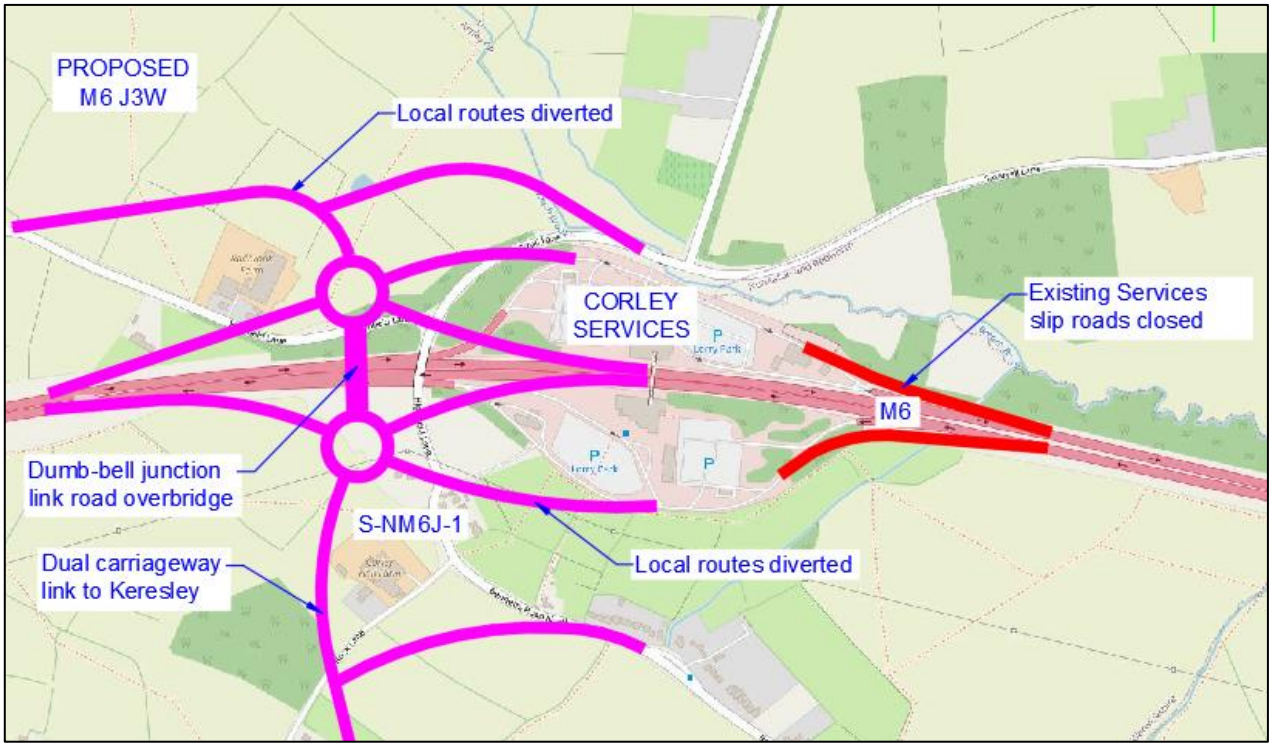

Figure 5-1 - Option 1 - (S-NM6J-1) M6 J3W at Corley Services

A junction to the west of Corley Services would avoid issues with weaving to J3, but the slip roads and access roads through the Services would need to be re-configured to suit. A dumb-bell roundabout or gyratory junction could be constructed with arms leading directly into the Services, and therefore the existing Services slip roads would be stopped up. Smorrall Lane would need to be diverted with some loss of property likely in this scenario.

The advantage of utilising Corley Services as a junction, compared to providing a separate junction, is that it prevents the creation of an additional node on the M6 and it does not impact the required weaving lengths for the slip roads proposed at this junction.

Corley Services Junction to A45 Pickford Green

Between the M6 and A45 junctions, a grade separated junction would be required to connect the B4098 Tamworth Road onto the proposed link road. This would likely be a compact junction due to the status of the connecting minor road. No connection would be required for the remainder of the link and bridges would be required where the proposed link road crosses the local roads. The alignment shown in Figure 5-2 stays to the east of the pylons before crossing to the west side to tie into the proposed junction on the A45 at Pickford Green.

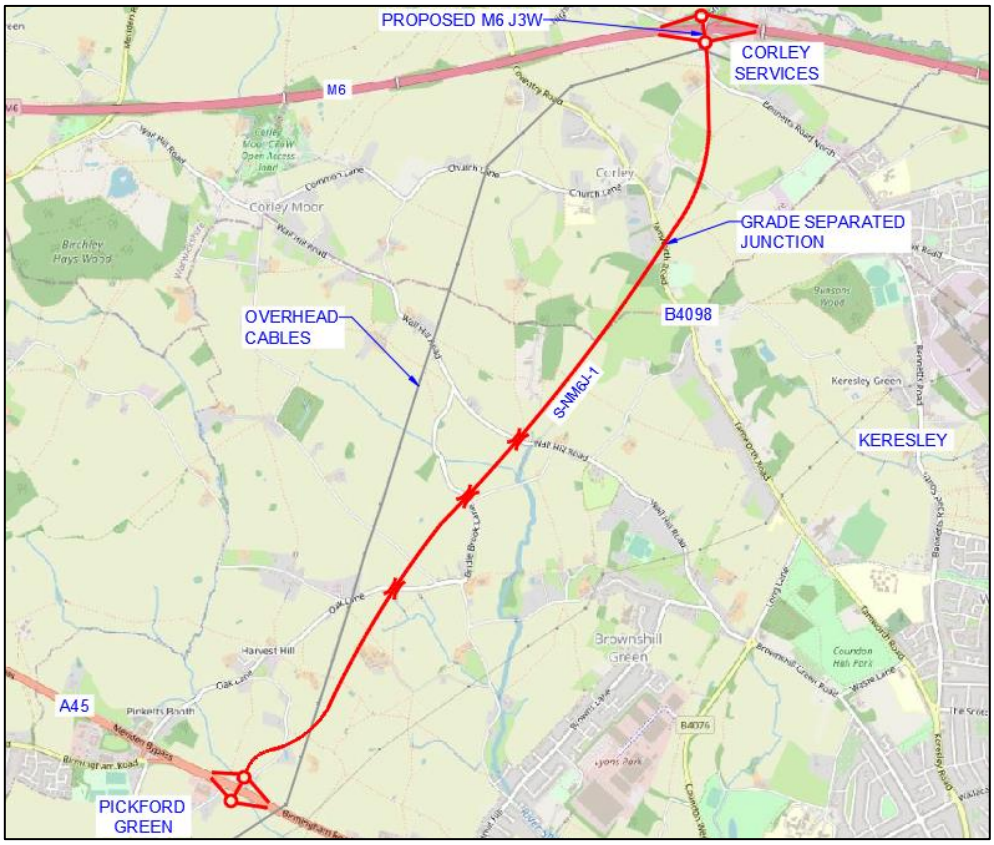

Figure 5-2 - Option 1 (S-NM6J-1)- Route from Corley Services Junction to A45

5.3.2. Option 2 (S-NM6J-2) – M6 / B4098 Tamworth Road / West of Corley Services

A new motorway junction using the existing B4098 underbridge would lie in close proximity (approximately 1km) to the existing Corley Services. Proposals for a new junction here would result in substandard weaving distances between the proposed east facing slips of the new junction and the west facing slips of the Services (refer to Figure 5-3) The new west facing slip roads would clash with the M299 accommodation bridge 0.5km west of the proposed junction location and would need to be rebuilt to span over the wider span carriageway, or alternatively diverted.

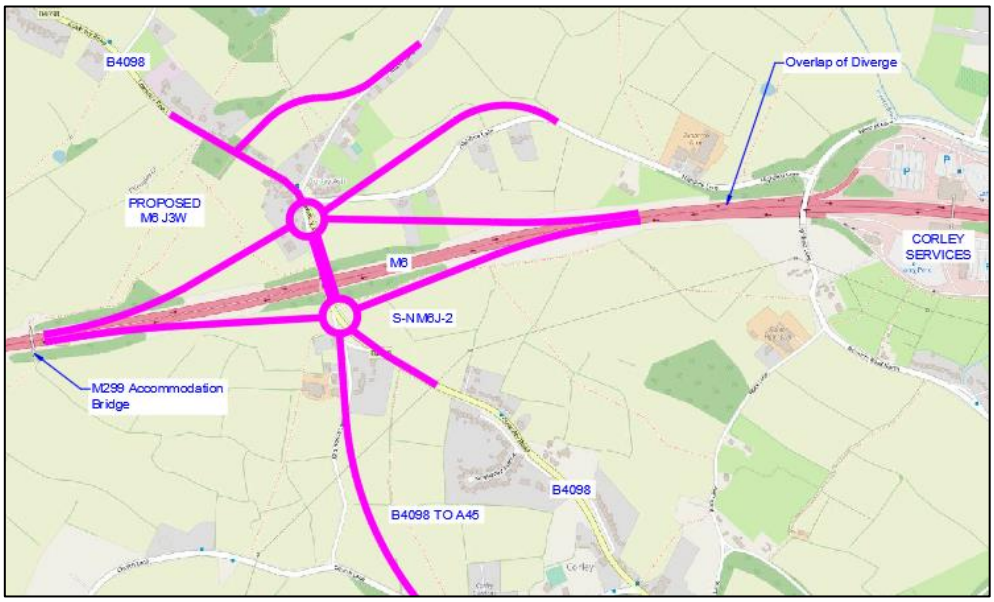

Figure 5-3 - Option 2 M6 J3W at B4098 Sketch

The existing B4098 passes beneath the M6 with a single carriageway, and although there is scope to add a dumb-bell roundabout either side of the motorway, the single carriageway link is unlikely to be of sufficient capacity to cater as a motorway junction. Similarly, the local roads on either side of the motorway would require significant remodelling and impacts upon the small community in the vicinity. A separate underpass running parallel to the existing underbridge would be required to provide the required capacity at the junction, however, this in turn would create further impacts upon the local roads and communities either side of the motorway, resulting in some loss of property.

B4098 Tamworth Road to A45 Pickford Green

A new dual carriageway will need to be provided towards the A45 Birmingham Road in Pickford Green (Eastern Green SUE) from the proposed M6 J3W (refer to Figure 5-4). A corridor is feasible as the majority of this route crosses through greenfield land however there is a risk that some dwellings, woodlands and communities maybe impacted along this route. Further investigation is required to determine the optimum alignment between M6 J3W and the A45 Birmingham Road.

A new link road to the A45 would start from the proposed M6 junction and route south towards Wall Hill Road and onwards to Pickford Green. The majority of a corridor towards Pickford Green from the B4098 could be located on the western side of the overhead HV powerline which runs in a southerly direction between the M6 and A45. The corridor will need to cross beneath the route of the powerline on the northbound approach to the M6. Bridges will be required where the proposed link road crosses the local roads.

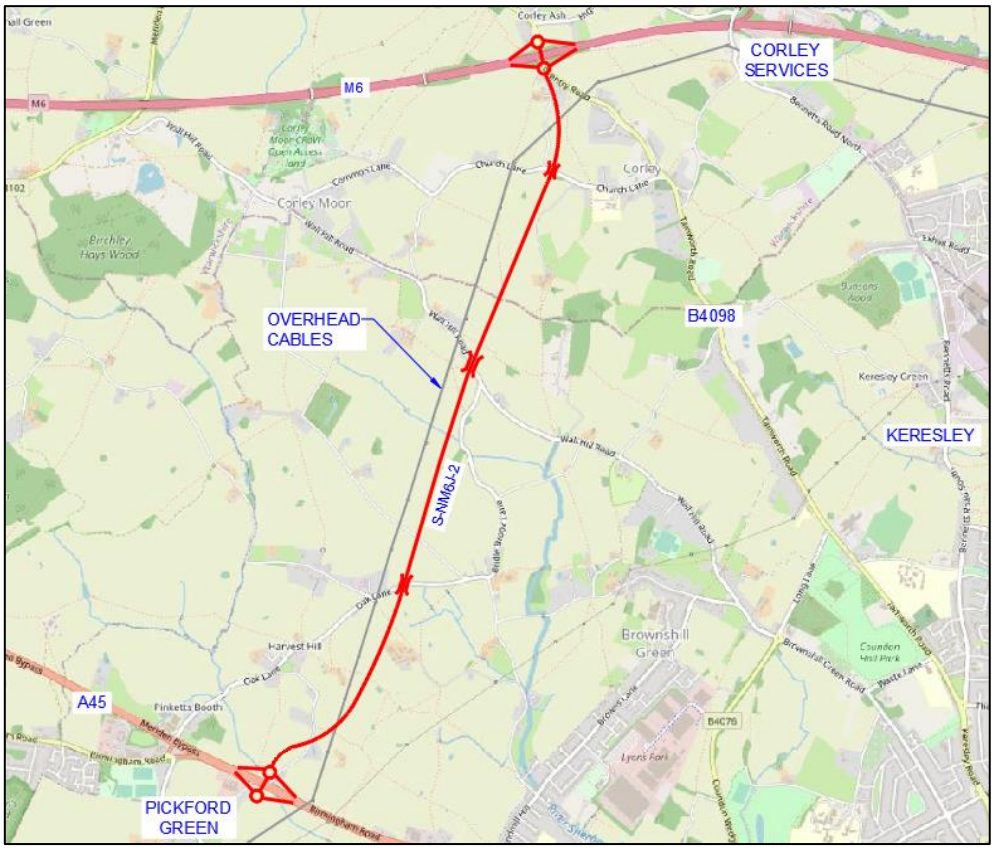

Figure 5-4 - Link Road from B4098 Junction to A45

The sub-standard weaving length on the M6, single carriageway underbridge and impact upon the local communities present onerous constraints which make this option an undesirable location for a new junction, and therefore this option would not be taken forward for further development.

5.3.3. Option 3 (S-NM6J-3) – M6 / B4102 Meriden Road / West of Corley Services

Similarly to Option 2, a new junction at the location of the M6 overbridge that crosses the B4102 Meriden Road would immediately impact upon properties and places of interest in the vicinity (refer to Figure 5-5 and Figure 5-6). The current alignment of the B4102 Meriden Road is heavily skewed with only a single carriageway passing beneath the motorway. As per Option 2, it is unlikely to be of sufficient capacity to cater for a motorway junction and the predicted traffic. The construction of a dumb-bell roundabout either side of the motorway on the B4102 would have a detrimental impact upon the local community with the loss of numerous properties required to accommodate the junction. Significant remodelling of the local highway network would be required, possibly with the construction of an additional parallel bridge to cater for the predicted traffic.

This option would have potential impacts upon the existing infrastructure and properties (including Grade II listed buildings) on the B4102 Meriden Road, Wall Hill Road, the Heart of England Conference Centre and Old Hall Farm Cottage in the vicinity of the proposed junction.

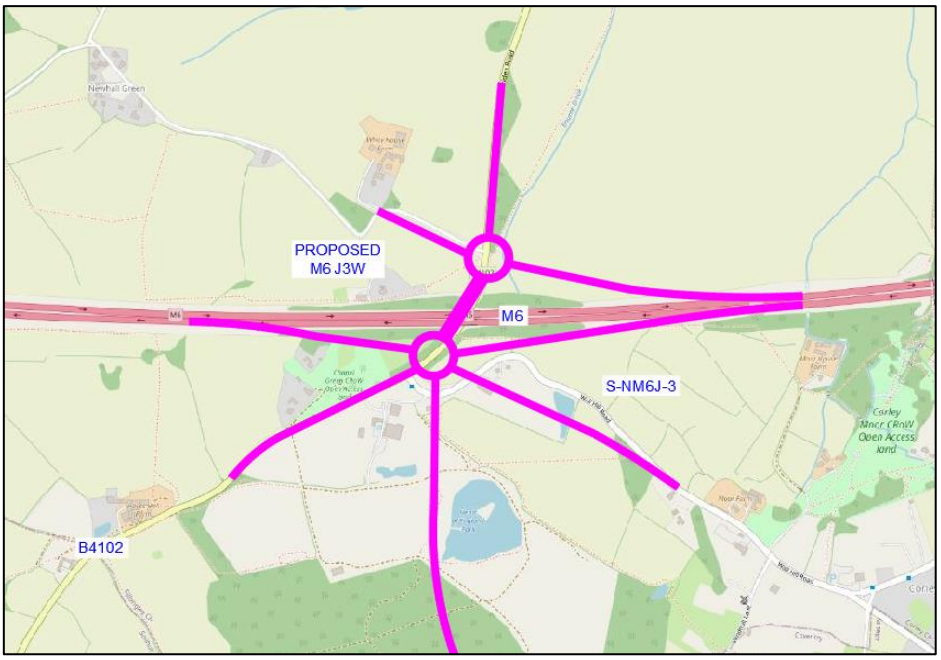

Figure 5-5 - Option 3 B4102 online upgrade and A45 junction

B4102 to A45 Pickford Green

A new link will need to be provided towards the A45 Birmingham Road in Pickford Green (Eastern Green SUE) from the proposed M6 J3W. A corridor is feasible, using desirable minimum alignment geometry, as the majority of this route crosses through greenfield land however there is a risk that several properties would be affected along this route. Further investigation is required to determine the alignment between M6 J3W and the A45 Birmingham Road.

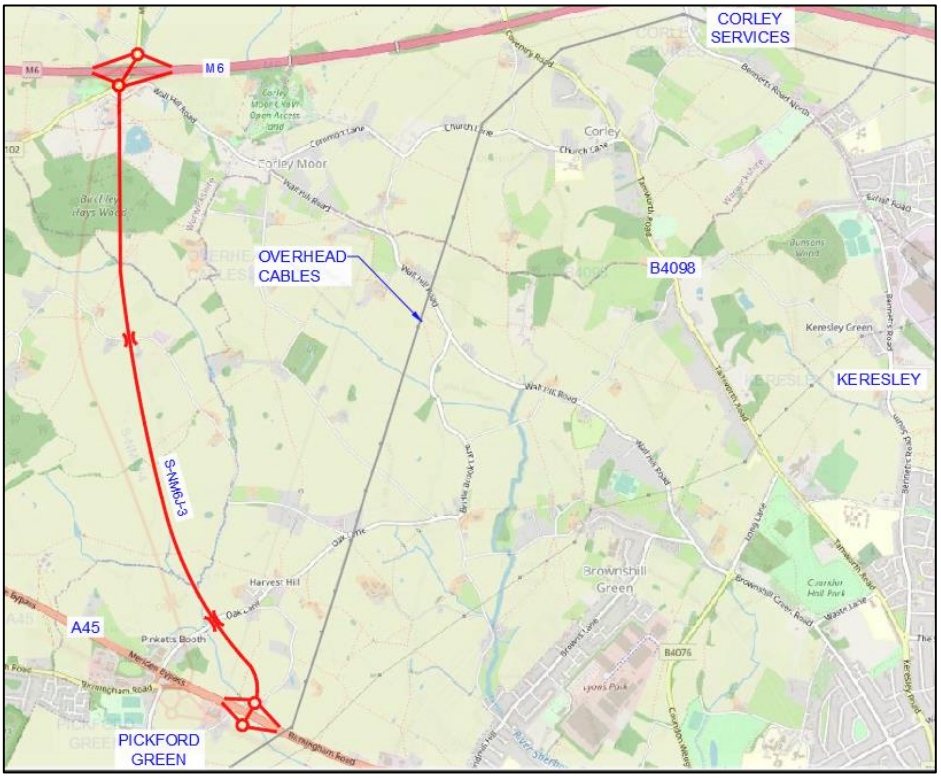

Figure 5-6 - Link Road from West of Corley Services to A45

The existing B4102 would be unsuitable to re-use as a motorway junction link road, with substantial works to either widen the underbridge or provide a parallel structure. This would have a significant impact upon the local communities resulting in loss of properties on both sides of the motorway. These constraints make this option an undesirable location for a new junction, and therefore would not be taken forward for further development.

5.3.4. Option 4 (S-NM6J-4) – M6 / Green-field site / West of Corley Services

Options 2 and 3 looked at re-using existing underbridges as locations for a new motorway junction, however these would be undesirable due to the unsuitability of the existing road network and the impact upon the local communities built around these roads. Option 4 therefore uses a green-field location, approximately 0.5km to the east of the B4102 underbridge. This location has several advantages over the previous options as it is far enough away from Corley services to avoid impacting upon its west facing slip roads, i.e. produce above desirable minimum weaving lengths, and also contains fewer properties that would be affected by the construction of a new junction. A dumb-bell or larger gyratory roundabout type junction could be provided at this location with minimal impact to the surrounding dwellings however this would depend on the capacity requirements (refer to Figure 5-7and Figure 5-8).

The slip roads in both directions would impact the treeline on the embankment along the M6 motorway and would require the removal or extension of an accommodation bridge close to the eastern tie-in to the motorway. The proposed west facing slip roads would partially cross over the existing B4102 and therefore works to extend the underbridge would be required.

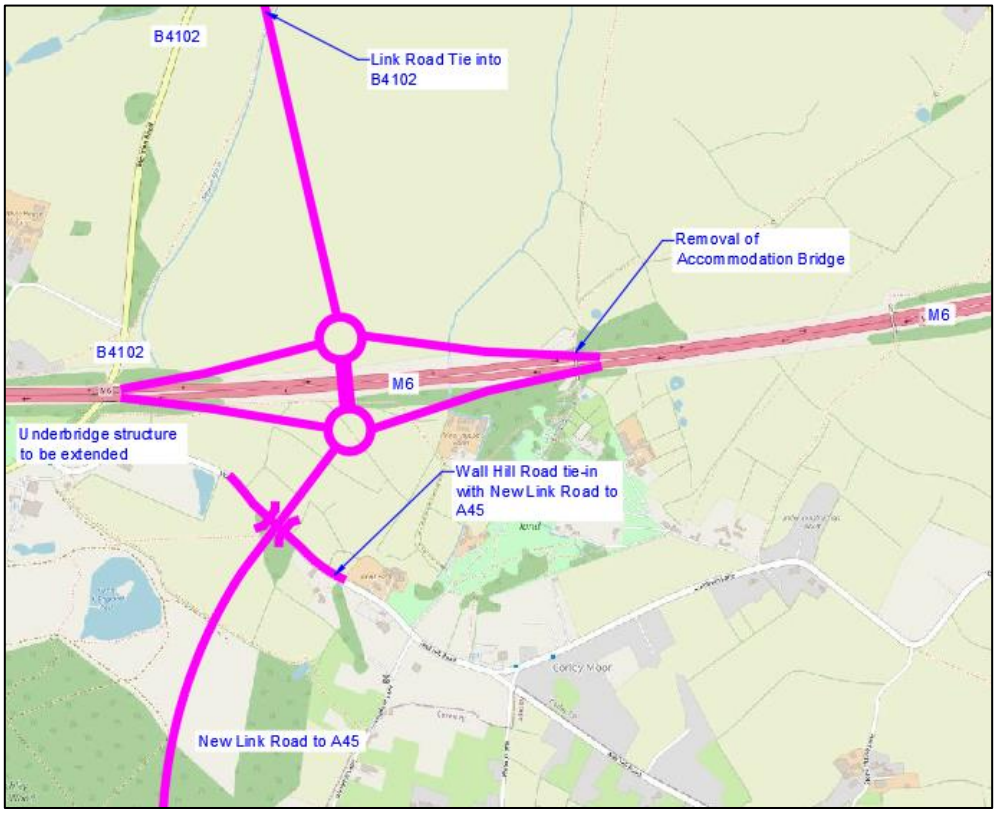

Figure 5-7 - Option 4 (S-NM6J-4) M6 J3W to east of B4102

Proposed M6 J3W to A45 Pickford Green

The new link road to the south would veer to the south-west of Corley Moor, cutting through Birchley Hays Wood to avoid Wall Hill Road / Watery Lane (refer to Figure 5-8). The corridor would then route in a south east direction through green field land towards the junction of Oak Lane and Harvest Hill Lane before tying back into the proposed junction for the Eastern Gren SUE on the A45 Birmingham Road. Bridges would be required to cross over the local roads, although in some cases, these could be re-routed and connected to reduce the number of structures.

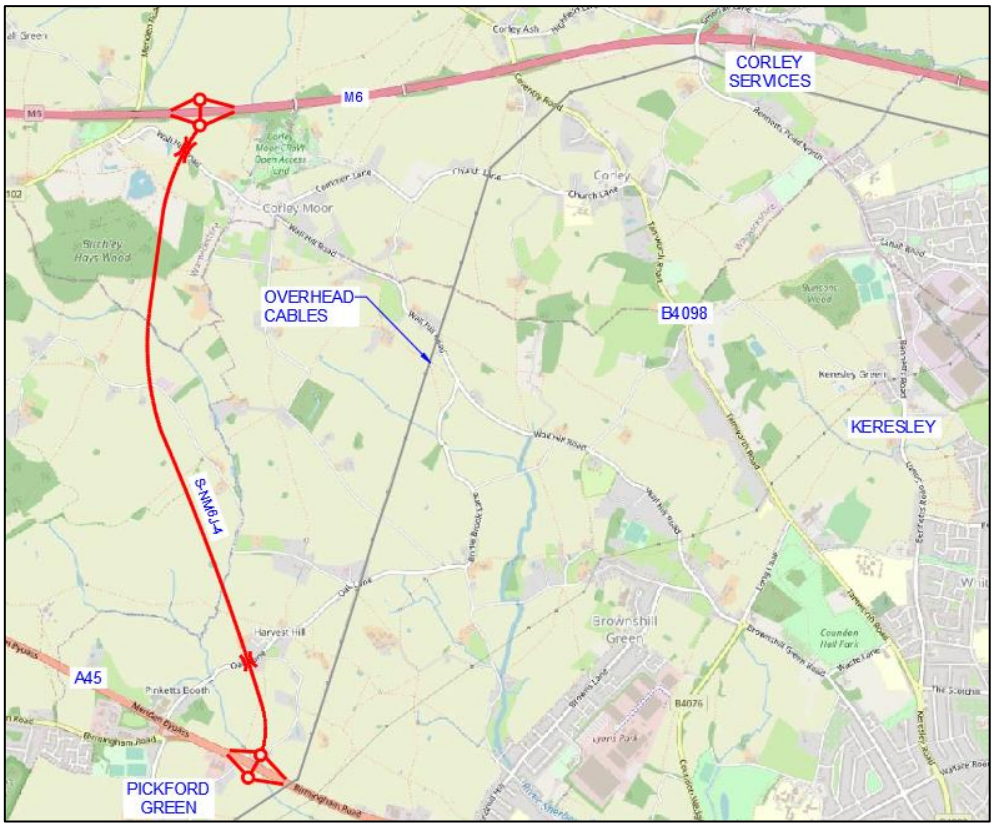

Figure 5-8 – Link Road from West of Corley Services to A45

5.3.5. Proposed A45 Pickford Green junction

The location of the link tie-in has been determined by the access point into the proposed Eastern Green SUE development. Whilst a compact junction may have sufficed for the connection of the A45 to the development, the addition of an expressway linking the M6 motorway, would necessitate the increase of the junction to a full grade separated version in accordance with CD122 *Geometric Design of Grade Separated Junctions*. This would take the form of either a dumb-bell link or a larger gyratory roundabout.

The A45 in the vicinity of Pickford Green contains numerous low standard junctions accessing the main carriageway, as well as direct access from private and retail properties. These include a car dealership, the junction of Brick Hill Lane as well as Pickford Green Lane. Watercourses such as the Pickford Brook will also require culverting or diverting, whilst the existing bus stop laybys would have to be relocated to a suitable location. The weaving distances to junctions upstream and downstream, including the B4104, on the A45 would affect potential slip road layouts. A widespread re-configuration of these side roads would be required in order to allow for the addition of a grade separated junction within the A45 corridor.

Two junction types have been considered for Pickford Green; either a gyratory roundabout type junction (refer to Figure 5-9) or dumb-bell (refer to Figure 5-10).

The scale of the proposed junction would need to be assessed using the predicted traffic flows, but the slip roads would require a simple direct taper from the A45 into single lane slips, but could be widened to two lanes on the approach to the junction roundabout.

Access to the A45 from the M6 would be ideal at Pickford Green as it is proposed as a location for a new junction into the proposed development, alternative junction locations on the A45 may be possible within this corridor but have not been included as part of this study.

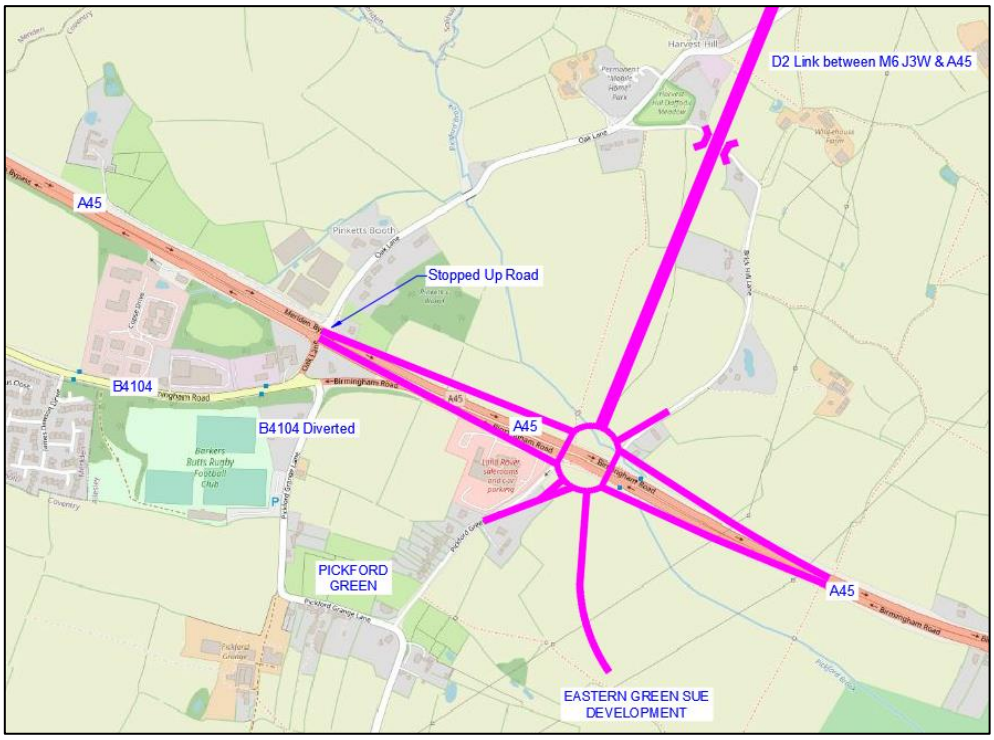

Figure 5-9 - Option 4 Single Roundabout Sketch

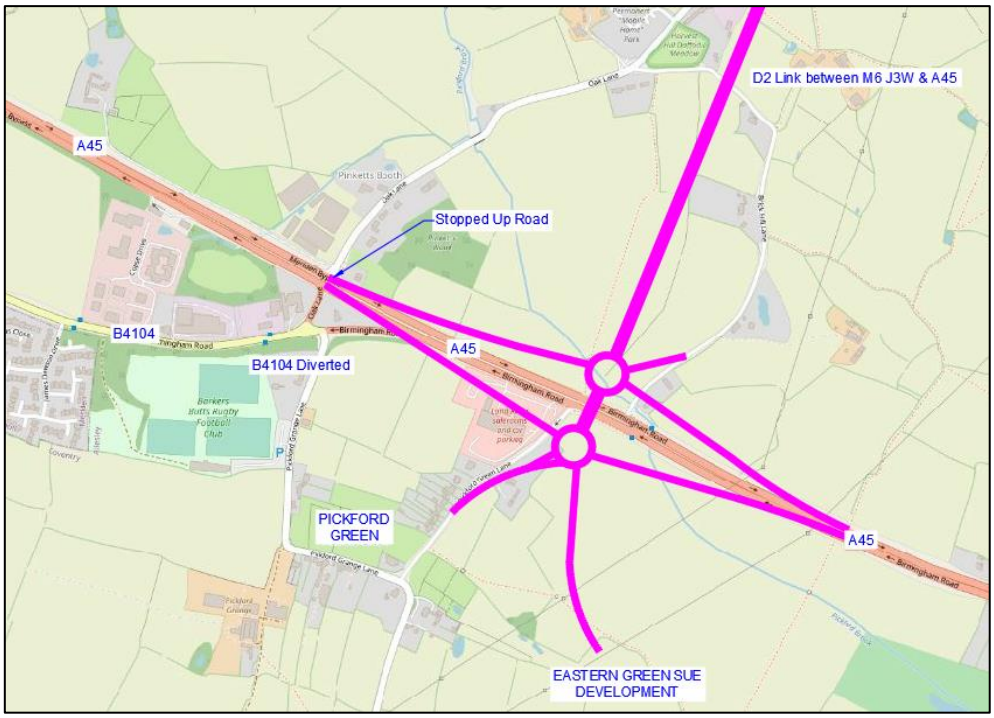

Figure 5-10 - Option 4 Dumb-bell Junction to M6JW Sketch

5.4. RAG Summary Table

Comparison Heading	Option 1 (S-NM6J-1)	Comment	Option 1 Link Road (S-NM6J-1)	Comment	Option 2 (S-NM6J-2)	Comment	Option 2 Link Road (S-NM6J-2)	Comment
Timescales		Complex Construction		Land acquisition required		Complex Construction		Land acquisition required
Cost		Reconfiguration of Corley Services Diversion of local routes		Similar costs for each route anticipated		Remodelling local highway network. Diversion of pylons Land acquisition		Similar costs for each route anticipated
Environmental Impact		Loss of habitat / woodland Telecoms mast		Further development of alignment required to determine preferred route		Sewage Pumping Station Local community		Further development of alignment required to determine
Acceptability		High cost, disruption to Services (traffic management)		High standard connection between M6 & A45. Allows connectivity to Tamworth Road		High cost, additional structure, significant remodelling of local roads		High standard connection between M6 & A45.

Comparison Heading	Option 3 (S-NM6J-3)	Comment	Option 3 Link Road (S-NM6J-3)	Comment	Option 4 (S-NM6J-4)	Comment	Option 4 Link Road (S-NM6J-4)	Comment
Timescales		Complex Construction		Land acquisition required		Adjacent Land required		Land acquisition required
Cost		Remodelling local highway network. Diversion of pylons Land acquisition		Similar costs for each route anticipated		Orthodox road construction Land acquisition		Similar costs for each route anticipated
Environmental Impact		Loss of habitat / woodland (Birchley Hay Woods) Impact on local community and Exhibition Centre		Further development of alignment required to determine		Loss of habitat / woodland		Further development of alignment required to determine
Acceptability		High costs, additional structure. Significant remodelling of local roads		High standard connection between M6 & A45.		Least disruptive to motorway and communities		High standard connection between M6 & A45.

6. Hawkesbury Level Crossing

6.1. Overview

This section draws upon work carried out in 2019 for Warwickshire County Council (Hawkesbury Level Crossing) and submitted as part of an optioneering study.

Hawkesbury Lane Level Crossing is located on the Nuneaton to Coventry line, which is a twin-track line connecting the West Coast Main Line at Nuneaton with the Rugby-Birmingham line at Coventry. The railway level crossing intersects Blackhorse Road in Exhall, an area on the southern edge of Bedworth, and is located between Coventry Arena and Bedworth stations.

Blackhorse lane is a two-way single carriageway, subject to a 30mph speed limit, providing access to a large industrial estate to the west and a sizeable residential estate to the east.

The level crossing is equipped with a pair of lifting barriers on each side of the railway to allow the control of through traffic whilst trains pass through the site. Based on the observed results of a survey by MDS Transmodal, barrier downtime appears to be in the region of 12 minutes for a typical day hour with two passenger and one freight service passing over the level crossing. Currently, Blackhorse Road experiences high levels of congestion during the period when the barriers are down, causing environmental issues, a major impact on journey times and frustration to the residents. Crash Map has been consulted and a total of three accidents have been identified over a five-year duration from 2014 to 2018 which were all categorised as slight.

The WCC proposal is for the existing level crossing to be removed and a new highway diversion crossing either above or below the Nuneaton to Coventry rail line to be provided. This will assist further growth and reduce delay caused by the barrier down times at Blackhorse Road. Therefore, six potential options have been assessed as outlined below; two options as shortlisted and four further options presented for information. Note, the options identified would need detailed study and liaison with Network Rail to confirm their feasibility.

- Option 1 (C-HLC-2): Online Highway Diversion – Over the crossing;
- Option 6 (C-HLC-3): Offline Highway Diversion – Under the railway via existing Stephenson Rd tunnel;

Plus four alternative design options presented for information:

- Option 2 (C-HLC-2a): Online Highway Diversion – Under the crossing;
- Option 3 (C-HLC-3a): Offline Highway Diversion – Over the railway;
- Option 4 (C-HLC-3b): Offline Highway Diversion – Under the railway; and
- Option 5 (C-HLC-5): Closure of crossing and alternative diversionary route

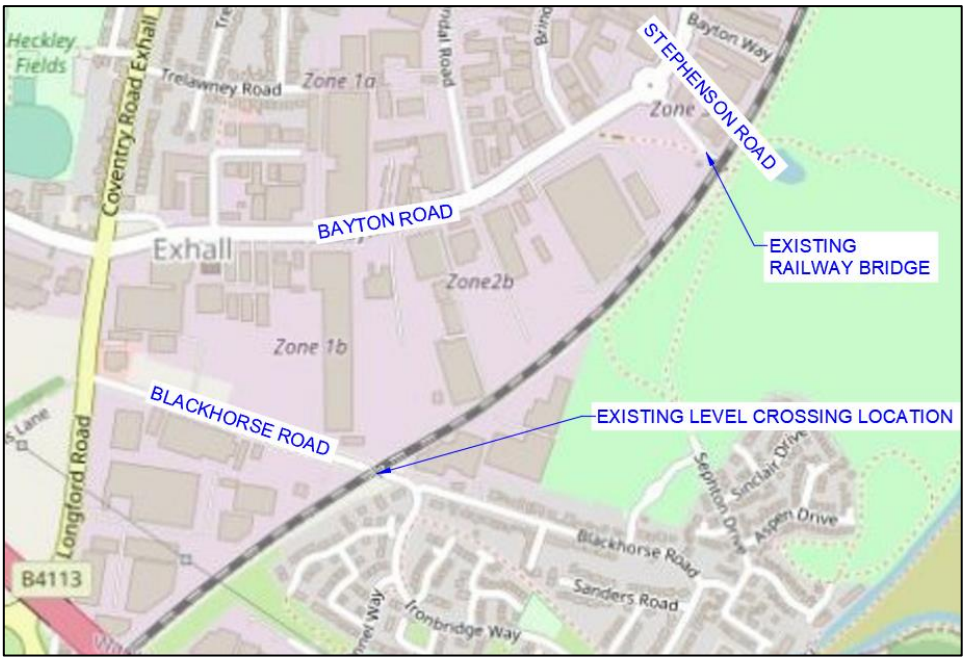

Figure 6-1 - Hawkesbury Lane Level Crossing Location

6.2. Environmental Constraints

A Stage 1 Environmental Review has been undertaken for the scheme area, and is shown in Appendix E. Whilst this assessment only directly concerned the shortlisted options; C-HLC-2 and C-HLC-3, the assessment of the constraints in the area would apply to the alternative options (2a, 3a, 3b and 5) as well. Table 6-1, below, provides a summary of the key findings of the review.

Table 6-1 - Hawkesbury Level Crossing - Key Environmental Constraints

Topic	Constraint	Comment	Further Actions Likely Required
Air Quality	There are large number of residential receptors in close proximity to the Scheme area, which would be sensitive to air quality impacts. The closest AQMA is Coventry AQMA, which is located approximately 3000m south.	Temporary impacts to air quality likely to occur during construction. Options, may also result in changes to the current traffic flow and therefore, result in long-term changes to air quality.	As the Scheme progresses, a suitably qualified specialist is recommended to screen the Scheme against the Institute of Air Quality Management criteria to recommend the need for further assessment.
Cultural Heritage	Two Listed Buildings approx. 280m south east.	It is not anticipated that the current proposed options would result in direct or indirect impacts to nearby heritage assets.	HER data for both designated and non-designated historic environment assets and investigations should be purchased, in order to better understand the heritage assets in the area, including the potential for buried archaeology within the main Scheme boundary
Landscape and Visual Effects	There are many residential properties which currently have views over the Scheme area. The open land to the north is also within Birmingham Greenbelt land.	Options C-HLC-2 and -3 would likely result in greatest landscape and visual impacts.	New above ground infrastructure and vegetation clearance should be kept to a minimum and landscaping reinstatement should be considered during the design stage. Once extents of vegetation clearance are better known, an arboriculturist should be consulted to determine if trees have any statutory protections and recommend any suitable RPZs. The need to undertake further LVIA should be reviewed as the design progresses.
Biodiversity	Habitats and structures within and directly adjacent to the Scheme extent have the potential to support protected species, particularly within the area of undeveloped land to the north.	Option C-HLC-3, which proposes an alternative access road to the north, would likely result in the greatest potential impacts to biodiversity.	All design options should minimise the need for habitat and vegetation clearance. As the Scheme progresses, Scheme options should be reviewed and the need to undertake further ecological survey and assessment should be determined.

Topic	Constraint	Comment	Further Actions Likely Required
Geology and Soils	The Scheme extent is underlain by a principal aquifer and within an area of medium groundwater vulnerability. The presence of onsite contaminants is not known however, potential contaminants include onsite made ground, asbestos and contaminants associated with the operation of the highway e.g. coal-tar and diesel. There are multiple historic landfill sites and recorded mine entries to the east, within 200m of the Scheme extent.	N/A	As the Scheme progresses, input from a suitably qualified specialist should be sought, to prepare a scope for further detailed assessments where necessary e.g. Phase 1 ground survey, ground water risk assessment and UXO assessment.
Material Assets and Waste	The proposed Scheme will likely result in the generation of CDEW. There is also potential for hazardous waste to be generated.	N/A	It is recommended that further assessment is undertaken as early as possible to more accurately estimate the types and quantities of potential waste arisings, and consideration as to how these will be managed.
Noise and Vibration	Large number of residential properties in the Scheme area, which would be sensitive to increased noise and vibration levels during both construction and operational stages.	N/A	As the Scheme progresses and more detail on the Scheme and construction methodology is known, the proposed Scheme should be reviewed by a noise specialist, to determine if a noise impact assessment would be required and where necessary and to liaise with the local EHO.

Topic	Constraint	Comment	Further Actions Likely Required
Population and Human Health	Residential and commercial / industrial receptors in close proximity to the Scheme. Undeveloped land to the north is likely used as an open space by the local community. A PRoW footpath runs along the proposed alignment of Option C-HLC-3.	Temporary disruption anticipated during construction, which will be managed by principal contractor. Option C-HLC-3 may result in impacts to the know PRoW and open space to the north, which is likely used by local community.	During the design, land ownership records should be checked to ensure the correct permissions are obtained where necessary, to access land parcels and complete works associated with the proposed Scheme Appropriate consultations with the local authority and relevant stakeholders should also be undertaken as necessary. Options should ensure that PRoW remain unaffected or that alternative access route are provided as part of the design.
Road Drainage and the Water Environment	There are waterbodies or watercourses within 500m of the Scheme, but none directly within the Scheme extent. The Scheme is underlain by a principal aquifer within medium groundwater vulnerability and also located within in Flood Zone 1.	Scheme options not anticipated to directly alter surface water. Scheme options are likely to require the need for increases in impermeable surface are, so may result in changes to drainage and flood risk.	As the Scheme progresses, further assessment relating to flood risk, water quality and groundwater protection may be required.

6.3. Design Options

Four potential options for the improvement of Hawkesbury Lane level crossing were included on the Options Shortlist (C-HLC-1 to C-HLC-4). C-HLC-1 (no improvement) and C-HLC-4 (optimise signal timings) have not been assessed as they would not require additional infrastructure. Four additional design options have been presented (C-HLC-2a, 3a, 3b and 5) for information.

6.3.1. Option 1 (C-HLC-2): Online highway diversion – Over the crossing

Option 1 consists of providing a new highway link crossing over the railway line using an overbridge (refer to Figure 6-2). This is potentially the most problematic structural option to construct as it requires the maximum interface with the operation of the railway and access to the nearby properties. Foundations and abutments for the bridge would need to be built either side of the railway lines as some operations, such as piling, may need to be undertaken during line possessions to avoid the risk of plant toppling onto the line.

This option would require the ground level to be built up on approach to the railway crossing for the bridge to achieve the minimum vertical clearance above the railway; a rise of 8m including 6.4m clearance to allow for possible future electrification of the track and deck thickness of approx. 1.5m suitable for spanning a twinned line. The section between the railway and Blackhorse Road would require a gradient of 5% in addition to desirable standard crest and sag curves, with the ground level built up starting approximately 200m either side of the railway. This would be to allow footways to be incorporated that are both Disabled Discrimination Act (DDA) and DMRB compliant.

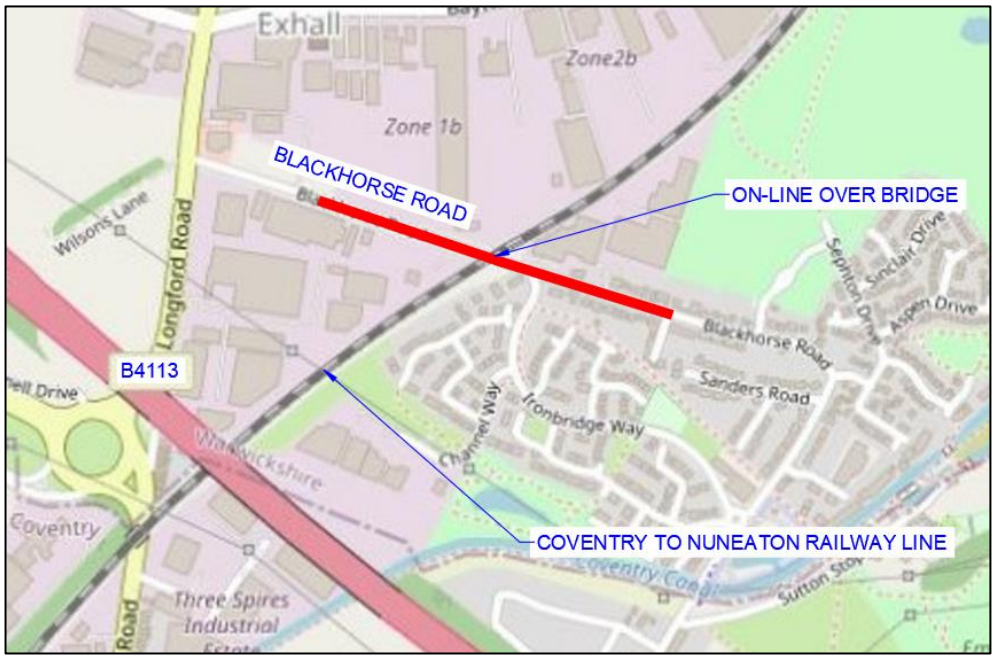

Figure 6-2 - Proposed online alignment.

Advantages:

- Avoids the use of greenfield sites, minimising the disruption to natural habitats;
- This option allows the continuity of the existing road to both sides of the railway to be maintained; and
- In the long term this option will have the least impact on user journey times as the route is most direct.

Disadvantages:

- Removes the access to both private and commercial properties and depending on solution, several properties may need to be demolished. Ironbridge Way would need to be re-routed as no access onto Blackhorse Road would be possible;
- It is likely that much of the utility plant will need to be diverted prior to construction;
- This option is likely to require the compulsory purchase (CPO) of several properties;
- Major disruption to the immediate highway network and railway during construction and will be reliant on careful co-ordination of traffic management phases as well as temporary diversion routes for users;
- Visual intrusion to nearby landscape. The embankment/retaining walls would likely impact on views for properties on Blackhorse Road as well as those on Ironbridge Way;
- With traffic located on high embankment, there will be issues with noise and pollutants affecting the properties to the east of the railway track; and
- High cost of constructing and long-term maintenance of the on-line structure.

6.3.2. *Alternative:* Option 2 (C-HLC-2a): Online highway diversion – Under the crossing

Option 2 consists of a link passing underneath the railway line. This would require a new underpass structure to allow for a clearance of approximately 7m beneath the railway line before rising back up to meet the Blackhorse Road existing road levels (refer to Figure 6-3). The vertical clearance includes 5.3m headroom and a deck thickness of approximately 1.5m plus additional tolerances for crossfall etc. As above, the carriageway would require a gradient of 5% footways to be incorporated that are both DDA and DMRB compliant.

This option requires excavation in the area and the need for diversionary works will have to be assessed.

Figure 6-3 - Proposed online alignment - under the crossing

Advantages:

- Visually, this option is less intrusive as the proposal is in cutting which is not disruptive to the short or medium views of the area;
- As per Option 1, this proposal will provide a direct route and maintain access to the residential estate to the east and industrial estate to the west;

- This option will improve the immediate highway network, reducing journey times/delay whilst also providing an improvement to the rail system.

Disadvantages:

- In terms of drainage, there may be the need to pump out water during excavation operations in the construction phase. An allowance for a permanent pumped drainage system would have to be made in any cost estimates for this option;
- The progress of the scheme will require diversion of statutory undertakers' apparatus;
- As per Option 1, it removes access to both private and commercial properties and, depending on solution, several properties may need to be demolished;
- This option is likely to require the compulsory purchase (CPO) of several properties, although to a lesser degree than in Option 1;
- Major disruption to highway and railway during construction and will be reliant on careful traffic management phases; and
- To minimise the disruption to rail travel and gain approval from Network Rail; an alternative construction method would need to be sought, this would entail avoiding open excavation in the near vicinity of the rail track and would potentially involve greater clearances; further impacting the drainage requirements and impact on the environment.

6.3.3. *Alternative:* Option 3 (C-HLC-3a): Offline highway diversion – Over the railway

Option 3 proposes to provide a crossing via Bayton/Stephenson Road further to the north. The existing underpass on Stephenson Road would be retained as an NMU route for residents for any future development. A new structure to the south of Stephenson Rd (refer to Figure 6-4) would be provided instead. Note, this option is dependent upon development taking place to the east of the railway line and provide access to the development. Due to the constraints on available land to the west of the line, the link would need to cross over the railway line using a skewed overbridge. Since the railway is already at approximately 4 to 5m above ground level at this point, a steep slope would be required on the approach to meet the minimum vertical height required above the railway, and to allow the tie in with Stephenson Road roundabout. The vertical clearance above the railway would need to include 6.4m clearance to allow for the future electrification of the track and a deck thickness of approx. 1.5m suitable for spanning a twinned line. The 5m above ground level with the additional 8m required above the railway would result in a tall structure at least 13m above the surrounding ground level.

To achieve the required levels above the railway the approach gradients would exceed 13% along with sub-standard crest and sag curvature. This would be excessive for a new link road, and as a result, this option can be rejected at this stage.

Advantages:

- This option allows Stephenson Rd to remain operational during construction;
- Easier to construct, as it is offline. In addition, if constructed before the new development is built, the works can be done on site resulting in minimal disruption to the road network;
- Avoids the compulsory purchase of private properties;
- Option could allow for easier access to housing development and associated construction traffic;
- Opportunity to keep existing bridge to be used in future for NMU route;

Disadvantages:

- This option would require excessive gradients on approach to bridge making it non-compliant to standards;
- High cost of constructing and long-term maintenance of the structure;
- The option will require the acquisition of land to develop;
- There may be difficulties with obtaining approval from Network Rail as there are risks associated with going over a rail track as well as increased delays to rail network.

- This option would be reliant on the housing development being built and coordination would need to be investigated;
- With traffic located on high embankment, there will be issues with noise and pollutants affecting the existing and newly-built properties to the east of the railway track.

Figure 6-4 - Proposed off-line alignment – over the railway

6.3.4. *Alternative:* Option 4 (C-HLC-3b): Offline highway diversion - Under the railway

Option 4 also proposes that the existing underpass is retained as an NMU route for residents of the future development and a new structure is constructed to the south of Stephenson Rd (refer to Figure 6-5). Note, as per Option 3, this option is dependent upon development taking place to the east of the railway line. As above, the horizontal alignment would cross the railway line on a skewed alignment, tying into the existing roundabout, and re-routing the retail units from Stephenson Road onto the new link. As the railway is already at approximately 5m above ground level, only approximately 2 to 3m further would need to be excavated to allow for a clearance of 5.3m headroom plus deck thickness, crossfall, tolerances etc. The resulting gradient, on the approach to the underpass would be acceptable, although the low point would be beneath the railway line, and some form of pumping may be required to ensure that the underpass does not flood.

Figure 6-5 - Proposed off-line alignment - under the railway

Advantages:

- Easier to construct, as it is offline. In addition, if constructed before the new development is built, the works can be done on site resulting in minimal disruption to the road network;
- Visually this option is less intrusive to the short or medium views of the area as the proposal is in cutting;
- Avoids the compulsory purchase of private properties;
- The impact on the residential estate is avoided;
- Greater flexibility to provide a solution that complies to the standard;
- Likely to be the cheapest option;
- Option could allow for easier access to housing development and associated construction traffic;
- Opportunity to keep existing bridge to be used in future for NMU route; and
- The earthworks requirement is significantly reduced compared to other options.

Disadvantages:

- There may be the need to pump out water during excavation. An allowance for a permanent pumped drainage system would have to be made in any cost estimates for this option;
- The option will require the acquisition of land to develop;
- There may be some difficulties with installing a gravity drainage system; however, as the rail track is elevated, this will not be as onerous as Option 2.
- There may be difficulties with obtaining approval from Network Rail as there are greater risks associated with going under a rail track as well as increased delays to rail network.
- This option may be reliant on the housing development being built and coordination would need to be investigated.

6.3.5. *Alternative:* Option 5 (C-HLC-5): Closure of the crossing and diverting traffic along an alternative route

The fifth option would be to close the crossing and divert the traffic via an alternative route (refer to Figure 6-6). The most appropriate diversion identified is through Grange Road then Bedworth Road back to Blackhorse Road. Although it is the cheapest option, this diversion would add an extra seven minutes to the journey for drivers and 41 minutes for pedestrians.

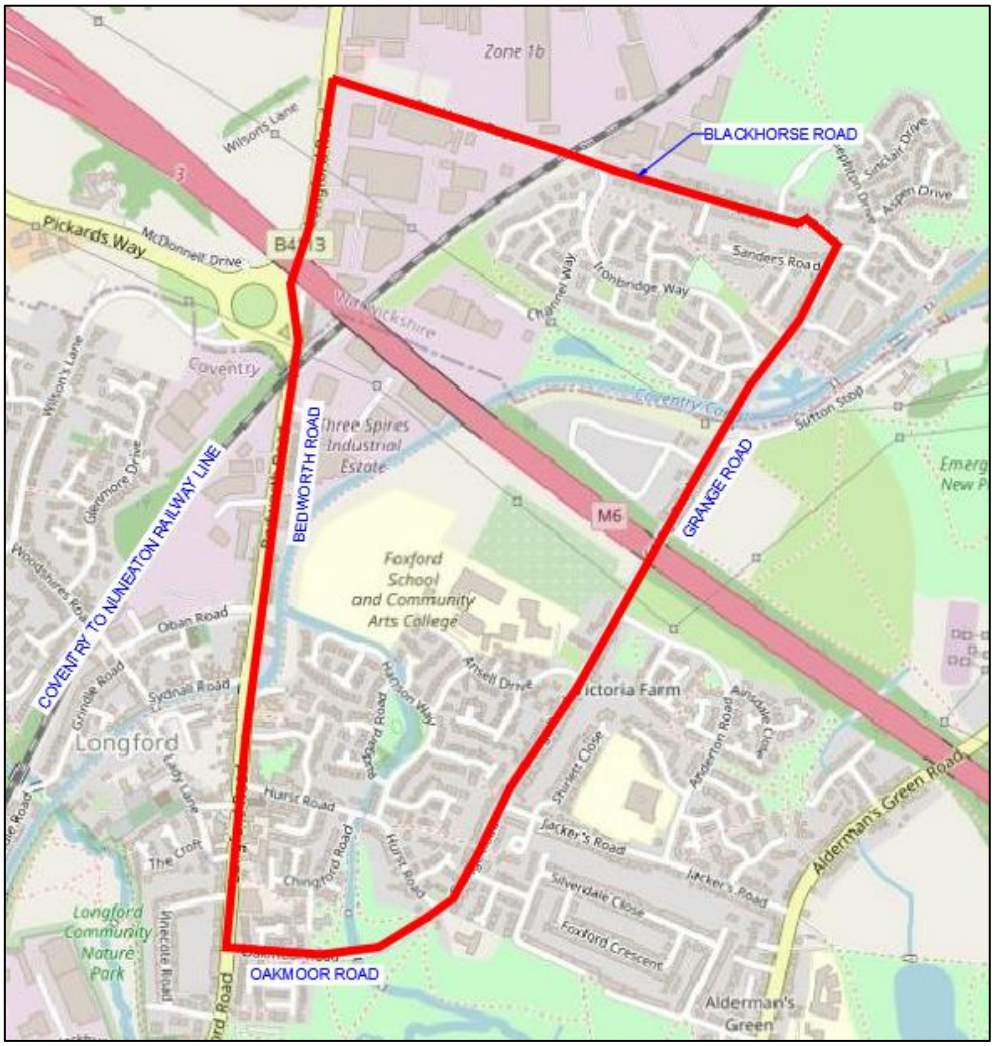

Figure 6-6 - Option 5 proposed permanent diversion route

Advantages:

- Minimal work would be needed and therefore the costs associated would also be very low;
- No disruption to the properties nearby due to construction work; and
- Provides benefits to the efficiency of the rail system.

Disadvantages:

- Long diversion from original route, with pedestrians being the most affected; and
- There will be added pressure to the capacity of both Grange Road and Bedworth Road due to the increased traffic volume and the impact on the wider highway area will need to be considered further.

6.3.6. Option 6 (C-HLC-3): Offline highway diversion – Stephenson Road

Option C-HLC-3 proposes re-using an existing underpass on Stephenson Road, further to the north. However, as can be seen in the photograph below, the subway in its current form would not be suitable for its intended use (refer to Figure 6-7). In addition to sub-standard headroom, it is very narrow and therefore the only feasible way that this could be considered would be via signal controlled single way running. Even in this scenario, only standard cars would be able to pass through. Furthermore, there would be insufficient room to provide suitable pedestrian access alongside the carriageway.

The existing underpass appears to be an old original structure, and modification to its current form may not be permissible or feasible, particularly as excavation would be required in addition to widening to make the bridge fit for all-vehicular use.

This option would therefore not be considered suitable and can therefore be discounted.

Figure 6-7 - Existing railway bridge north of Blackhorse Rd (Extracted from Google Streetview 2019)

Advantages:

- Visually this option is less intrusive to the short or medium views of the area as the proposal is in cutting;
- Avoids the compulsory purchase of private properties;
- The impact on the residential estate is avoided;

Disadvantages:

- There may be difficulties with obtaining approval from Network Rail as there are greater risks associated with works on the rail track as well as increased delays to rail network. This would require co-ordination.
- Making any modifications or rebuilding the structure would be complex and expensive
- Removes the opportunity to keep existing bridge to be used in future for NMU route
- Limited capacity would be provided unless existing structure is demolished and rebuilt

6.4. RAG Summary Table

Table 6-1 - Comparison of alternative crossing options for Blackhorse Rd Level Crossing

Comparison Heading	Option 1 (C-HLC-2)	Comment	*Alternative* Option 2 (C-HLC-2a)	Comment	*Alternative* Option 3 (C-HLC-3a)	Comment	*Alternative* Option 4 (C-HLC-3b)	Comment	*Alternative* Option 5 (C-HLC-5)	Comment	Option 6 (C-HLC-3)	Comment
Timescales		Acquisition of land, properties and rail possessions		Acquisition of land and properties		Requires housing development		Requires housing development		Minimal work required		Disruption to railway
Cost		High costs and land requirements		High costs and land requirements		Large earthworks quantities required		Avoids purchase of properties. Greater flexibility with design		Minimal impact to existing infrastructure		High cost to modify or rebuild structure
Environmental Impact		High visual intrusion due to overbridge		Associated drainage implications		High visual intrusion due to overbridge		Some drainage implications		Increase noise and pollution on diversion route		Potential drainage implications
Acceptability		High risk with overbridge construction		There may be challenges achieving NR approval		Excessive gradients and do not comply to standards		Least problematic		Long diversion, may not be accepted by users		Risk with structure works and there may be challenges achieving NR approval

Table 6-1 shows a direct comparison between the six options which allows a decision to be made as to the preferred option at this time.

Option 1 C-HLC-2: This option has been dismissed at this stage due the high costs, land requirements and risks entailed with providing the overbridge.

Option 2 C-HLC-2a: Although technically feasible, it would have impacts on the immediate environment, difficulties gaining approval from network rail and drainage implications.

Option 3 C-HLC-3a: This option has been dismissed at this stage as the construction of a structure at the required height would be costly in comparison to other options, particularly due to the large volume of earthworks required. The approach gradients would be excessively steep and would not conform to current standards.

Option 4 C-HLC-3b: Less expensive than Options 1, 2 and 3 due to the shallow cut required. Approval from Network Rail required, and connection to local development to the east also required, however this option would be the most technically feasible.

Option 5 C-HLC-5: Further improvements would be required on the highway network to facilitate increased traffic volumes throughout the diverted route, but it is unlikely that the long diversion would be acceptable to motorists and pedestrians.

Option 6 C-HLC-3: This option has been discounted at this stage due to the limitations on vehicle type and single running that this option would require, as well as the unsuitable conditions for NMU's. Any alterations to the railway bridge would be complex and expensive.

The option to build an underpass off-line (Option 4) would seem preferable from an engineering point of view. A design to provide a wider railway underpass would be feasible, with a short closure of the railway and minimal disruption to the highway as most of the works will be done off-line. The existing level crossing would still remain open and continue to function for the duration of the works. The existing underpass on Stephenson Road would remain intact and continue to function as an NMU route following development of the site to the east of the railway line. This option would therefore produce the most benefits with significantly less constraint than the overbridge or on-line options. Engagement with Network Rail would be required to develop a buildable option to suit all parties and agree timescales for closures and construction.

7. Cycle Improvements

7.1. Overview

CCC received a Ministerial Direction in February 2020 to implement their preferred package for their Local Air Quality Action Plan (LAQAP). The LAQAP package focuses upon encouraging local trips to be made by walking and cycling rather than the car, with significant investment in a new high-quality cycle route between Coundon and the city centre, and on an engagement programme with schools, businesses and local communities. The secondary focus in then on greening the fleet and finally on restricting traffic flow on certain corridors and increasing capacity on adjacent routes to enable vehicles to flow more freely. Improving air quality requires less vehicle use and building a cycling network that is considered safe by the majority of the population will help achieve this.

The plan includes multiple infrastructure projects, including the four cycleway routes below. Three of these were shortlisted as part of the Coventry North Transport Package, with a further option, P-PCS-4, presented here for information.

- Route 1 (P-PCS-1) - Coundon Cycle Route (Coundon Road)
- Route 2 (P-PCS-2) - Link from Route 1 to Keresley Development (KLR) / Bennetts Road.
- Route 3 (P-PCS-3) - Route from city centre to Eastern Green – via Holyhead Road
- Route 4 (P-PCS-4) - Link from Long Lane to Holyhead Road

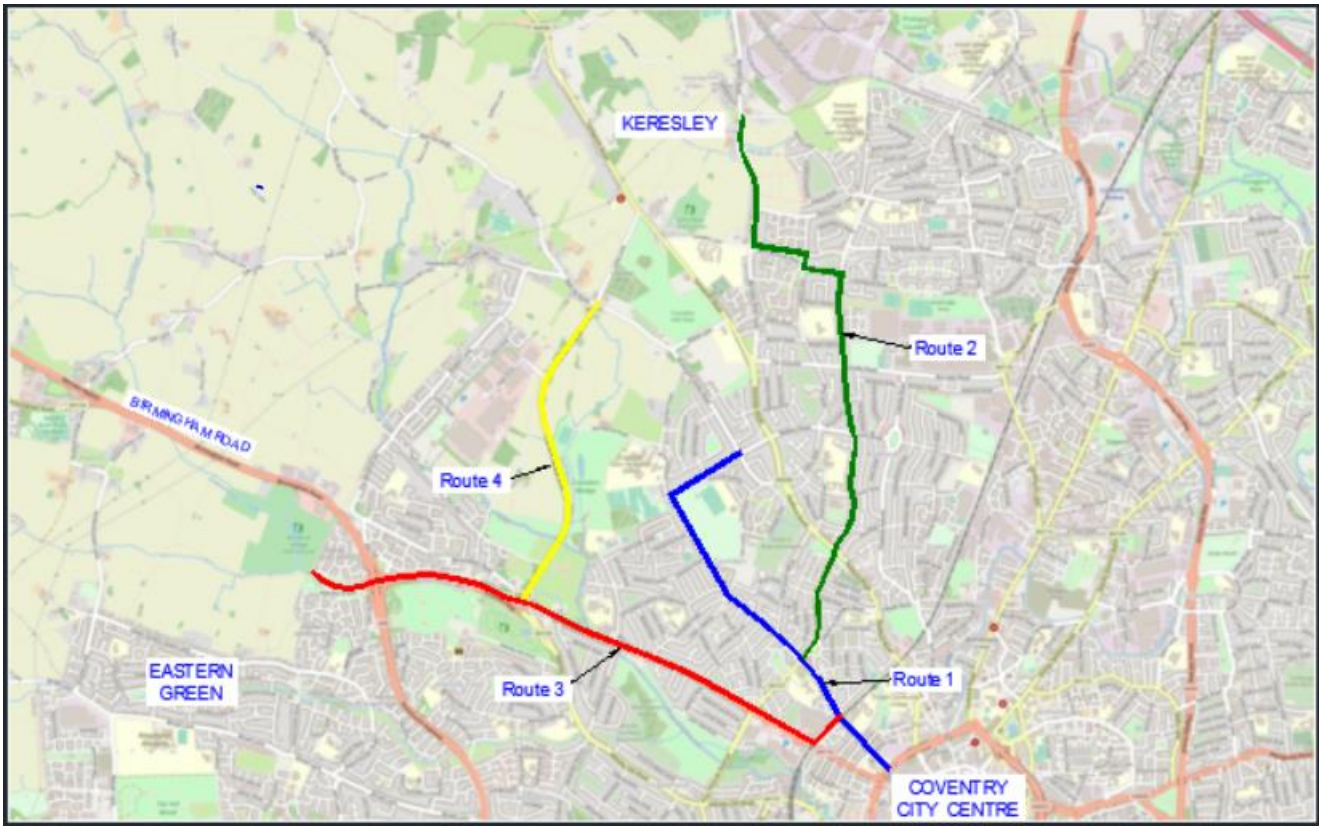

Figure 7-1 - Overview Plan

7.2. Environmental Constraints

A full environmental review was not undertaken for this option area due to the expected minor environmental impact from the construction of the proposed cycle improvements. Instead, the below provides a summary of

the key environmental constraints to be considered in the design and construction of the proposed cycle improvements.

7.2.1. Route 1 (P-PCS-1) - Coundon Cycle Route (Coundon Road)

- High bomb risk due to nearby potential strategic Luftwaffe target and proximity to already found UXOs
- Priority Species for CS Targeting – Lapwing, Redshank and Tree Sparrow
- Woodland Priority Habitat Network– Lower Spatial Priority
- Birmingham Greenbelt
- Source Protection Zone 3
- Groundwater Vulnerability map – Medium - High
- Soilscape: Slightly acid loamy and clayey soils
- Natural Drainage Type: Impeded drainage

7.2.2. Route 2 (P-PCS-2) - Link from Keresley to Coundon Cycleway

- High bomb risk due to nearby potential strategic Luftwaffe target
- Priority Species for CS Targeting – Lapwing, Redshank and Tree Sparrow
- Woodland Priority Habitat Network– Lower Spatial Priority
- Birmingham Greenbelt
- Source Protection Zone 3
- Groundwater Vulnerability map – Medium - High
- Soilscape: Slightly acid loamy and clayey soils
- Natural Drainage Type: Impeded drainage

7.2.3. Route 3 (P-PCS-3) - Route from city centre to Eastern Green – via Holyhead Road

- Flood Zone 2 – Pickford Brook along A444 between Eastern Green development and Kingsbury Road
- Flood Zone 3 – River Sherborne crossing Holyhead Road between B4076 and Kingsbury Road
- High bomb risk due to nearby potential strategic Luftwaffe target and proximity to already found UXOs
- Priority Species for CS Targeting – Lapwing and Redshank
- Woodland Priority Habitat Network– Areas of High Spatial Priority (Deciduous Woodland)
- Groundwater Vulnerability map – Medium - High
- Soilscape: Slightly acid loamy and clayey soils
- Natural Drainage Type: Impeded drainage

7.2.4. Route 4 (P-PCS-4) - Link from Long Lane to Holyhead Road

- Flood Zone 3 – Pickford Brook crosses B4076 north of A4114 Pickford Way/Holyhead Rd roundabout
- Flood Zone 3 – River Sherborne crosses B4076 north of Church Walk
- High bomb risk due to nearby potential strategic Luftwaffe target
- Priority Species for CS Targeting – Lapwing, Tree Sparrow and Grey Partridge
- Birmingham Greenbelt
- Groundwater Vulnerability map – Medium - High
- Soilscape: Slightly acid loamy and clayey soils
- Natural Drainage Type: Impeded drainage

7.3. Design Options

7.3.1. Route 1 (P-PCS-1) - Coundon Cycle Route (Coundon Road)

Coundon Cycleway will be a high-quality segregated cycleway that runs for 2.75km along the Coundon Road/Barker's Butts Lane/Westhill Road/Hollyfast Road corridor, connecting Coundon Green to the city centre, serving approximately 4500 households (refer to Figure 7-2).

The cycleway will be physically segregated from traffic and pedestrians throughout, with the exception being a shared footway/cycleway through the railway tunnel due to width restraints. It will be provided by re-allocating highway space from carriageway, footway or verge and will have priority over traffic along the full route, except for where controlled via traffic signals. Parking lay-bys will be relocated to existing hard verge area and floating bus stops created to allow cyclists to pass behind the stops.

The scheme will require geometric and operational changes such as:

- Hollyfast Road and Browett Road to be egress only to reduce conflicting movements around the junction with Westhill Road
- Westhill Road/Barker's Butts Lane roundabout re-shaped to create space for cycleway on east side and include zebra crossing.
- New traffic signals for cyclists on Barker's Butts Lane/ Three Spires Avenue junction where the cycleway switches from the southbound side of the carriageway to the northbound.
- Modifications to existing signalised Moseley Avenue/Barker's Butts Lane junction to add a 'cycleway only' stage that will operate when cycles are detected.
- School access to be relocated from Upper Hill Street to Barras Lane

The proposed measures would focus on improving NO_2 levels at the locations where particular problems have been identified in the Local Air Quality Action Plan, for example, Foleshill Road. However, a few disadvantages to the proposed design include the felling of trees and parking space relocation/loss and peak time restrictions which would be required place along route.

Figure 7-2 - Route 1 Sketch

7.3.2. Route 2 (P-PCS-2) - Link from Keresley to Coundon Cycleway

A new cycle route is proposed between Bennetts Road, in Keresley, and the Coundon cycleway (Route 1). This route aims to connect the new residential area with key destinations by providing direct, continuous, convenient cycle route or linkages, encouraging the public to cycle to work and school (refer to Figure 7-3).

The route starts between Bennetts Rd and Penny Park Lane junction on the southbound direction before turning left on Keresley Brook Road. There is not enough width to provide a segregated facility along Keresley Brook Road and approvals from CCC would be required in order to turn part of The Brook parkland into a cycleway. Signalling at the junction with Halford Lane will be necessary before it continues on to Headington Avenue towards Beake Avenue. The cycleway will then travel south along Beaker Avenue crossing approximately 6 side roads and 4 major junctions that will likely need to be signalised/upgraded.

Following south towards the city centre, the route continues on Engleton Road and then Moseley Avenue where it joins the Coundon Cycleway on Barker's Butts Lane. Along Engleton Road there are sections of road with narrower widths and some of the parking may need to be removed to accommodate a segregated facility.

Figure 7-3 - Route 2 Sketch

7.3.3. Route 3 (P-PCS-3) - Route from city centre to Eastern Green – via Holyhead Road

The cycleway route from Eastern Green Development to Coventry City Centre would be a segregated cycleway that runs for approximate 4km along the A4114 Pickford Way/Holyhead Rd. Atkins has undertaken a study to determine the existing level of cycle provision including constraints and opportunity; identified five variants along the corridor (refer to Figure 7-4) and determined a preferred route alignment.

There is an existing shared facility from Parkhill Drive to Dunchurch Way roundabout and an advisory cycle lane along Holyhead Road between Coundon Wedge Drive roundabout and Holyhead Rd/Southbank Rd junction. Wide footways are provided along the route and on-street parking spaces provided on Holyhead Rd from west of Holyhead Rd/Southbank Rd junction to Holyhead Rd/Four Pounds Avenue junction. The cycleway would be

provided by re-allocating highway space from carriageway, footway or verge and will be physically segregated from traffic and pedestrians throughout. Five alignment options have been identified and are outlined below.

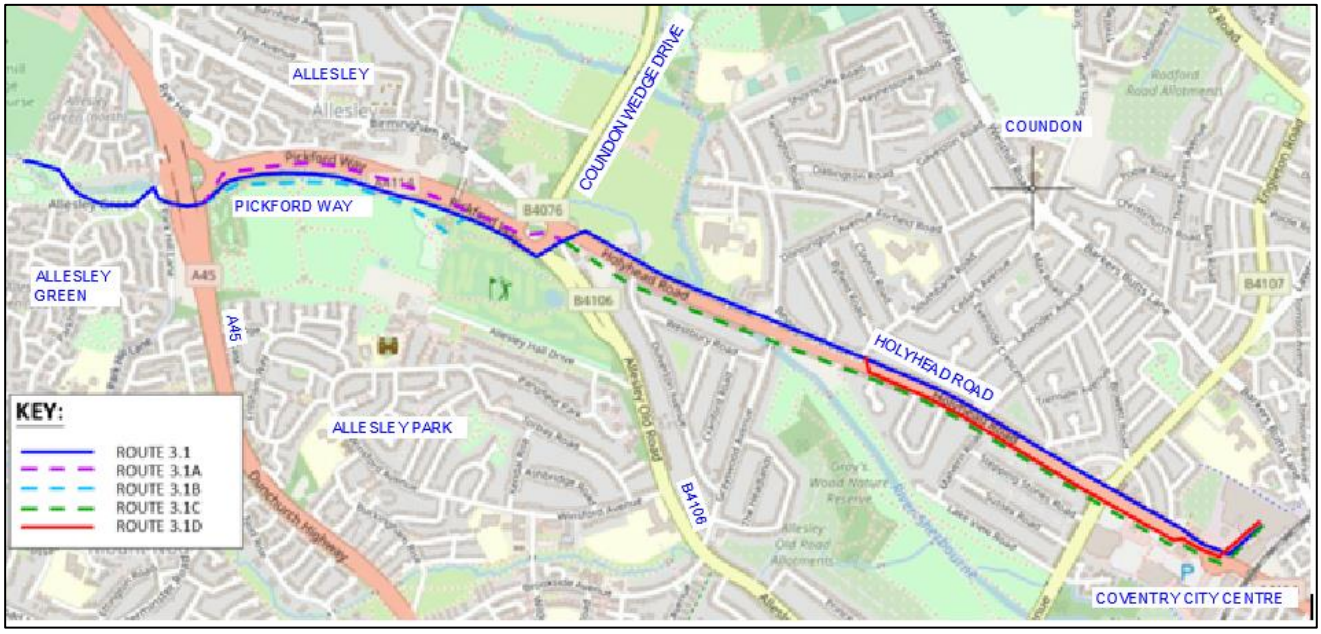

Figure 7-4 – Route 3 from City Centre to Eastern Green - Options Overview Plan

7.3.3.1. Option 3.1 - Sustainable Urban Extension to City Centre Via Holyhead Road (Preferred)

Proposed two-way segregated cycleway from the Eastern Green Development, running alongside Pickford Brook on approach to the A45. The route temporarily reverts to a shared facility around the A45 Pickford Way junction. The route continues along A4114 Pickford Way, with lane one of the outbound carriageway re-allocated as a two way cycleway.

The Coundon Wedge Drive roundabout is negotiated via a two-way segregated cycleway on the southern side, before crossing onto the northern side of Holyhead Road. The route continues along Holyhead Road on the northern side, before linking to the proposed LTI development. This is the option with least impact on existing vegetation.

Due to a major constraint at the bridge on Pickford Way, the carriageway would need to be widened towards the central reservation. Furthermore, on-street parking along Holyhead Road would need re-allocation and space number may be reduced.

7.3.3.2. Option 3.1A - Pickford Way Central Reservation Option

In Option 3.1A, instead of re-allocating the outbound lane on A4114 Pickford Way, cyclists would use a toucan crossing to join the two-way cycleway in the central reservation. The Coundon Wedge Drive roundabout is negotiated by part signalisation, and a link through the central island. The route then continues as per Option 3.1.

Although there would be no need to re-allocate the outbound lane on A4114 Pickford Way, the provision of two new signalised junctions result in an option that is more expensive to build and maintain, and increased journey time for both cyclists and cars. Additionally, earthworks and drainage design will be needed due to proximity to Pickford Brook may result in extensive drainage work.

7.3.3.3. Option 3.1B - Allesley Park Option

On the section between A45 and Holyhead Road, the cycle route diverts from the highway and extends through Allesley Park by way of widening the existing footways to accommodate a two-way cycleway before re-entering Pickford Way before the Coundon Wedge Drive roundabout. This improves safety for cyclists due to a greater distance from traffic and route through non-trafficked area and reduces construction activities near the live highway. However, CCC planning map shows this is an area with potential archaeology and policy constraints. In addition to that, this diversion would be a longer route and cyclists may feel unsafe when cycling at night.

7.3.3.4. Option 3.1C - Holyhead Road Southern Side Option

On the section along Holyhead Rd, the route remains on the southern side, before linking to the proposed LTI development. This allow cyclists to remain on one side of the road throughout the length of the route. Although the increased number of crossings at side roads and off-street parking accesses, potentially reduce cyclist's safety. In order to provide a cycleway that meets the standards, a few pinch points will need to be added along the footway adjacent to the cycle facility.

7.3.3.5. Option 3.1D - Holyhead Road Northern/Southern Side Combination

The route switches from the northern side east of Grayswood Avenue to continue along the southern side of Holyhead Road before linking to the proposed LTI development.

This option allows cyclists to access Alvis Retail Park more easily and for Beaumont Crescent to remain open. The downsides of this option are similar to those of Option 3.1C. Lane reduction from 3 to 2 lanes on Holyhead Road between Four Pounds Avenue and western entrance of Alvis Retail Park will also be required in order to keep the alignment within highway boundary.

7.3.3.6. Preferred Option

Option 3.1A requires two additional signalised junctions which increases the project build costs and increases future maintenance costs, this option also leads to increased journey time for cyclists and vehicles.

Option 3.1B diverts the route through Allesley Park which increases the route distance and provides an isolated/ vulnerable journey for cyclists reducing the level of safety and comfort. CCC planning maps also show Allesley Park with potential archaeology and policy constraints.

Option 3.1C causes a concern for cyclist safety due to the large number of side road crossings along the south of Holyhead Road. This route will also require a few pinch points leading to departures from standard which can also compromise safety.

Option 3.1D the downsides of this option are similar to those of Option 3.1C. Lane reduction from 3 to 2 lanes on Holyhead Road between Four Pounds Avenue and western entrance of Alvis Retail Park will also be required in order to keep the alignment within highway boundary.

From the five options outlined above we would therefore recommend that Option 3.1 is put forward as the preferred option as it has the least impact upon existing vegetation and creates the safest facility for cyclists without increases project costs or impacting heavily on journey times.

7.3.4. *Alternative:* Route 4 (P-PCS-4) - Link from Long Lane to Holyhead Road

This route would provide a 2-way cycle track from Long Lane to Holyhead Road where it joins the Eastern Green Cycleway (Route 3). To achieve the required width, the footway would be widened into the main carriageway (refer to Figure 7-5). Coundon Wedge Drive's total width is approximately 10m wide and currently has advisory lanes which would need to be removed. Due to the 40mph speed, the cycleway will be segregated through the addition of a minimum 0.5m verge between the narrowed carriageway and the track. At the Lyons Drive/Coundon Wedge Drive, two crossing options have been identified:

- Signalised diagonal crossings can be provided before and after the roundabout along Coundon Wedge Drive or;
- The roundabout can be upgraded to signalised so that cyclists can cross at give way lines.

Additional crossings would be provided at the junctions with Staircase Lane and Church walk, where Public Rights of Way cross Coundon Wedge Drive. At the A4114 Pickford Way/Holyhead Road roundabout, the cycleway joins the Eastern Green route on the southbound direction.

Figure 7-5 - Route 4 Sketch

7.4. RAG Summary Table

Table 7-1 - Comparison of alternative crossing options for Coventry Cycleways

Comparison Heading	Route 1 (P-PCS-1)	Comment	Route 2 (P-PCS-1)	Comment	Route 3 (P-PCS-1) (3.1)	Comment	Route 3 (P-PCS-1) (3.1A)	Comment	Route 3 (P-PCS-1) (3.1B)	Comment	Route 3 (P-PCS-1) (3.1C)	Comment	Route 3 (P-PCS-1) (3.1D)	Comment	Alternative: Route 4 (P-PCS-4)	Comment
Timescales		Utility diversions and approvals required		Significant road closures and diversions required		Less disruption to Pickford Way and private accesses		Increased disruption to traffic during works to Pickford Way central reservation and roundabout		Reduced need for diversions and road closures during construction		Disruption to side roads and private accesses		Disruption to side roads and private accesses		Small disruption to traffic during works on lane that is being affected
Cost		Changes to geometry, potential for utilities being affected		This may be high if land purchase is required		Changes to geometry, utilities may be affected		Additional earthwork and drainage design required		Low risk of utilities being affected		Changes to geometry, utilities may be affected		Changes to geometry, utilities may be affected		Changes to geometry, utilities may be affected
Environmental Impact		Felling of a few trees to provide space for cycleway		Section of parkland needed for cycleway		Within flood zones 2 and 3		Proximity to Pickford Brook		Impacts to parkland as cyclists go through it		Felling of a few trees to provide space for cycleway		Felling of a few trees to provide space for cycleway		Can be accommodated within highway width
Acceptability		Parking space relocation and peak time restriction		Although impacts on properties' accesses it provides better infrastructure for residents		Avoids crossing private accesses and cyclists remain on one side of the road		Cyclists may be opposed to crossing carriageway and roundabout		Issues with going through Allesley park		Increased number of side roads and private accesses		Increased number of side roads and private accesses		Likely to be welcomed by residents and Lions Park employees

8. Rowley's Green

8.1. Overview

The existing junction is a large signalised gyratory, approximately 100m diameter, and serves the A444 to the north and south, Winding Horse Lane to the west and Judds lane and the Ricoh Arena to the west. The number of lanes around the gyratory varies between three and five gyratory arranged in spiral markings to maximise the flow around the junction.

The link to the north is a rural standard all-purpose dual carriageway which connects to Junction 3 of the M6. This link is subject to a 50mph speed limit which reduces to 40 mph on the immediate approach to the junction. There are three lanes on approach and exit to the roundabout, but the majority of the link consists of two lanes in each direction. There is only one junction along this link; a left in/left out access into an industrial estate on Silverstone Drive. The corridor contains a wide bank of cutting or embankment up to 15m wide, containing semi-mature hedgerows.

The link to the south consists of an urban standard all-purpose dual carriageway which continues into Coventry city centre, and is subject to a 50-mph speed limit. To the south of Rowley's Green junction, a signalised junction serving Arena Park Shopping Centre and Ricoh Arena Car Park is located approximately 0.5km to the south. In addition, an exit from the Ricoh Arena is located midway along this link on the southbound carriageway. The number of lanes on this link increases from three to four on the northbound approach to the gyratory. A pedestrian footbridge crosses the A444 carriageway 100m south of the junction with a further pedestrian subway crossing the carriageway closer to the Arena Park junction.

Winding House Lane, to the west of Rowley's Green roundabout, is a single carriageway road subject to a 40mph speed limit. The carriageway widens out to three lanes on the approach to the roundabout, with two lanes exiting but reducing to one lane 150m from the roundabout.

Shortlisted options to improve the congestion in the vicinity of the junction include;

- Option 1 (S-RGI-1) – Free-flow lane between Winding Horse Lane and A444
- Option 2 (S-RGI-2) – North-South flyover the A444 mainline carriageway
- Option 3 (S-RGI-4/5) – Reconfigure disused railway for Very Light Rail (VLR) or Bus Rapid Transit (BRT)

Plus one further alternative design option which was not shortlisted, but has been included here for information:

- Option 4 (S-RGI-6) – Reconfigure disused railway as a cycle route

8.2. Environmental Constraints

A Stage 1 Environmental Review has been undertaken for the scheme area, and is shown in Appendix F. Note this does not include the alternative design option S-RGI-6. Table 8-1, below, provides a summary of the key findings of the review.

Table 8-1 - Rowley's Green - Key Environmental Constraints

Topic	Constraint	Further Comment	Further Actions Likely Required
Air Quality	The Scheme is located within Coventry City-Wide AQMA. There are a large number of residential properties in close proximity to the Scheme, which would be sensitive to air quality impacts.	Temporary impacts to air quality likely to occur during construction. The Scheme may also result in changes to the current traffic flow and therefore, result in long-term changes to air quality. Options S-RGI-4 and -5, which utilise more sustainable public transport, would potentially result in greatest benefits to long-term air quality.	As the Scheme progresses, a suitably qualified specialist is recommended to screen the Scheme against the Institute of Air Quality Management criteria to recommend the need for further assessment.
Cultural Heritage	There are no known statutory or non-statutory heritage assets within 300m of the Scheme area. The risk to unknown buried archaeology is anticipated to be low.	Impacts to known heritage assets not currently anticipated.	HER data should be purchased during the design stage, in order to better understand the heritage assets in the area, including the potential for buried archaeology within the main Scheme boundary. This is also likely to be required a part of the planning process.
Landscape and Visual Effects	The landscape and visual sensitivity of the Scheme area is deemed to be low. However, the Scheme area is partially within Birmingham Greenbelt land. There are also a number of residential properties located to west. However, it is not believed that these residential receptors currently have direct views over the Scheme area.		Vegetation clearance should be kept to a minimum and landscaping reinstatement should be considered during the design stage. One extents of vegetation clearance are better known, an arboriculturist should be consulted to determine if trees have any statutory protections and recommend any suitable RPZs. The design should be aware of potentially causing new visual impacts to these adjacent residential receptors, particularly for Options S-RGI-4 and -5 which are closest to the residential properties.

Topic	Constraint	Further Comment	Further Actions Likely Required
Biodiversity	There are no designated sites within 1km or habitats of principal importance within proximity to the Scheme area. The disused railway line and woodland block located to the west of the Scheme, does have potential to provide habitats known to support ecological protected species.	Options which require works within the adjacent disused railway line and woodblock, would likely result in impacts to notable ecological species and their habitats.	Scheme options should minimise the need for clearance of vegetation and habitats where possible. As the Scheme progresses, Scheme options should be reviewed and the need to undertake further ecological survey and assessment should be determined.
Geology and Soils	The Scheme extent is underlain by a principal aquifer and within an area of high groundwater vulnerability. The presence of onsite contaminants is not known however, potential contaminants include onsite made ground, asbestos and contaminants associated with the operation of the highway e.g. coal-tar and diesel. The Scheme is within a high-risk area to UXO.	N/A	As the Scheme progresses, input from a suitably qualified specialist should be sought, to prepare a scope for further detailed assessments where necessary e.g. Phase 1 ground survey and ground water risk assessment. A detailed UXO assessment, to assess the risk of unexploded ordnance being present in the vicinity of the site may also be required.
Material Assets and Waste	The proposed Scheme will likely result in the generation of CDEW. There is also potential for hazardous waste to be generated.	N/A	It is recommended that further assessment is undertaken as early as possible to more accurately estimate the types and quantities of potential waste arisings, and consideration as to how these will be managed.
Noise and Vibration	The Scheme is not within a Noise Important Area (NIA). Number of receptors sensitive to noise and vibration within the surrounding area.	Options S-RGI-4, and -5, which propose the introduction of a light rail or bus route, in close proximity to the adjacent residential buildings would potentially create the greatest long-term noise impacts.	As the Scheme progresses and more detail on the Scheme and construction methodology is known, then proposed Scheme should be reviewed by a noise specialist, to determine if a noise impact assessment would be required and where necessary and to liaise with the local EHO.

Topic	Constraint	Further Comment	Further Actions Likely Required
Population and Human Health	Several residential areas, community assets and businesses within surrounding area. There are dedicated foot and cycle lanes within the Scheme area.	Temporary disruption anticipated during construction, which will be managed by principal contractor.	During the design, land ownership records should be checked to ensure the correct permissions are obtained where necessary, to access land parcels and complete works associated with the proposed Scheme. The design should also ensure that the current foot and cycle way provisions within and surrounding the Scheme area, remain unaffected, particularly during the operational stage of the Scheme.
Road Drainage and the Water Environment	There are not believed to be any waterbodies or watercourses within the Scheme extent. The nearest designated main river is located approximately 600m east. The Scheme is located within in Flood Zone 1 and is underlain by a principal aquifer with high groundwater vulnerability.	N/A	As the Scheme progresses, further assessment relating to flood risk, water quality and groundwater protection may be required.

8.3. Design Options

Options to improve the congestion in the vicinity of the junction include;

- Option 1 (S-RGI-1) – Free-flow lane between Winding Horse Lane and A444
- Option 2 (S-RGI-2) – North-South flyover the A444 mainline carriageway
- Option 3 (S-RGI-4/5) – Reconfigure disused railway for Very Light Rail (VLR) or Bus Rapid Transit (BRT); and

An alternative design option:

- Option 4 (S-RGI-6) – Reconfigure disused railway as a cycle route

8.3.1. Option 1 (S-RGI-1) – Free-flow lane between Winding Horse Lane and A444

A segregated free-flow lane would be feasible between the two arms and would entail widening out the carriageway on the inside of the bend (refer to Figure 8-1 for the sketch and Figure 8-2 for a schematic layout). Construction for the exit and entry taper would extend approximately 150m in both directions. There are several constraints in the area which would need to be resolved:

1. Burbage Lane accesses onto Winding House lane approximately 70m from the gyratory; this access would need to be stopped up to allow for the free-flow lane, with access onto Winding House Lane re-directed via Wheelwright Lane 0.7km further to the south.
2. Acquisition of land from the industrial property located between the two arms. This would need to be sufficient to allow for the lane itself and the required visibility splay, although it would not affect the building in the centre of the plot.
3. A communications mast and cabinet may need to be re-located to accommodate the free-flow lane.
4. An existing retaining wall is currently located on the inside of the bend at the edge of the property, and this will need to be removed along with the retained earthworks.

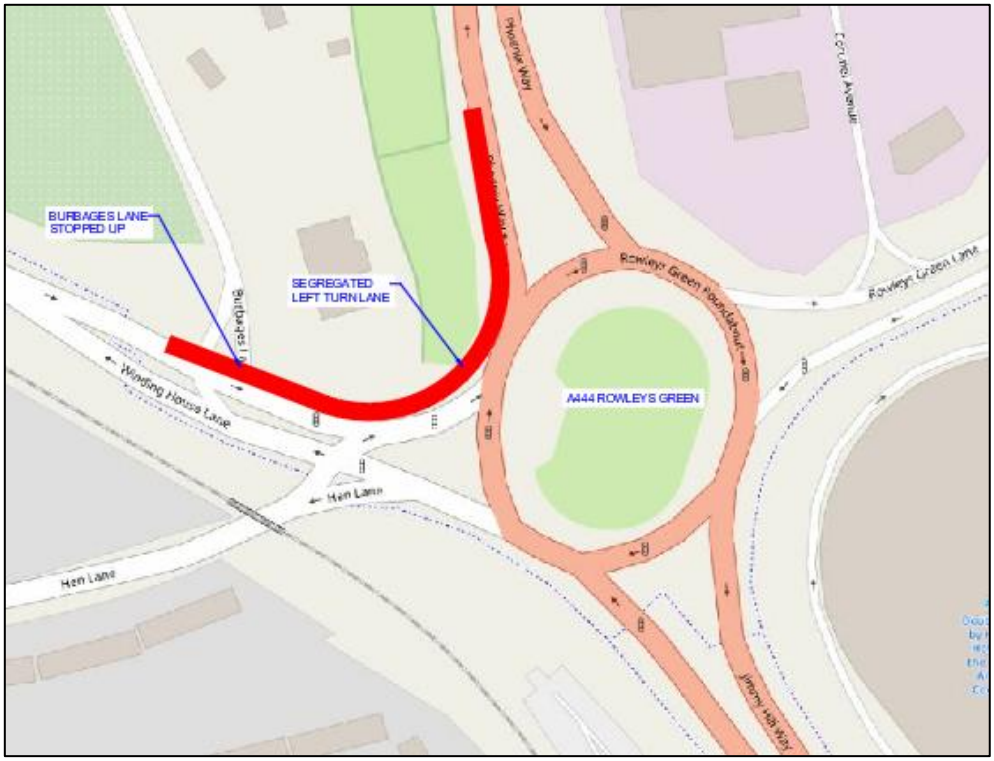

Figure 8-1 - Option 1(S-RGI-1) Sketch

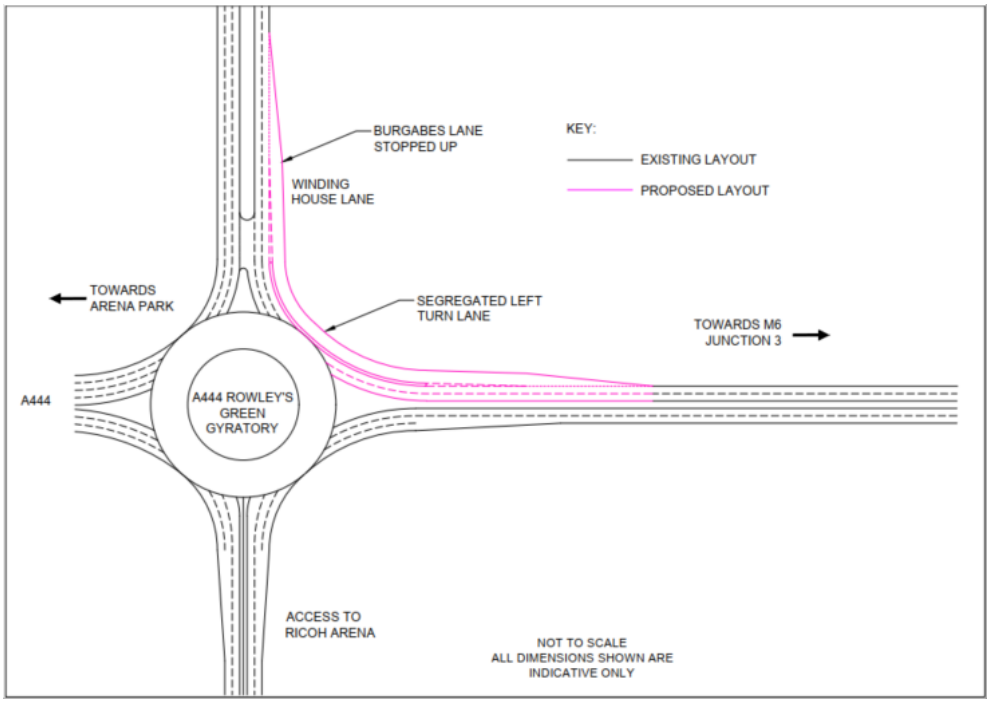

Figure 8-2 - Free-flow lane between Winding Horse Lane and A444 Schematic Layout

8.3.2. Option 2 (S-RGI-2) – North-South flyover A444 mainline

The existing circulatory contains up to five lanes in certain sectors yet the junction still reports high congestion at peak times. Significant benefit could be accrued by separating the straight through traffic, i.e. northbound to M6 Junction 3 and southbound to Coventry city centre. This could be achieved by constructing a flyover through the junction for the A444 traffic tying back down into the existing carriageway on either side (refer to the sketch layout in Figure 8-3 and the schematic layout **Error! Reference source not found.**).

The viaduct would need to rise up to approximately 8m to provide adequate headroom and construction depth above the existing circulatory. The form of construction would need to be determined at a later stage of development, but would likely consist of a series of spans in a viaduct over a length of approximately 200m, with cantilevers possibly to allow the at-grade entry and exit lanes to run partially underneath close to the roundabout. The approach ramps would need to rise up over a distance of 150m with a 6% maximum permissible gradient, and would be formed on earthworks embankments, but with shear retaining walls either side to reduce the footprint. The width of the corridor available within the highway boundary appears narrow, and it is likely that some land would be required from the adjacent landowners.

The speed limit along the link to the south of Rowley's Green is 50 mph, and there would therefore be a constraint posed by the short weaving distance between the Arena Park junction and the tip of nosing to the start of the flyover (in both directions). Southbound traffic from M6 J3 would need to be signed to reach the Arena Car Park by using the flyover and signed through the existing Rowley's Green junction to reach Arena Park Shopping Centre. This layout would preclude traffic wishing to use the car park to turn right at Rowley's Green junction due to the crossing manoeuvre created by the southbound traffic on the flyover. They would instead need to continue to the next junction and carry out a U-turn at the roundabout. Traffic emerging from the car park to travel north will be able to reach either traffic stream as the junction is controlled by signals, and therefore the weaving issue should not be a problem for northbound traffic. Notwithstanding, signing for M6 J3 should be placed south of the Arena Park junction to avoid crossing manoeuvres on the approach to the flyover.

The link to the north could accommodate a similar approach to the south, except that there would be no issues with weaving as the M6 junction would lie a further 1km from the tie in from any proposed flyover. Access onto the flyover would not be possible from the Silverstone Drive junction, however this would simply use the left-hand lanes that would run to the existing Rowley's Green junction.

A pedestrian footbridge is located 100m to the south of the roundabout linking the Arena Car Park directly into the Ricoh Arena internal access road. This would need to be removed to accommodate a new flyover through the junction, as the levels would clash directly. An alternative means of access either side of the A444 would

need to provide a minimum of 100m further to the south, before the start of the rise for the flyover, however this would need to be agreed with Ricoh Arena. A sub-way between the Car Park and the Arena is located 370m south of the roundabout, and any widening works would need to ensure that the structural integrity of the subway is not affected.

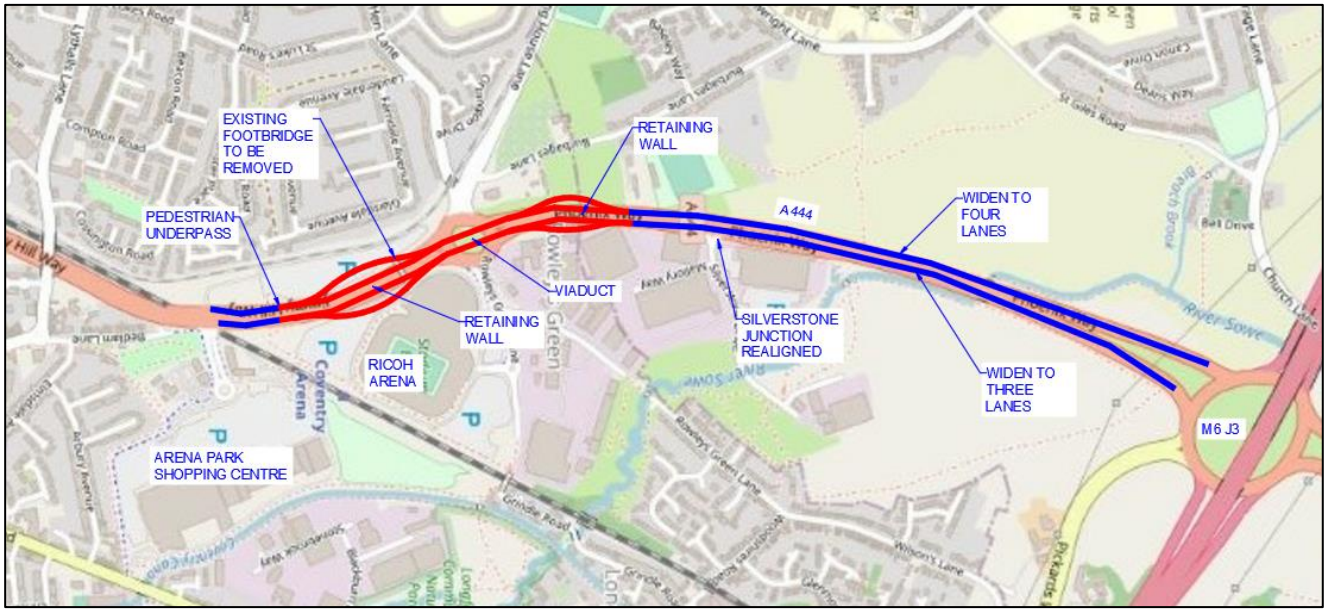

Figure 8-3 - Option 2 (S-RGI-2) Rowley's Green Flyover Sketch

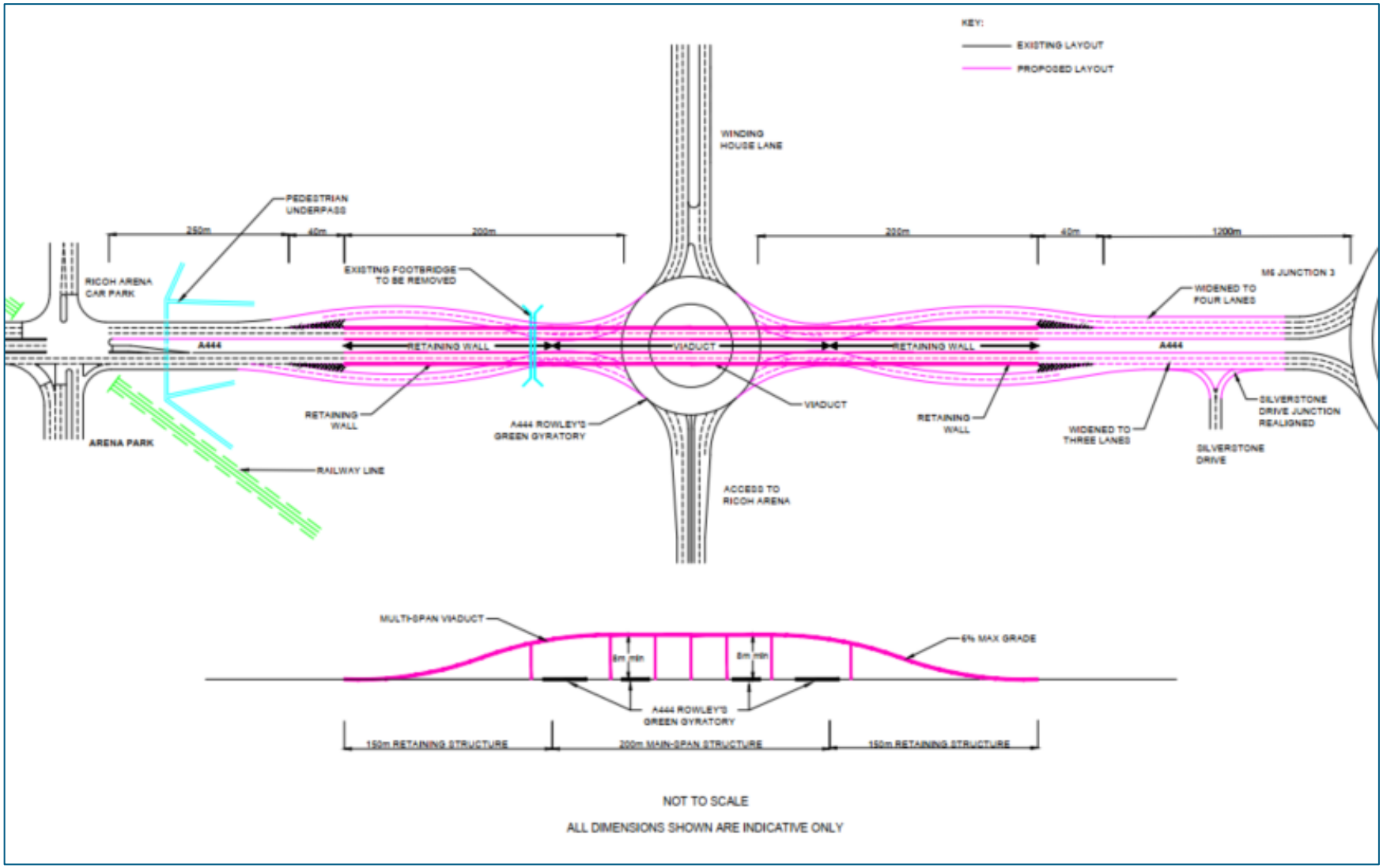

Figure 8-4 - North-South flyover A444 mainline Schematic Layout

8.3.3. Option 3 (S-RGI-4/5) – Reconfigure disused railway for Very Light Rail (VLR) or Bus Rapid Transit (BRT)

A line of disused railway track runs to the west of the A444 as far as Rowley's Green roundabout before veering to the west to run to the south of Winding House Lane. This line commences in the vicinity of the Arena Park as a diverge from the mainline railway line and extends further west into Keresley. The redundant line consists of a single track which has been fenced off in a corridor approximately 6m wide. The bridge over Hen Lane, close to Rowley's Green appears to have been built to accommodate a second track. The track then runs in a narrow corridor between the existing properties and the Winding House Lane carriageway, before crossing Wheelwright Lane at an at-grade level crossing.

The horizontal and vertical alignments, being formerly used as a rail line, would be suitable for use as a route for VLR or BRT. However, the existing corridor through much of its length, only accommodates a single track. Whilst the structure on Hen Lane would appear to be wide enough to accommodate a two-way vehicle track, there is a constraint along Winding House Lane. Either the carriageway would need to be adjusted further to the north or land taken from the properties to the south, particularly at the level crossing on Wheelwright Lane. The structure over Hen Lane, constructed in 1912, would need to be examined to check for deterioration if it were to be re-used for vehicular traffic.

The existing railway line lies away from access points for pedestrians; facilities would need to be provided to provide safe means of access for all users, e.g. adjacent to the Ricoh Arena Car Park and Wheelwright Lane. Lighting and communications would be required as part of any upgrade, either along the track or fed locally from the pedestrian access points. The section shown would only form part of a wider VLR/RT project, as in isolation a scheme covering the area as shown would not provide significant benefits; the continuity of this proposal would need to be established i.e. if a VLR or BRT would connect beyond the limits shown into Coventry City Centre or extend further to the west as far as Keresley.

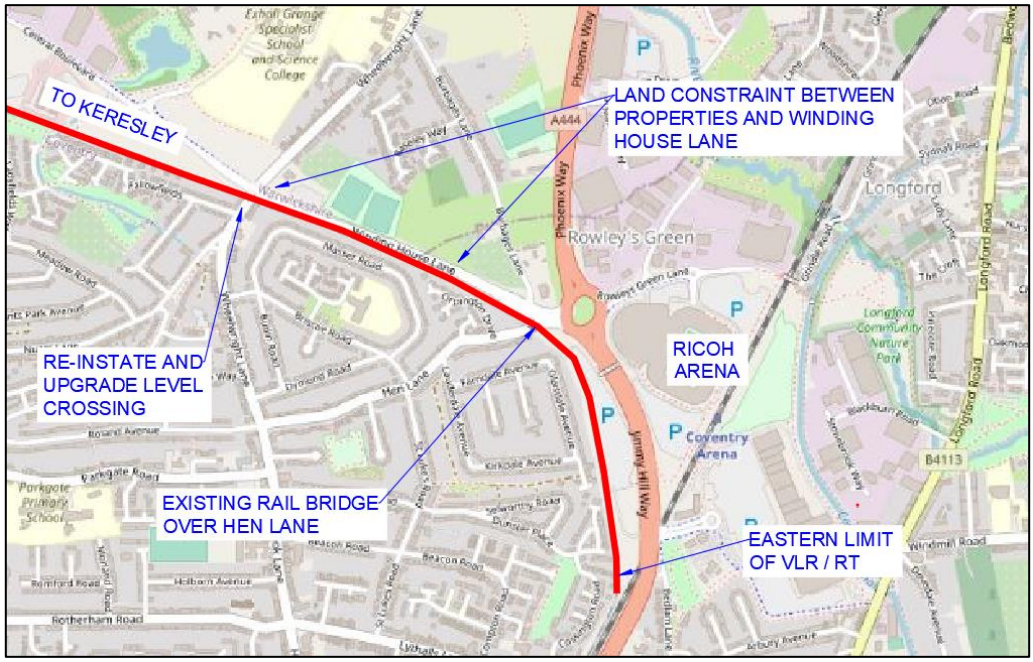

Figure 8-5 - Option 3 (S-RGI-4/5) VLR or Bus Rapid Transit

8.3.4. *Alternative:* Option 4 (S-RGI-6) – Reconfigure disused railway as a cycle route

As above, the horizontal and vertical alignments, being formerly used as a rail line, would also be suitable for use as a cycle route (Figure 8-6 - Option 4 (S-RGI-6) Reconfigure disused railway as a cycle route). The width would be adequate for use, although re-surfacing would be required throughout, as well as lighting along the length of the track. The level crossing on wheelwright Lane would need to be re-configured as a controlled toucan crossing due to the close proximity of turning traffic from Winding House Lane. There is an existing shared NMU route from Rowley's Green roundabout which crosses over to the north side of Winding House Lane opposite the access into Burbage Lane.

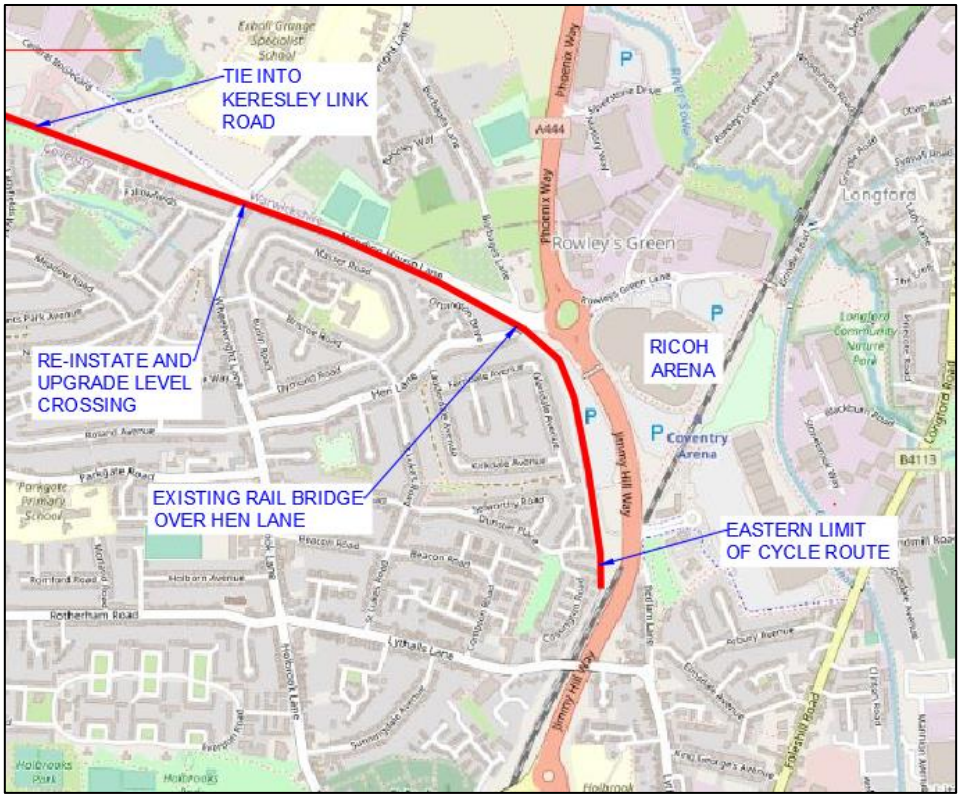

Figure 8-6 - Option 4 (S-RGI-6) Reconfigure disused railway as a cycle route

Although there is an existing cycle route facility along Winding House Lane, this option would provide benefits as it would avoid the need to cross over the carriageway and also link the facilities at Rowley's Green with the proposed cycle route along Keresley Link Road.

8.4. RAG Summary Table

Comparison Heading	Option 1 (S-RGI-1)	Comment	Option 2 (S-RGI-2)	Comment	Option 3 (S-RGI-4/5)	Comment	*Alternative:* Option 4 (S-RGI-6)	Comment
Timescales		Land acquisition and road diversion		Majority of works on-line		Works on Winding House Lane		Within available land
Cost		Possible retaining structure and impact upon transmission mast		Expensive long-span structure		Widening of track and reconfiguring of Winding House carriageway Lighting, reconstruction of track and controlled crossing		Lighting, reconstruction of track and controlled crossing
Environmental Impact		Minimal impact		Some visual impact upon neighbourhood		Some impact to properties on Winding House Lane		Limited impact
Acceptability		Re-routing of Burbage Rd to consider		Many benefits to traffic, but loss of pedestrian route to Ricoh Arena		Links Keresley to Ricoh Arena		Would link up with Keresley Link Road

9. A444 Newton Road Junction

9.1. Overview

The existing junction lies on the A444 dual carriageway link between the M6 Junction 3, to the north of Coventry, and an at-grade roundabout to the south of Bermuda. The length of this link is approximately 3.6km and is subject to national speed limit. There is one other junction along this link which comprises a left in/left out access from the southbound carriageway into the north side of Bedworth.

The existing junction comprises south facing slips only, with direct tapers leading to single lane slip roads. The northbound diverge enters into Newtown Road at a signalised junction. Entry to the southbound merge is via a priority junction, with a ghost island providing a turning lane for eastbound traffic on Newtown Road.

Options to upgrade the A444 Newton Road junction include;

- Option 1 S-NRS-1 Realignment of the NB diverge and new northbound merge

Plus two alternative design options presented for information:

- Option 2.1 S-NRS-1a Simple northbound merge slip; and
- Option 2.2 S-NRS-1b Simple southbound diverge slip

9.2. Environmental Constraints

A Stage 1 Environmental Review has been undertaken for the scheme area, and is shown in Appendix G. Table 9-1, below, provides a summary of the key findings of the review.

Table 9-1 - Newtown Road - Key Environmental Constraints

Topic	Constraint	Comment	Further Actions Likely Required
Air Quality	There are several sensitive receptors near the Scheme, including residential properties, medical premises and ecological designated sites. There are no AQMA within 200m.	Temporary impacts to air quality likely to occur during construction. The Scheme may also result in changes to the current traffic flow and therefore, result in long-term changes to air quality.	As the Scheme progresses, a suitably qualified specialist is recommended to screen the Scheme against the Institute of Air Quality Management criteria to recommend the need for further assessment.
Cultural Heritage	There are no known historic (statutory or non-statutory) assets within 300m of the Scheme area. There is potential for unknown buried archaeology to be present in the undeveloped land parcels to the north west.	Impacts to known heritage assets not currently anticipated. However, undeveloped land parcels to the north-west may impact on unknown buried archaeology.	Consideration should be given during the design to avoid any proposals in previously undeveloped land, which may result in disturbance of any unknown buried archaeology. HER data should be purchased during the design stage, in order to better understand the heritage assets in the area, including the potential for buried archaeology within the main Scheme boundary. This is also likely to be required a part of the planning process.
Landscape and Visual Effects	There are many residential properties which have views over the Scheme area. Areas of broadleaved deciduous woodland in the immediate area.	Requirements for vegetation clearance will likely result in impacts on landscape and visual amenity.	Vegetation clearance should be kept to a minimum and landscaping reinstatement should be considered during the design stage. Once extents of vegetation clearance are better known, an arboriculturist should be consulted to determine if trees have any statutory protections and recommend any suitable RPZs.

Topic	Constraint	Comment	Further Actions Likely Required
Biodiversity	Bedworth Sloughs LNR is located directly adjacent to the north-east of the Scheme extent. Habitats and structures within and directly adjacent to the Scheme extent have the potential to support protected species. Deciduous woodland (habitat of principal importance) located to the east of the A444.	Direct impacts to the LNR not anticipated. The Scheme has the potential to cause disturbance and destruction of protected species and their habitats.	As the Scheme progresses, proposals should be reviewed and the need to undertake further ecological survey and assessment should be determined. The Scheme should minimise the need for clearance of vegetation and habitats where possible. If clearance of deciduous woodland (located to the east) cannot be avoided, then a mitigation strategy to reinstate this lost habitat would likely be required.
Geology and Soils	The Scheme extent is underlain by a Principal Aquifer (bedrock) and within an area of moderate groundwater vulnerability. The presence of onsite contaminants is not known however, potential contaminants include onsite made ground, asbestos and contaminants associated with the operation of the highway e.g. coal-tar and diesel. Scheme may require development of agricultural land parcels to the north-west.	N/A	As the Scheme progresses, input from a suitably qualified specialist should be sought, to prepare a scope for further detailed assessments where necessary e.g. Phase 1 ground survey and ground water risk assessment. Appropriate soil management plans should also be in place where necessary, to safeguard the loss of any Best Most Versatile (BMV) soils associated with the agricultural land to the north-west.
Material Assets and Waste	It is likely that the materials required for the Scheme could include concrete, metal, aggregates and asphalt / bitumen surface material. Waste streams are likely to include soils, vegetation clearing, concrete and road surface materials. There is also potential for hazardous waste to be generated.	N/A	It is recommended that further assessment is undertaken as early as possible to more accurately estimate the types and quantities of potential waste arisings, and consideration as to how these will be managed. Impacts arising from material use and waste should be mitigated through good design and construction / demolition good practices.

Topic	Constraint	Comment	Further Actions Likely Required
Noise and Vibration	The Scheme is within a Noise Important Area (NIA). Large number of receptors sensitive to noise and vibration within the surrounding area (residential properties).	Scheme has potential to cause increase noise and vibration impacts during construction and operation stages.	As the Scheme progresses and more detail on the Scheme and construction methodology is known, then proposed Scheme should be reviewed by a noise specialist, to determine if a noise impact assessment would be required and where necessary and to liaise with the local EHO.
Population and Human Health	Several residential areas, community assets and businesses within surrounding area.	Temporary disruption anticipated during construction, which will be managed by principal contractor.	During the design, land ownership records should be checked to ensure the correct permissions are obtained where necessary, to access land parcels and complete works associated with the proposed Scheme
Road Drainage and the Water Environment	There are not believed to be any waterbodies or watercourses within the Scheme extent. The nearest designated main river is located approximately 90m south. Bedworth Sloughs lake also located ~150m east. The Scheme is located within in Flood Zone 1 and is underlain by a principal aquifer with moderate groundwater vulnerability.	N/A	As the Scheme progresses, further assessment relating to flood risk, water quality and groundwater protection may be required.

9.3. Design Options

Options to upgrade the A444 Newton Road junction include;

- Option 1 S-NRS-1 Realignment of the NB diverge and new northbound merge;

Plus two alternative design options:

- Option 2.1 S-NRS-1a Simple northbound merge slip; and
- Option 2.2 S-NRS-1b Simple southbound diverge slip

9.3.1. S-NRS-1 Option 1

An outline sketch included in Vectos' Woodlands Access Assessment shows the northbound diverge realigned closer to the A444 to line up with a new junction containing a link to a new northbound merge slip. The new link would to the north of Newtown Road would consist of a two-way carriageway to connect to new developments, before forming a slip to merge with the A444 (See Figure 9-1 and Appendix 6). The layout produced by Vectos only included the northbound link and development on the west side of the A444, and no southbound diverge slip was considered. The realigned diverge re-uses the existing diverge taper and nosing but continues northwards in a straighter alignment towards Newtown Road. The new slip would remove some of the visual screening within the existing embankment and would need to be benched into newly formed earthworks. It would also need a culvert to cross over the existing stream which passes beneath the A444. The redundant length of slip could be broken up and the existing culvert removed to compensate for the covering of the stream under the realigned slip. There should be no issues with the horizontal alignment on the new slip, with possibly a slight improvement in visibility on exit from the mainline due to the straighter alignment, however the sharp crest curve at the back of nose may be sub-standard, and this would constrain forward visibility on exit from the mainline carriageway, although no worse than existing.

The new junction is shown approximately 50m to the west of the A444 underbridge, and consists of signals on the new slip, the new link to the north and Newton Road in both directions. The two new links have been brought together for ease of phasing. The stop line on the slip road is shown set back to allow for a footway crossing, however this will need to be checked to determine whether there would be adequate visibility to the signals and pedestrian crossing on Newtown Road to the east, as the existing vegetation and structure is likely to be a constraint. The signals and crossing to the east on Newtown Road are set under the A444 structure, and there would be some concern at this location due to the level of lighting at this point, as it would be significantly darker during daytime, than the surrounding roads. The safety of NMUs using the crossing facility would be a cause for concern, as well as the visibility to the signal head for vehicles travelling westbound.

The new link to the north of the junction would require the stopping up of the southern end of Newtown/Woodlands Road and run adjacent to the A444 carriageway before joining up with a new roundabout providing access to a development. The new link would need to ensure that the integrity of the top of the A444 embankment is maintained. This contains a close-boarded noise fence at the top of the slope. A retaining structure would therefore be required, over a length of approximately 150m, rising up to 6m high. The barrier and parapets on the A444 would need to be assessed and possibly replaced as part of this phase of work.

The length of slip road and taper appear short in the northbound merge slip as shown on Vectos' sketch VD18716-SK01, and it is likely that the start of the nosing and end of taper would need to be located a further 100m northwards.

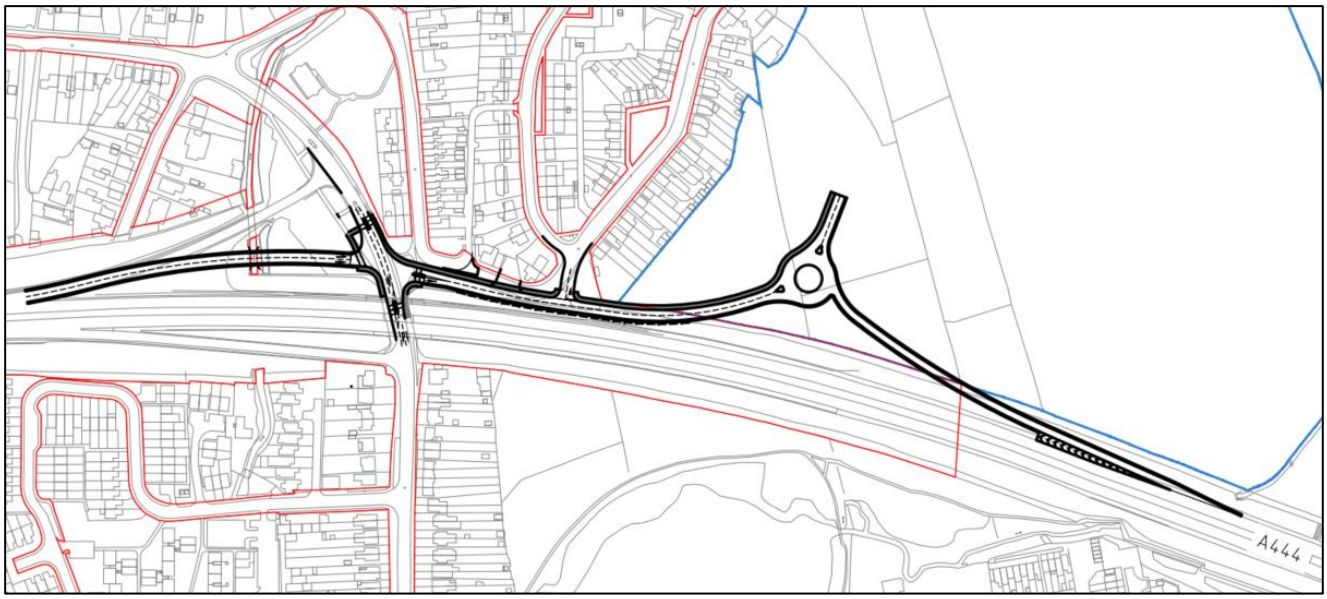

Figure 9-1 - Vectos sketch VD18716-SK01

9.3.2. *Alternative:* S-NRS-1a Option 2.1 – Northbound Merge

Warwickshire County Council (WCC) produced a design showing simple north facing merge and diverge slips onto the A444, as shown on Figure 9-2 and Appendix 10.1.A.4.

Northbound merge

This would consist of a simpler arrangement retaining the existing northbound diverge junction and adding a single lane slip road directly from Newtown Road to merge directly into the A444 northbound carriageway. However, this is severely constrained by the existing road network to the east of the A444. Although it may be possible to fit in the slip in the narrow corridor between Woodlands Road and the main carriageway, it would require extensive retaining structures either side of the slip, requiring the removal of the dense vegetation and visual screening. As above, the barrier and parapets on the A444 would need to be assessed and possibly replaced as part of this phase of work.

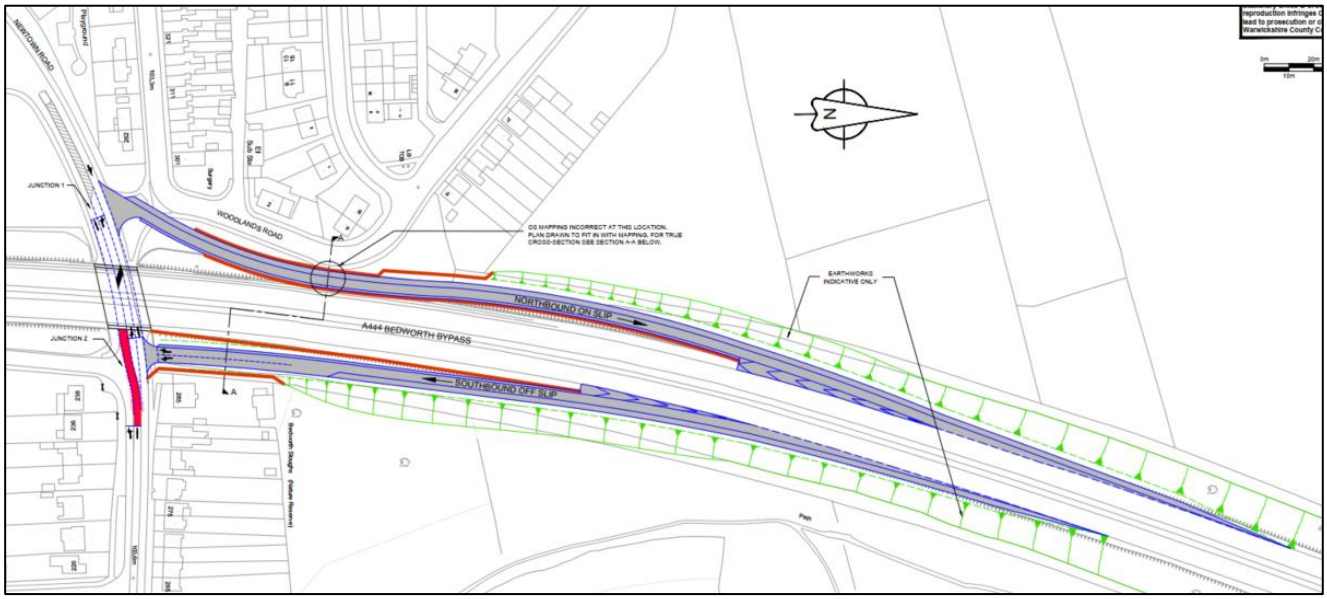

Figure 9-2 - Extract from WCC drawing H/A444-30\010A

9.3.3. *Alternative:* S-NRS-1b Option 2.2 – Southbound Diverge

The southbound carriageway contains an additional junction into Sunderland Drive approximately 0.9km north of Newtown Road, consisting of a left-in/left-out access. A further southbound diverge would be commence approximately 0.5km south of the Sunderland drive merge taper, which would be a departure from standard for the sub-standard weaving length. The compliant distance for an all-purpose carriageway is 1km.

A simple diverge taper and slip onto Newtown Road would be severely constrained by the properties along Newtown Road. Although the gap between the A444 carriageway and the nearest property boundary is approximately 17m, the majority of the vegetation would need to be cleared to accommodate a slip road, resulting in the loss of visual screening to the properties. It would also require extensive retaining structures either side of the slip, and modification to the existing bridge structure.

Forming a junction on the east side of the A444 would be constrained by the close proximity of the bridge structure, with the entry radius needing to commence under the bridge. The visibility splays to the junction (signalised or priority) would also be constrained in both directions, by the property boundaries along Newtown Road and the bridge structure.

9.4. Issues to consider

- The intervisibility shown in the junction, as shown in the sketch provided by Vectos, is constrained by the bridge structure.
- Constraints to provision of a junction on the east side due to close proximity of properties.
- Realigned slip roads would remove mature trees and the visual screening to the adjacent properties
- New slip roads would provide additional noise source closer to the recipients
- Road network to the east of A4444 to be re-configured to suit new junction
- Very narrow corridor to the east of the A444
- Additional retaining structures and possible modification to the existing bridge required to accommodate new slips.
- Future maintenance of large structure adjacent to A444
- Noise fence, parapet and barrier systems on A444 to be assessed and possibly modified as part of the works.
- New culvert required for stream crossing beneath the A444
- Sub-standard weaving on southbound carriageway between Sunderland Drive junction and potential SB diverge

The layout produced by WCC and by Vectos were shown on Ordnance Survey background, which would inevitably contain a margin of error. The distances available in the narrow corridors for the proposed slip roads would therefore need to be verified with accurate surveys to determine whether they are feasible.

The site of potential new slip roads and junction on Newtown Road is constrained by adjacent properties and the existing A444 underbridge. The Vectos option considers a tie-in to the A444 located further to the north, which would reduce the impact upon the nearby residential area, but the safety of the junction would need to be considered carefully if this option is to be taken further. The southbound carriageway is already served by the access into Sunderland Drive, which would create a sub-standard weaving distance to a new junction to the south. The intervisibility of the proposed junction on Newtown Road would need to be assessed in detail using accurate 3D topographical surveys to ensure that desirable visibility can be achieved throughout the unction and on approach through the structure.

9.5. RAG Summary Table

Comparison Heading	Option 1 (S-NRS-1)	Comment	Alternative: Option 2.1 (S-NRS-1a)	Comment	*Alternative:* Option 2.2 (S-NRS-1b)	Comment
Timescales		To fit development of properties		Majority of works within highway boundary		Majority of works within highway boundary
Cost		Large structure adjacent to A444		Large structure adjacent to A444		Large structure adjacent to A444
Environmental Impact		Loss of visual screening and noise pollutants to adjacent properties		Loss of visual screening and noise pollutants to adjacent properties		Loss of visual screening and noise pollutants to adjacent properties
Acceptability		Provides access to new development Signals and stop lines under structure Maintenance of structure		Impact on existing structure Maintenance of structure		Junction constrained by properties and bridge Sub-standard weaving length Maintenance of structure

10. Summary of Options

10.1. Overall RAG table

Option ID	Scheme Description	Timescales RAG	Comment	Cost RAG	Comment	Environmental Impact RAG	Comment	Acceptability RAG	Comment	Overall Rating RAG
C-KLR-1	No Link Road	Not assessed								
C-KLR-2	Partial Link Road	Not assessed								
C-KLR-3	Option 1		Impacts upon several third-party land which may extend project time scale.		Impacts upon LHP gas main over a large section and incorporates an additional junction. Initial cost estimate: £15.5m		Less impact upon Jubilee Woods		Impacts upon more third-party land and LHP gas main over a greater distance.	
C-KLR-4	Option 2		Impacts upon third party land at Bennetts Road removed.		Doesn't utilise existing alignment of Watery Lane. Initial cost estimate: £15.5m		Less impact upon Jubilee Woods		Adopts 'S-bend' which is an unfavourable alignment	
C-KLR-5	Option 2A		Impacts upon third party land at Bennetts Road removed.		Doesn't utilise existing alignment of Watery Lane. Initial cost estimate: £15.5m		Has a greater impact upon Jubilee Woods		Has a greater impact upon Jubilee Woods	
C-M6J3-1	No improvement	Not assessed								
C-M6J3-2	Optimise traffic signals	Not assessed								

Option ID	Scheme Description	Timescales RAG	Comment	Cost RAG	Comment	Environmental Impact RAG	Comment	Acceptability RAG	Comment	Overall Rating RAG
C-M6J3-3*	M6 J3 Hamburger-style layout / 'J' links		Within highway boundary		Orthodox road construction		Some impact upon existing vegetation and screening within gyratory		Proposal within footprint of existing gyratory. Impact upon existing compound within gyratory	
C-M6J3-4*	M6 J3 Free flow lanes		Adjacent land required		Costs associated with widening existing slip roads structures.		NW of J3 – widening in vicinity of structures. River Sowe.		A444 SB to M6 EB merge most feasible.	
C-M6J3-5	A444 Tunnel		Complex construction, but within highway boundaries		Lifetime operation and maintenance may exceed construction costs		Tunnel would be located within area prone to flooding		Very high cost to construct and maintain	
Alternative: C-M6J3-6	A444 Flyover		Complex construction, some land acquisition		Lifetime operation and maintenance may exceed construction costs. Pylons diversions		Significant impact caused by construction, noise and visual intrusion		Very high cost, loss of property and disruption	
C-M6J3-7	Removal of B4113 link interchange	Not assessed								
C-M6J3-8	Signal and lane allocation changes	Not assessed								
C-HLC-1	No improvement	Not assessed								
C-HLC-2	Online highway diversion – Over the crossing		Acquisition of land, properties and rail possessions		High costs and land requirements		High visual intrusion due to overbridge		High risk with overbridge construction	
Alternative: C-HLC-2a	Online highway diversion – Under the crossing		Acquisition of land and properties		High costs and land requirements		Associated drainage implications		There may be challenges achieving NR approval	

Option ID	Scheme Description	Timescales RAG	Comment	Cost RAG	Comment	Environmental Impact RAG	Comment	Acceptability RAG	Comment	Overall Rating RAG
C-HLC-3	Offline highway diversion – Stephenson Road		Disruption to railway		High cost to modify or rebuild structure		Potential drainage implications		Risk with structure works and there may be challenges achieving NR approval	
Alternative: C-HLC-3a	Over the railway		Requires housing development		Large earthworks quantities required		High visual intrusion due to overbridge		Excessive gradients and do not comply to standards	
Alternative: C-HLC-3b*	Under the railway		Requires housing development		Avoids purchase of properties. Greater flexibility with design		Some drainage implications		Least problematic	
C-HLC-4	Optimise level crossing	Not assessed								
Alternative: C-HLC-5	Closure of the crossing and diverting traffic along an alternative route		Minimal work required		Minimal impact to existing infrastructure		Increase noise and pollution on diversion route		Long diversion, may not be accepted by users	
P-PCS-1	Route 1 – Coundon Cycle Route (Coundon Road)		Utility diversions and approvals required		Changes to geometry, potential for utilities being affected		Felling of a few trees to provide space for cycleway		Parking space relocation and peak time restriction	
P-PCS-2	Route 2 - Link from Keresley to Coundon Cycleway		Significant road closures and diversions required		This may be high if land purchase is required		Section of parkland needed for cycleway		Although impacts on properties' accesses it provides better infrastructure for residents	
P-PCS-3 (3.1)	Route 3 Option 3.1 - Route from city centre to Eastern Green – via Holyhead Road		Less disruption to Pickford Way and private accesses		Changes to geometry, utilities may be affected		Within flood zones 2 and 3		Avoids crossing private accesses and cyclists remain on one side of the road	

Option ID	Scheme Description	Timescales RAG	Comment	Cost RAG	Comment	Environmental Impact RAG	Comment	Acceptability RAG	Comment	Overall Rating RAG
P-PCS-3 (3.1A)	Route 3 Option 3.1A - Pickford Way Central Reservation		Increased disruption to traffic during works to Pickford Way central reservation and roundabout		Additional earthwork and drainage design required		Proximity to Pickford Brook		Cyclists may be opposed to crossing carriageway and roundabout	
P-PCS-3 (3.1B)	Route 3 Option 3.1B - Allesley Park		Reduced need for diversions and road closures during construction		Low risk of utilities being affected		Impacts to parkland as cyclists go through it		Issues with going through Allesley park	
P-PCS-3 (3.1C)	Route 3 Option 3.1C - Holyhead Rd Southern Side Option		Disruption to side roads and private accesses		Changes to geometry, utilities may be affected		Felling of a few trees to provide space for cycleway		Increased number of side roads and private accesses	
P-PCS-3 (3.1D)	Route 3 Option 3.1D - Holyhead Rd Northern/ Southern Side Option		Disruption to side roads and private accesses		Changes to geometry, utilities may be affected		Felling of a few trees to provide space for cycleway		Increased number of side roads and private accesses	
Alternative: P-PCS-4	Route 4 - Link from Long Lane to Holyhead Road		Small disruption to traffic during works on lane that is being affected		Changes to geometry, utilities may be affected		Can be accommodated within highway width		Likely to be welcomed by residents and Lions Park employees	
P-BPR-1	Bus Park & Ride services between Bermuda Park and Keresley	Not assessed								
P-SAI-1	Coventry/Nuneaton Station accessibility improvements	Not assessed								

Option ID	Scheme Description	Timescales RAG	Comment	Cost RAG	Comment	Environmental Impact RAG	Comment	Acceptability RAG	Comment	Overall Rating RAG
S-RGI-1*	Option 1 – Free-flow lane between Winding House Lane and A444		Land acquisition and road diversion		Possible retaining structure and impact upon transmission mast		Minimal impact		Re-routing of Burbage Rd to consider	
S-RGI-2	Option 2 – North-South flyover A444 mainline		Majority of works on-line		Expensive long-span structure		Some visual impact upon neighbourhood		Many benefits to traffic, but loss of pedestrian route to Ricoh Arena	
S-RGI-3	Rowley's Green: Mainline A444 north-south hamburger layout	Not assessed								
S-RGI-4/5*	Option 3 –VLR / BRT		Works on Winding House Lane		Widening of track and reconfiguring of Winding House carriageway Lighting, reconstruction of track and controlled crossing		Some impact to properties on Winding House Lane		Links Keresley to Ricoh Arena	
Alternative: S-RGI-6*	Option 4 – Cycle route		Within available land		Lighting, reconstruction of track and controlled crossing		Limited impact		Would link up with Keresley Link Road	
S-NM6J-1*	Re-using Corley Services as a junction / M6		Complex construction		Reconfiguration of Corley Services Diversion of local routes		Loss of habitat / woodland Telecommunication mast		High cost, disruption to services (traffic management),	

Option ID	Scheme Description	Timescales RAG	Comment	Cost RAG	Comment	Environmental Impact RAG	Comment	Acceptability RAG	Comment	Overall Rating RAG
S-NM6J-1	Link Road		Land acquisition required		Similar cost for each route anticipated		Further development of alignment required to determine preferred route		High standard connection between M6 & A45. Allows connectivity to Tamworth Road.	
S-NM6J-2	M6 / B4098 Tamworth Road / West of Corley Services		Complex construction		Remodelling local highway network. Diversion of pylons Land acquisition		Sewage Pumping Station Local community		High cost, additional structure, significant remodelling of local roads	
S-NM6J-2	Link Road		Land acquisition required		Similar costs for each route anticipated		Further development of alignment required to determine preferred route		High standard connection between M6 & A45	
S-NM6J-3	M6 / B4102 Meriden Road / West of Corley Services		Complex construction		Remodelling local highway network. Diversion of pylons Land acquisition		Loss of habitat / woodland (Birchley Hay Woods) Impact on local community and Exhibition Centre		High costs, additional structure, significant remodelling of local roads	
S-NM6J-3	Link Road		Land acquisition required		Similar costs for each route anticipated		Further development of alignment required to determine preferred route		High standard connection between M6 & A45.	

Option ID	Scheme Description	Timescales RAG	Comment	Cost RAG	Comment	Environmental Impact RAG	Comment	Acceptability RAG	Comment	Overall Rating RAG
S-NM6J-4*	M6 / Greenfield site / West of Corley Services		Adjacent Land required		Orthodox road construction Land acquisition		Loss of habitat / woodland		Least disruptive to motorway and communities	
S-NM6J-4	Link Road		Land acquisition required		Similar costs for each route anticipated		Further development of alignment required to determine preferred route		High standard connection between M6 & A45.	
S-NM6J-5	Link road between new junction and proposed Eastern Green junction of A45	Presented separately above								
S-NM6J-6	Link road between new junction and A45 at Meriden	Presented separately above								
S-NRS-1	Option 1 – (Vectos Design)		To fit development of properties		Large structure adjacent to A444		Loss of visual screening and noise pollutants to adjacent properties		Provides access to new development Signals and stop lines under structure Maintenance of structure	
Alternative: S-NRS-1a	Option 2.1 – NB Merge		Majority of works within highway boundary		Large structure adjacent to A444		Loss of visual screening and noise pollutants to adjacent properties		Impact on existing structure Maintenance of structure	

Option ID	Scheme Description	Timescales RAG	Comment	Cost RAG	Comment	Environmental Impact RAG	Comment	Acceptability RAG	Comment	Overall Rating RAG
Alternative: **S-NRS-1b**	Option 2.2 – SB Diverge		Majority of works within highway boundary		Large structure adjacent to A444		Loss of visual screening and noise pollutants to adjacent properties		Junction constrained by properties and bridge. Sub-standard weaving length. Maintenance of structure	

*** This option has been highlighted as the preferred option for further investigation**

Appendices

Appendix A. Drawings

A.1. Keresley Link Road

A.2. Cycle Improvements

A.3. Rowley's Green

A.4. A444 Newton Road Junction

Appendix B. Environmental Review – Keresley Link Road

Appendix C. Environmental Review – M6 Junction 3

Appendix D. Environmental Review – New M6 Junction

Appendix E. Environmental Review – Hawkesbury Level Crossing

Appendix F. Environmental Review – Rowley's Green Junction

Appendix G. Environmental Review – A444 Newtown Road

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Appendix I3

ATKINS
Member of the SNC-Lavalin Group

Coventry North Transport Package

Options Appraisal Report

Coventry City Council

23 October 2020

Notice

This document and its contents have been prepared and are intended solely as information for Coventry City Council and use in relation to the Options Appraisal Report

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1. Introduction

1.1. Coventry North Transport Package

The Coventry North Transport Package is a study being undertaken by Atkins on behalf of Coventry City Council (CCC) to identify and assess a range of options for meeting future transport demand in the North Coventry area. Specifically, the study will identify options focused around the proposed Keresley Link Road (KLR), designed to serve the Keresley Sustainable Urban Extension (SUE) development in North-West Coventry, M6 Junction 3 and the nearby A444 corridor, and the potential removal of the Hawkesbury Level Crossing to increase rail capacity in the region.

As set out in the Coventry Local Plan, there is substantial planned residential and employment growth in the North Coventry area and this, combined with growth resulting from developments in the wider West Midlands region, such as the Midlands Engine Strategy and UK Central development near Solihull, are expected to present significant opportunities for economic development and regeneration in Coventry. However, the transport network in the area is expected to be placed under increasing pressure from these developments over the coming years, and as such the Coventry North Transport Package is designed to enable Coventry to capitalise on these opportunities, supporting both the objectives of the CCC Local Plan and West Midlands Combined Authority (WMCA) Local Transport Plan:

- To support businesses to grow and underpin economic growth;
- To develop a dynamic city centre in Coventry;
- To improve access to opportunities by enhancing the accessible transport network; and
- To tackle climate change through reduced emissions, creating an attractive, cleaner and greener Coventry.

The Coventry North Transport Package therefore considers the current and long-term transport challenges and opportunities for the area, incorporating the aims and objectives of both CCC and WMCA. The study will establish the case for investment in North Coventry based on the strategic and economic benefits of investing in the corridor. It will identify a long list of options that could meet the transport objectives and then undertake further, more detailed, appraisal on a package of options.

1.2. Report purpose

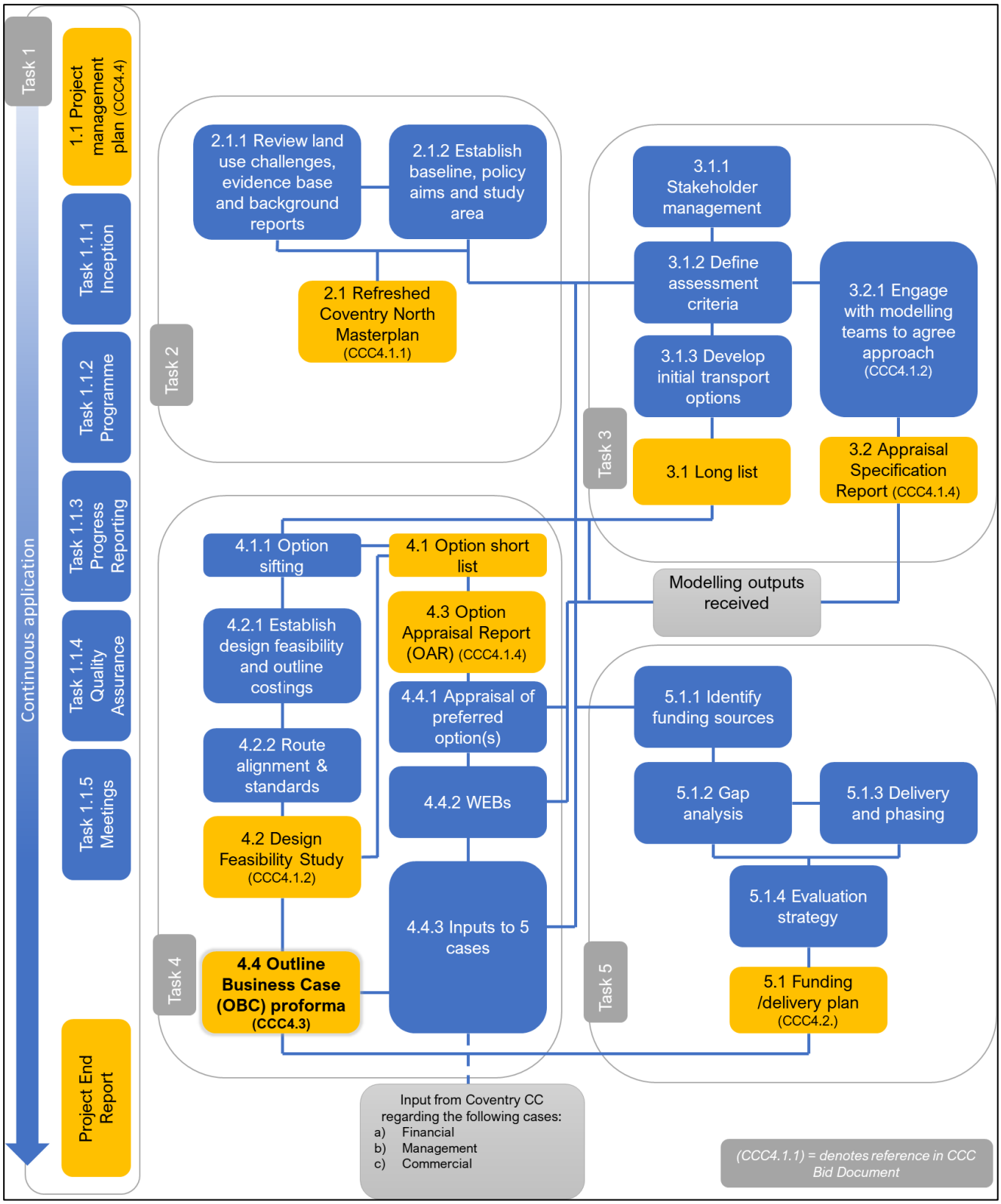
As set out in Figure 1-1, with task numbers from the Atkins proposal for the project, the overall study will encompass:

- Refreshing the Coventry North Masterplan describing the proposed alignment and impact of a Keresley Link Road (2.1);
- Producing a long list of options for alleviating transport constraints in the North Coventry area (3.1);
- These options will then be sifted and shortlisted according to agreed assessment criteria and in coordination with key stakeholders (4.1). The shortlisted options will be formed into appropriate packages for testing;
- Design feasibility study to assess the feasibility and risks of each option package, alongside an outline cost assessment to feed into an Option Appraisal Report (4.2 and 4.3). The outcome of this report will be to define a preferred package of schemes for final appraisal;
- Traffic modelling and environmental appraisal to understand the impacts of the preferred option and development of an Outline Business Case for the Keresley Link Road, incorporating the best performing options from the previous stages (4.4); and
- A funding/delivery plan, detailing the means of delivering the preferred package of measures (5.1).

As such, this Options Appraisal Report (OAR) is the main deliverable from Task 4.3, and incorporates evidence from Task 4.2. The purpose of the report is to:

- Set out the process and results of the option assessment and sifting process;
- Identify the six packages to be taken forward for further assessment and outline how the packages were derived; and
- Present traffic modelling and design feasibility assessment evidence relating to these packages and arrive at a single preferred package of options for full appraisal.

Figure 1-1 - Study approach



1.3. Study area

The area examined as part of this study encompasses the north-west of Coventry, plus the surrounding strategic highway network, and A444 corridor to Nuneaton. Specifically, as shown in Figure 1-2, within the Coventry city boundaries, the area west of Foleshill Road and north of Holyhead Road/A45, centred on the proposed Keresley SUE area and the Prologis Park industrial development, but also including the A444 and Rowley's Green junction, are included. M6 J3 (the Exhall Interchange) forms another key focus of the study, and the M6 west from J3 to where it crosses the B4102 will be examined for potential options. North of the M6, Hawkesbury Village, and specifically the level crossing on Blackhorse Road, is the third main focus of the study. North of this, the A444 corridor as far north as the Bermuda Park industrial development on the southern edge of Nuneaton completes the study area for the package.

There are substantial residential allocations in the Coventry North area as part of the Coventry Local Plan, and the area is forecast to experience significant housing growth over the forthcoming Local Plan period. The Keresley SUE is one of the largest proposed developments in Coventry, with approximately 3,100 homes, 2,500sq.m of retail space and a Primary School planned on the parcel of land between the B4098 Tamworth Road and Prologis Park. In addition, the Eastern Green development will see a further approx. 2,250 homes and 15 hectares of employment land developed adjacent to the A45, and, as part of the Nuneaton and Bedworth Borough Plan, land off Rowley's Green Lane will be developed with a further 200 homes and 18 hectares of employment land. A planning application for 212 dwellings to the north of Blackhorse Road has also been submitted in recent months.

These are in addition to further expansion of existing employment sites in the area. Prologis Park is a significant industrial development adjacent to the proposed Keresley SUE site, currently home to several major employers, including DHL and The Co-Operative, and with a further extension proposed on the northern edge of the site. Lyons Park on Coundon Wedge Drive is another significant industrial area, with Amazon and Jaguar Land Rover among employers on the site. Bermuda Park at the northern end of the A444 corridor is a further major employment growth site, hosting employers such as Dairy Crest, Hermes and DX. The employment growth in the local area will be boosted further by the UK Central development near Solihull, a major retail and business development attached to a High-Speed 2 (HS2) interchange, that will bring significant investment and jobs growth to the region.

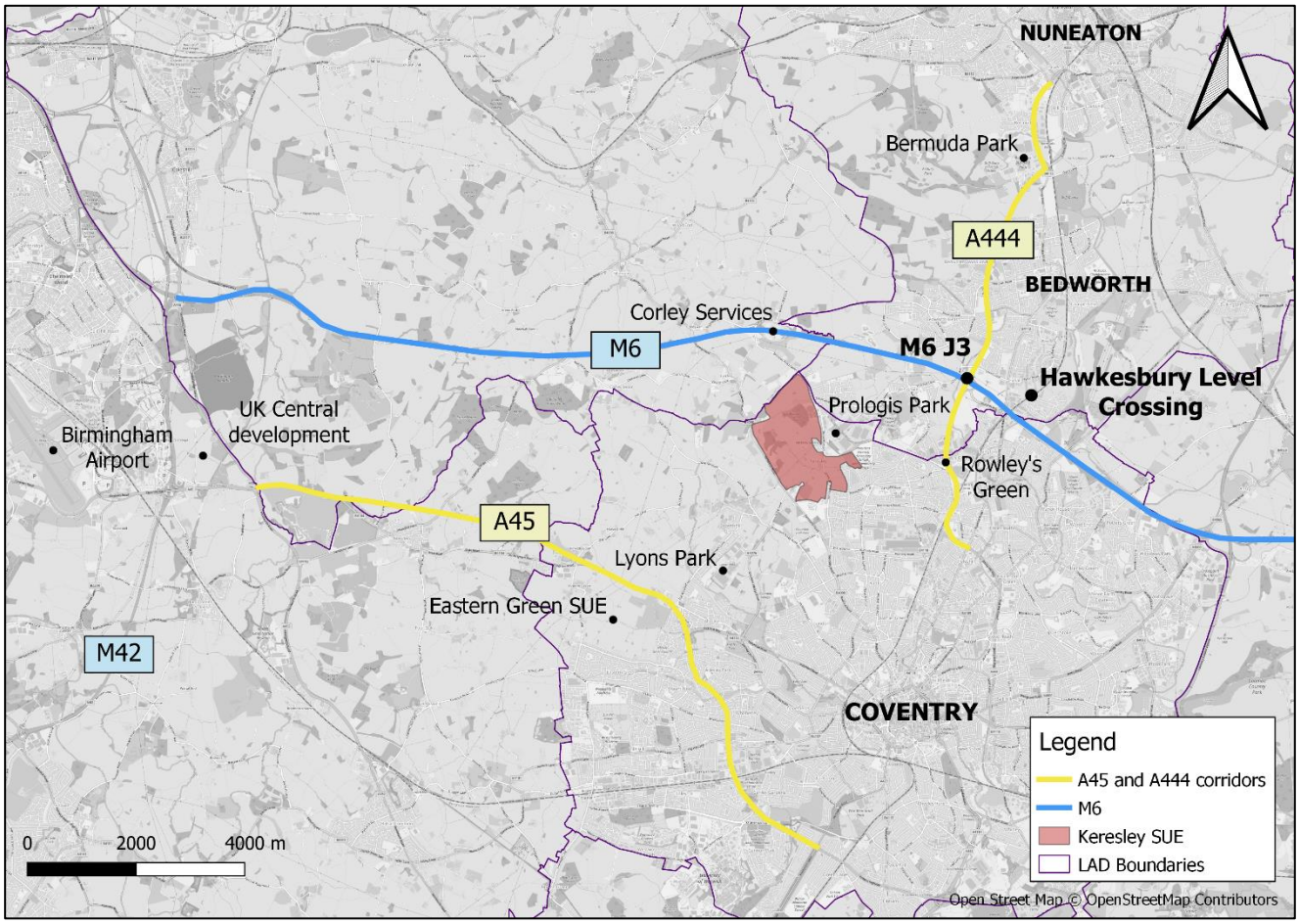
The Coventry North area features two major A-Roads within the city itself; the A45, which runs west from the south of the city towards the M42/Birmingham Airport/the National Exhibition Centre, and the A444, which runs north from the city centre towards M6 Junction 3, Bedworth and Nuneaton. Both routes were included in the DfT's indicative Major Road Network (MRN) in 2017[1], and the WMCA's Key Route Network (KRN), indicating their status as heavily-trafficked, economically important routes. The A45 is a two-lane dual carriageway with grade-separated junctions and, west of Coventry, a national speed limit of 60mph. The A444 is also largely a two-lane dual-carriageway, with some sections of three lanes close to major junctions. In the Coventry North area it passes through a junction with Holbrook Way, and a major at-grade signalised roundabout at Rowley's Green, next to the Ricoh Arena. It meets the M6 at the Exhall Interchange, a signalised roundabout. Between these two key strategic links in the city, there is no orbital route, meaning traffic wishing to travel between the A45 and A444 must use unsuitable local routes, such as Long Lane, Tamworth Road and the Scotchill.

The strategic road network in the area consists of the M6, which runs East-West, connecting the M1 near Rugby to Birmingham and the north-west and north Wales. M6 Junction 3 features two or three-lane slip roads onto a grade-separated signalised roundabout with the A444 and B4113, two miles west of this junction is Corley Services.

Running parallel to the A444 corridor between Coventry and Nuneaton is a railway line connecting Coventry to Bedworth, Bermuda Park and Nuneaton stations, with onward journeys to Leicester and Tamworth available from Nuneaton. This line passes through the Hawkesbury estate just north of the M6, crossing Blackhorse Road at a level crossing.

[1] Proposals for the Creation of a Major Road Network – Consultation; Department for Transport, December 2018

Figure 1-2 - Coventry North Study Area



1.4. Study Outcome Objectives

The study's outcome objectives reflect the aims of both CCC's Local Plan, and the WMCA Local Transport Plan, as set out in Section 1.1. These objectives are shown in Table 1-1 alongside an indication of how they support the CCC and WMCA objectives.

1.5. Document structure

The rest of this report is structured as follows:

- Section 2 provides background on the work already undertaken in the options identification process;
- Section 3 outlines the option sifting process, and the resulting Option Shortlist;
- Section 4 describes the process for the identification of six packages of options to be subject to further assessment;
- Section 5 provides detail of the assessment of these packages, including traffic modelling and design feasibility assessment results, as well as confirmation of the preferred package of options; and
- Section 6 provides a summary of this OAR and next steps for the study.

Table 1-1 - Coventry North Transport Package Outcome Objectives

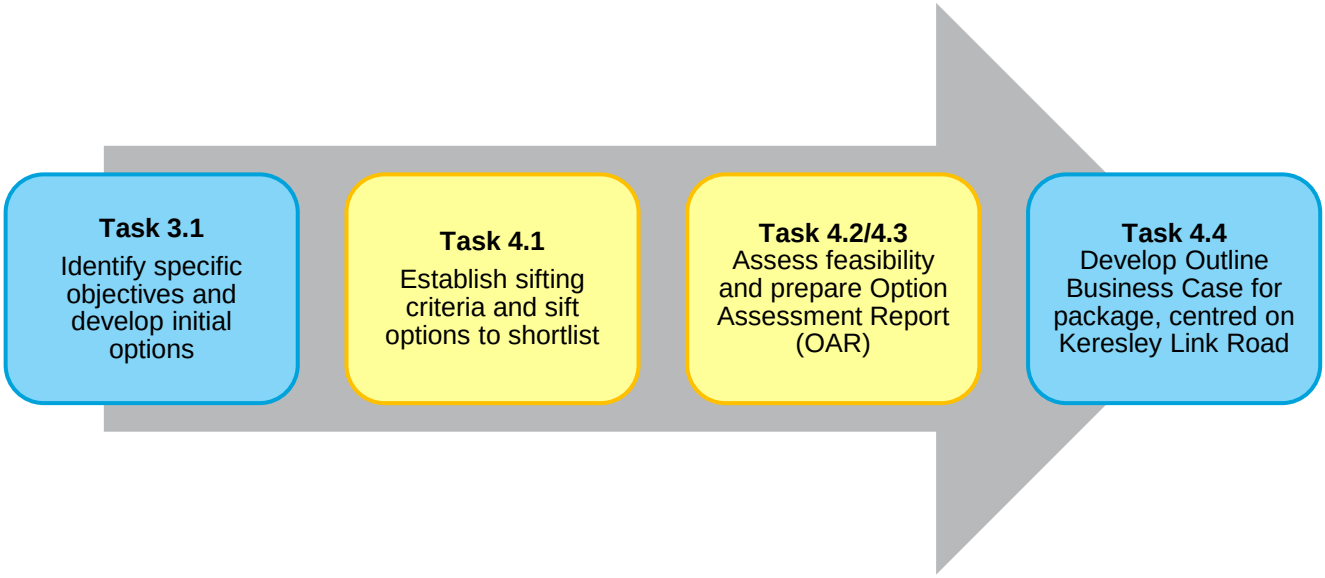
Outcome objective	CCC Local Plan Objectives									WMCA LTP Objectives				
	Supporting businesses to grow	Enabling the right infrastructure for the city	Developing a dynamic city centre	Raising the profile of Coventry	Creating an attractive, cleaner and greener city	Maintaining and enhancing an accessible transport network	Housing that meets the needs of all people	Improve the health and wellbeing of local residents	Support safer communities	Underpin growth and economic regeneration	Tackle climate change through reducing emissions	Improve the health, personal security and safety of people travelling in West Midlands	Tackle deprivation and improve opportunities by improving access	Enhance wellbeing and quality of life in the West Midlands
National														
Help unlock opportunities created by national schemes and events (HS2 and UK Central)	✓✓✓	✓		✓✓✓				✓✓		✓✓✓		✓	✓✓	✓✓
To improve the efficiency and operation of the Strategic Road Network, specifically the M6	✓✓	✓✓				✓✓✓				✓✓			✓	
Sub-Regional														
To improve connectivity between A45 and M6	✓	✓✓✓				✓✓✓		✓		✓✓		✓	✓	✓
Improve journey resilience along A444 corridor connecting Coventry to Nuneaton and Bedworth	✓✓	✓✓✓	✓✓	✓		✓✓✓	✓	✓	✓	✓✓		✓	✓✓	✓✓
Enable greater rail connections along Leamington Spa-Leicester rail corridor	✓✓	✓✓	✓	✓	✓	✓✓				✓✓✓	✓✓	✓	✓✓	✓
To provide greater access to growth sites (eg: universities and employment sites) in area	✓✓✓	✓✓	✓	✓		✓✓	✓	✓	✓	✓✓✓		✓	✓✓✓	✓✓
Local														
Reduce local vehicle congestion on nearby highways	✓✓	✓✓✓	✓✓		✓✓	✓✓✓		✓	✓	✓✓	✓	✓	✓	✓
Enhance mass-transit network in North Coventry area	✓	✓✓	✓	✓✓	✓✓	✓✓✓		✓	✓	✓✓	✓✓			
Support and enable strategic housing growth sites and other local plan allocations		✓	✓		✓	✓✓	✓✓✓	✓✓	✓✓	✓✓	✓	✓	✓	✓
Improve health and wellbeing via greater active travel		✓✓	✓	✓	✓✓	✓		✓✓✓			✓✓	✓✓✓		
Mitigate impact of traffic on local communities		✓			✓✓	✓	✓	✓✓✓	✓✓✓			✓✓✓		✓✓✓
Reduce environmental impact of traffic		✓		✓	✓✓✓	✓		✓✓	✓✓		✓✓✓			✓✓

2. Work already undertaken

2.1. Introduction

In the overall option appraisal approach for the Coventry North Transport Package, this report presents the process and results of Task 4.1, as well as the findings from Tasks 4.2 and 4.3, as shown in Figure 2-1.

Figure 2-1 - Summary of appraisal approach



The tasks for the process as a whole can be summarised as follows:

Task 3.1: Identify specific objectives and develop initial options

Identify specific outcome objectives for the package at a national, sub-regional, and local level. Identify options which meet the transport objectives through discussion with CCC and other stakeholders.

Task 3.1 output: Options long list

Task 4.1: Establish sifting criteria and sift options to shortlist

Development of sifting criteria (based on the DfT's EAST), giving due consideration to the transport objectives and the range of options which could be proposed. The long list of options will be sifted against this criteria and 'packages' of options will be identified.

Task 4.1 output: Options shortlist

Task 4.2/4.3: Assess feasibility and prepare Option Assessment Report (OAR)

High-level assessment of design feasibility and risks of shortlisted packages, plus outline traffic assessments and cost estimates, before presenting the assessment of the shortlisted packages in an Option Assessment Report.

Task 4.2/4.3 output: Option Assessment Report (OAR)

Task 4.4: Develop Outline Business Case for package, centred on Keresley Link Road

Following more detailed traffic and environmental assessment of the preferred package, development of a five-case Outline Business Case (OBC) proforma in line with WMCA requirements, demonstrating the case for the Keresley Link Road, as part of a wider Coventry North Transport Package.

Task 4.4 output: Outline Business Case (OBC)

2.2. Task 3.1: Identify objectives and develop initial options (complete)

As set out in Section 1.4, objectives for the study were developed and agreed with CCC, reflecting the priorities and aims of the Coventry Local Plan, and WMCA Local Transport Plan. An initial option development exercise was then conducted with CCC to establish schemes (and scheme options) that would help achieve these stated objectives; this formed the initial Options Long List.

2.2.1. Options Long List

The Long List of options is shown in Table 2-1 and Figure 2-2, with all off-line alignments shown indicative. The Long List was split into three broad areas to best reflect the priorities of CCC in potential solutions to the challenges facing transport in North Coventry; Core options, Public Transport & Active Mode options, and Supporting options.

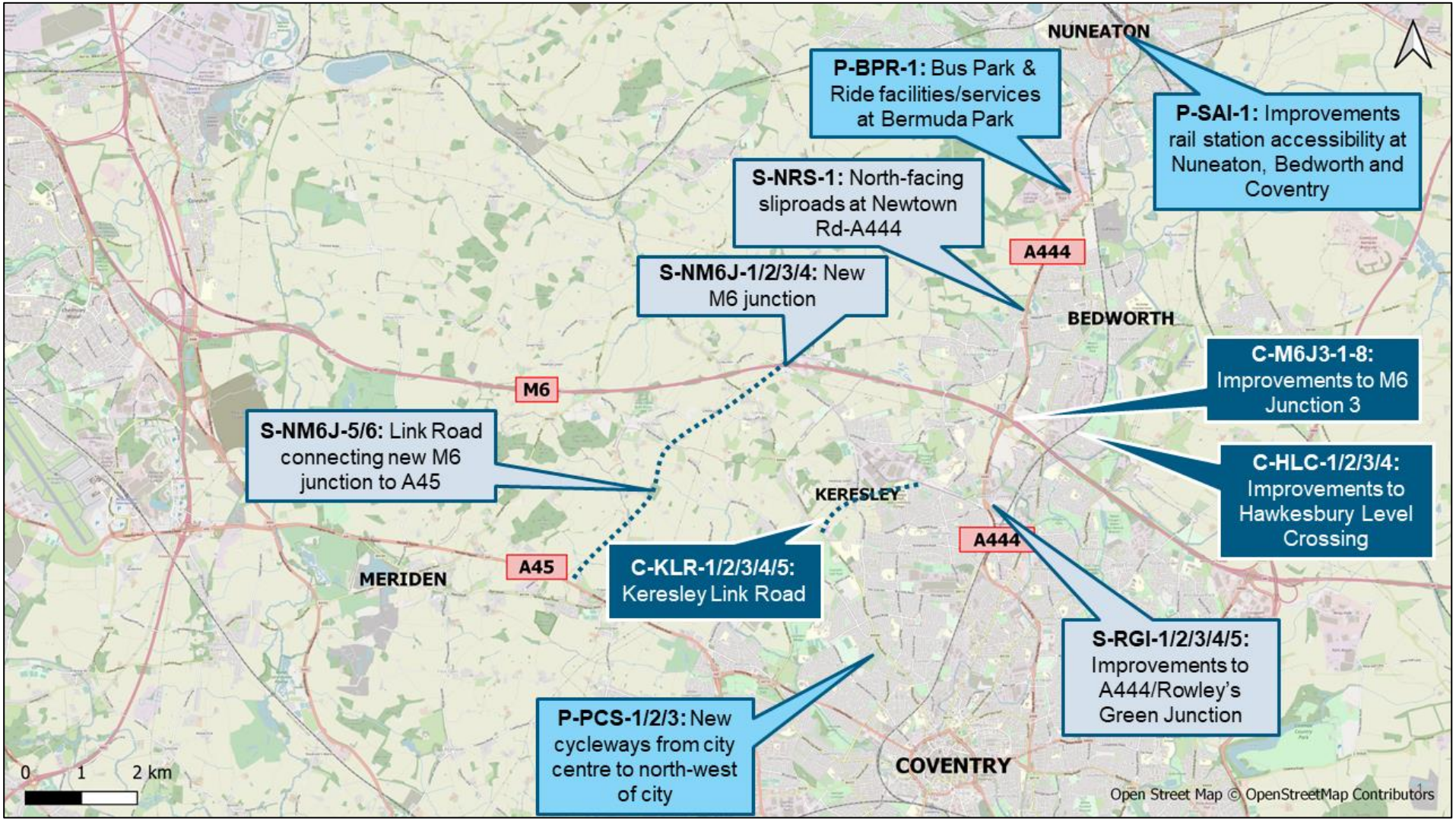
Table 2-1 - Options Long List

Area	Reference	Option Name	Option Description
Core	C-KLR-1	Keresley Link Road: No Link Road Option	Option without Keresley Link Road; simply development access for Keresley SUE, with no through-connecting links.
Core	C-KLR-2	Keresley Link Road: Partial Link Road Option	Keresley Link Road connecting Long Lane/Tamworth Road with Bennetts Road (plus Keresley SUE development access)
Core	C-KLR-3	Keresley Link Road: Alignment 1	Keresley Link Road connecting Long Lane/Tamworth Road with Winding House Lane. The alignment meets Bennetts Road at a four-arm roundabout, passing through properties in the south west corner of the junction and partially follows the existing alignment of Watery Lane, forming a three arm roundabout where the existing carriageway currently takes a southern direction.
Core	C-KLR-4	Keresley Link Road: Alignment 2	Keresley Link Road connecting Long Lane/Tamworth Road with Winding House Lane. As per Alignment 1, but takes road further south when crossing Bennetts Road to avoid properties.
Core	C-KLR-5	Keresley Link Road: Alignment 2A	Keresley Link Road connecting Long Lane/Tamworth Road with Winding House Lane. This alignment follows the Option 2 alignment, but without a junction with Watery Lane (Watery Lane stopped up either side of Link Road)
Core	C-M6J3-1	M6 J3: No improvement	Option without improvement to M6 Junction 3
Core	C-M6J3-2	M6 J3: Optimising traffic signals on gyratory	Optimise traffic signals on gyratory
Core	C-M6J3-3	M6 J3: Hamburger layout for A444	Option to introduce a 'hamburger' for the A444 through the middle of the roundabout gyratory. This option could also include 'j' links connecting the on/off slips to the A444.
Core	C-M6J3-4	M6 J3: Segregated left turn slips	Segregated left turn slip roads
Core	C-M6J3-5	M6 J3: Tunnel for A444	Option to introduce a tunnel underneath the entire junction so that the A444 bypasses the entire junction.
Core	C-M6J3-6	M6 J3: Flyover for A444	Introduce a new flyover so that the A444 bypasses the junction to east.

Area	Reference	Option Name	Option Description
Core	C-M6J3-7	M6 J3: Removal of B4113 at roundabout	Removal of B4113 link into Exhall Interchange to improve operation of junction
Core	C-M6J3-8	M6 J3: Improvements to signals/lane allocations on gyratory	Improvements to Exhall Interchange roundabout signals/lane allocation to improve function
Core	C-HLC-1	Hawkesbury Level Crossing: No improvement	Option without improvement to Hawkesbury Level Crossing
Core	C-HLC-2	Hawkesbury Level Crossing: Blackhorse Rd bridge	Level crossing replaced by bridge on Blackhorse Road
Core	C-HLC-3	Hawkesbury Level Crossing: Stephenson Road new link	Level crossing removed. Provide access under railway from Stephenson Road (Bayton Rd Industrial Estate) and connect through to Stockley/Sephton Road, effectively bypassing Blackhorse Road.
Core	C-HLC-4	Hawkesbury Level Crossing: Optimise level crossing operation	Maintain level crossing, but optimise operation (whilst maintaining safety) to allow more trains to operate on-line.
Public Transport & Active Modes	P-PCS-1	City centre to Westhill Rd Cycleway	City centre-Coundon Rd-Barker's Butts Ln-Westhill Rd cycleway
Public Transport & Active Modes	P-PCS-2	Westhill Rd to Keresley Cycleway	Cycleway connecting Keresley SUE to Westhill Road
Public Transport & Active Modes	P-PCS-3	City centre to Eastern Green Cycleway	Cycleway connecting Eastern Green development to City centre
Public Transport & Active Modes	P-BPR-1	Bus Park & Ride services between Bermuda Park and Keresley	New bus services operating A444 corridor between Bermuda Park and Keresley
Public Transport & Active Modes	P-SAI-1	Coventry/Nuneaton Station accessibility improvements	Improvements to accessibility at Coventry/Bedworth/Nuneaton Stations to encourage greater uptake of rail in region.
Supporting	S-RGI-1	Rowley's Green: Free-flowing lane NB from Winding House Lane to A444	Addition of free-flowing NB lane between Winding House Lane and A444
Supporting	S-RGI-2	Rowley's Green: Mainline A444 north-south flyover	North-South flyover for mainline A444 traffic, freeing capacity/enabling optimisation at existing roundabout
Supporting	S-RGI-3	Rowley's Green: Mainline A444 north-south hamburger layout	North-South hamburger arrangement for mainline A444 traffic

Area	Reference	Option Name	Option Description
Supporting	S-RGI-4	Rowley's Green: Incorporation of Very Light Rail	Incorporation of north-western arm of Very Light Rail (VLR) scheme, running parallel to A444 and Winding House Lane to Keresley/Prologis Park
Supporting	S-RGI-5	Rowley's Green: Incorporation of Bus Rapid Transit scheme	Bus rapid transit scheme running parallel to A444 and Winding House Lane to Keresley/Prologis Park
Supporting	S-NM6J-1	New M6 Junction: at Corley Services	Utilise Corley Services slip roads to form new junction. Services moved offline.
Supporting	S-NM6J-2	New M6 Junction: at B4098 tunnel	Utilise B4098 tunnel to form new junction. Corley Services to be moved to new junction location to alleviate merging/weaving concerns.
Supporting	S-NM6J-3	New M6 Junction: at B4102 tunnel	Utilise B4102 tunnel to form new junction. Corley Services to be moved to new junction location to alleviate merging/weaving concerns.
Supporting	S-NM6J-4	New M6 Junction: at greenfield site	New junction on greenfield site. Corley Services to be moved to new junction location to alleviate merging/weaving concerns.
Supporting	S-NM6J-5	New M6 Junction link road: to A45 at Eastern Green	Link road between new junction and proposed Eastern Green junction of A45.
Supporting	S-NM6J-6	New M6 Junction link road: to A45 at Meriden	Link road between new junction and A45 at Meriden.
Supporting	S-NRS-1	A444-Newtown Road junction: north-facing sliproads	Additional north-facing slips added to A444 Newtown Road junction

Figure 2-2 - Options Long List Summary



3. Option Sifting (Task 4.1)

3.1. Introduction

The options in the Long List were then sifted against a set of criteria that reflect the agreed Outcome Objectives shown in Section 1.4, following the principles of the DfT's Early Appraisal Sifting Tool (EAST). These criteria are shown in Table 3-1 alongside the relevant objective.

Once the sifting criteria had been established, the sifting process was undertaken, determining whether each option in isolation should be retained for further consideration in this study, or not be taken further. At this stage, the aim was not to significantly reduce the number of options (as there is insufficient evidence to do so at this stage in the option appraisal process) but to remove those options which were not considered to sufficiently support the agreed Outcomes Objectives.

Table 3-1 - Objectives and Sifting Criteria

Level	Objective	Relevant sifting criterion
National	Help unlock opportunities created by national schemes and events (HS2 and UK Central)	Qualitative measure of the potential change in the resilience of the M6 and A45, reflecting improved capacity provided on local network.
	To improve the efficiency and operation of the Strategic Road Network, specifically the M6	Average journey time between M6 Junction 2 and Junction 4
		Change in the likelihood of queuing onto mainline from M6 J3
Sub-Regional	To improve connectivity between A45 and M6	Improvements in connectivity in north-west Coventry
	Improve journey resilience along A444 corridor connecting Coventry to Nuneaton and Bedworth	Likely change in vehicle delays on the A444 between Foleshill Road and Bermuda Park
	Enable greater rail connections along Leamington Spa-Leicester rail corridor	Changes in access to local rail stations
		Qualitative assessment of improvements to capacity resulting from optimisation of Hawkesbury Level Crossing
	To provide greater access to growth sites (eg: universities and employment sites) in area	Qualitative assessment of connectivity to major strategic growth sites; Prologis Park, Lyons Park and local university sites (Coventry University and University of Warwick)
Local	Reduce local vehicle congestion on nearby highways	The extent to which an option provides an alternative to motor vehicle travel
		Qualitative assessment of extent to which additional highway capacity has been provided
	Enhance mass-transit corridor in North Coventry area	The extent to which an option increases public transport uptake in city
	Support and enable strategic housing growth sites and other local plan allocations	Qualitative assessment based upon the proximity to identified growth sites outlined in the Coventry Local Plan, with consideration given to the size and proposed timeline of development
	Improve health and wellbeing via greater active travel	Extent to which option increases active travel uptake
	Mitigate impact of traffic on local communities	Qualitative assessment of impacts relating to safety, air quality, noise and severance.
	Reduce environmental impact of traffic	Qualitative assessment of impacts relating to biodiversity, landscape, heritage, flood risk)

3.2. Options Shortlist

The outcome of the sifting process was the removal of three options from the Long List, and the formation of the resulting Options Shortlist, as shown in summary in Table 3-2. Note the rationale listed is a summary, with full details of qualitative scores against each criterion, and accompanying comments, shown across three tables (for National, Sub-Regional, and Local criteria), in Appendix A.

Table 3-2 - Options Shortlist Summary

Reference	Option name	Option retained?	Rationale
C-KLR-1	Keresley Link Road: No Link Road Option	×	Would provide no link for the proposed Keresley SUE, preventing any distribution of traffic or active routes through NW of city
C-KLR-2	Keresley Link Road: Partial Link Road Option	✓	Provides link with Keresley SUE, improving connectivity in area
C-KLR-3	Keresley Link Road: Alignment 1	✓	Provides link with Keresley SUE, improving connectivity in area
C-KLR-4	Keresley Link Road: Alignment 2	✓	Provides link with Keresley SUE, improving connectivity in area
C-KLR-5	Keresley Link Road: Alignment 2A	✓	Provides link with Keresley SUE, improving connectivity in area
C-M6J3-1	M6 J3: No improvement	✓	Improvement may not be required if alternative (new) junction provided
C-M6J3-2	M6 J3: Optimising traffic signals on gyratory	✓	Provides means of meeting future demand at junction
C-M6J3-3	M6 J3: Hamburger layout for A444	✓	Provides means of meeting future demand at junction
C-M6J3-4	M6 J3: Segregated left turn slips	✓	Provides means of meeting future demand at junction
C-M6J3-5	M6 J3: Tunnel for A444	✓	Provides means of meeting future demand at junction
C-M6J3-6	M6 J3: Flyover for A444	×	Likely to be unacceptable to both authorities and local residents, given likely environmental cost
C-M6J3-7	M6 J3: Removal of B4113 at roundabout	✓	Provides means of meeting future demand at junction
C-M6J3-8	M6 J3: Improvements to signals/lane allocations on gyratory	×	Not carried through, given close overlap with C-M6J3-2
C-HLC-1	Hawkesbury Level Crossing: No improvement	✓	Improvement only possible if viable alternative in place; if not, no improvement may be best option
C-HLC-2	Hawkesbury Level Crossing: Blackhorse Rd bridge	✓	Helps rail corridor and local congestion without causing significant re-routing of traffic
C-HLC-3	Hawkesbury Level Crossing: Stephenson Road new link	✓	Helps rail corridor and local congestion, as well as helping to enable Hawkesbury Golf Course Land development
C-HLC-4	Hawkesbury Level Crossing: Optimise level crossing operation	✓	Improves current situation with minimal intervention beyond direct rail upgrade

Reference	Option name	Option retained?	Rationale
P-PCS-1	City centre to Westhill Rd Cycleway	✓	Provides useful cycleway into north-west of city, encouraging active travel
P-PCS-2	Westhill Rd to Keresley Cycleway	✓	Provides useful cycleway into north-west of city, encouraging active travel
P-PCS-3	City centre to Eastern Green Cycleway	✓	Provides useful cycleway into north-west of city, encouraging active travel
P-BPR-1	Bus Park & Ride services between Bermuda Park and Keresley	✓	Would likely support growth along A444 corridor, and reduce traffic
P-SAI-1	Coventry/Nuneaton Station accessibility improvements	✓	Helps to support growth in area through encouraging sustainable transport
S-RGI-1	Rowley's Green: Free-flowing lane NB from Winding House Lane to A444	✓	Helps to support growth by improving travel along A444 corridor
S-RGI-2	Rowley's Green: Mainline A444 north-south flyover	✓	Helps to support growth by improving travel along A444 corridor
S-RGI-3	Rowley's Green: Mainline A444 north-south hamburger layout	✓	Helps to support growth by improving travel along A444 corridor
S-RGI-4	Rowley's Green: Incorporation of Very Light Rail	✓	Helps to support growth by improving travel along A444 corridor
S-RGI-5	Rowley's Green: Incorporation of Bus Rapid Transit scheme	✓	Helps to support growth by improving travel along A444 corridor
S-NM6J-1	New M6 Junction: at Corley Services	✓	Provides alternative means of improving connections to SRN
S-NM6J-2	New M6 Junction: at B4098 tunnel	✓	Provides alternative means of improving connections to SRN
S-NM6J-3	New M6 Junction: at B4102 tunnel	✓	Provides alternative means of improving connections to SRN
S-NM6J-4	New M6 Junction: at greenfield site	✓	Provides alternative means of improving connections to SRN
S-NM6J-5	New M6 Junction link road: to A45 at Eastern Green	✓	Provides alternative means of improving connections to SRN
S-NM6J-6	New M6 Junction link road: to A45 at Meriden	✓	Provides alternative means of improving connections to SRN
S-NRS-1	A444-Newtown Road junction: north-facing sliproads	✓	Helps to support growth by improving travel along A444 corridor

4. Development of packages

4.1. Introduction

The individual options shown in Section 3.2 represent potential components of a Coventry North Transport Package. To help assess which combination of these options would comprise a preferred, single package, six packages were formed and assessed to understand their potential impact. This section describes how these packages have been devised and the components of each.

It is important to note that the aim of the packaging exercise has not been to include every option in at least one package. Instead the objective has been to devise six packages which enable as clear an assessment as possible of the impact of the individual options, as well as potential complementarities with other options.

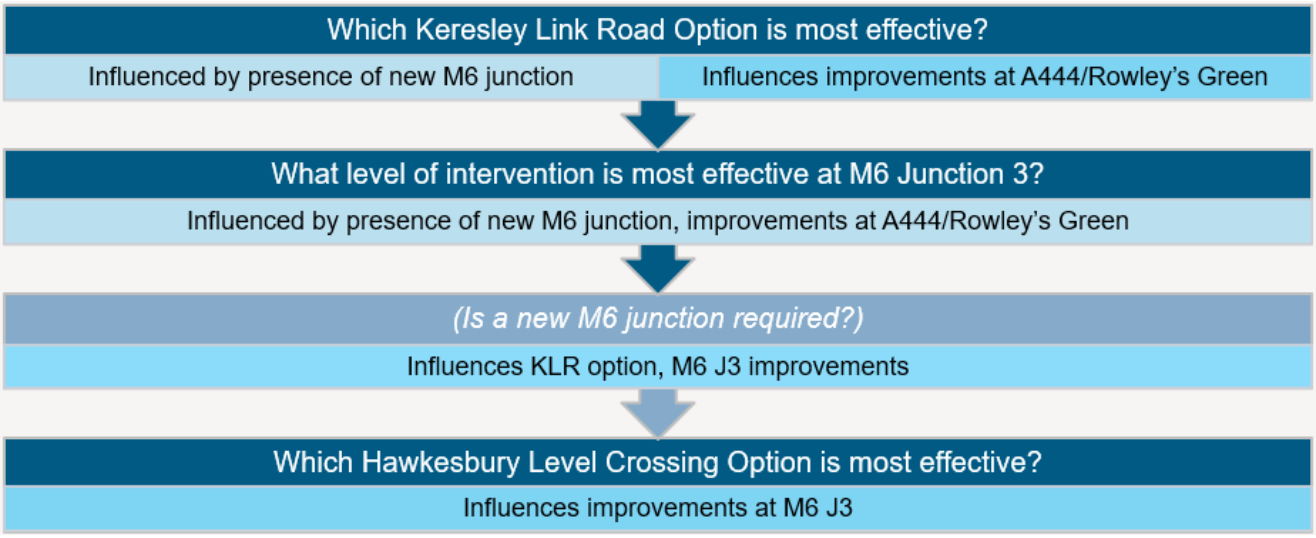
Most shortlisted options are in at least one package, however, for some of the options there are too many variants to test, for example, the different potential locations for a new M6 junction. Where is the case options have been picked which are representative of the others, and which are likely to have similar performance in the traffic model.

4.2. Package selection process

The selection of the packages was based upon the principles of the structured decision-making tool, Strategic Choice[2]. Strategic Choice is a process for identifying the key decisions ('Decision Areas') that are most likely to determine the nature of the strategy (the 'Problem Focus'), and to consider which Decision Areas and Options are inter-linked, and which conflict. Considering the specific context of this study, it was decided not to follow the Strategic Choice process in its full form, and instead use its key principles as a guide, given the majority of the schemes and problems being considered for the Coventry North Transport Package did not directly conflict, or indeed in many cases, offer scope for complementarities.

Instead, the package selection exercise initially identified three key problems (plus one supplementary problem regarding a new junction on the M6) that were the focus of CCC in the study and were instrumental in dictating the nature of the strategy. These four questions are shown in Figure 4-1. These key decision areas were then analysed to consider linkages between the areas, as well as potential conflicts. These influences are also shown in Figure 4-1.

Figure 4-1 - Problem Focus and Decision Areas



[2] Friend, J & Hickling, A (2005) 'Planning Under Pressure: The Strategic Choice Approach' *3rd Edition* Elesevier

By considering the connections and conflicts between the key focuses of the study, combinations of options were able to be identified that would fulfil the following criteria:

- Packages comprising of a wide range of components;
- Maintaining ‘comparability’ of packages by selecting packages with a small number of differences from one other package;
- Representing a range of likely indicative cost levels; and
- Ensuring that package formulation considered the complementarities and conflicts of the Decision Area Focus first and foremost.

Six illustrative packages were selected based on this approach and are set out in Table 4-1. Note that a distinction was made between highway and public transport options at the A444-Rowley’s Green junction, to aid the package testing and modelling process.

Table 4-1 - Package Summary

Package number	Problem Focus Decision Areas				Other Decision Areas					
	Keresley Link Road	M6 J3	New M6 Jct	Hawkesbury Level Crossing	A444-Rowley's Green Jct (Highway)	A444-Rowley's Green Jct (PT)	Pedestrian and cycle routes	Bermuda Park & Ride	Station Accessibility	A444-Newtown Rd Jct
1	Partial Link Road (C-KLR-2)	-	New Jct at Corley plus Link Road to Eastern Green (S-NM6J-1 + S-NM6J-5)	-	-	Incorporation of Very Light Rail (S-RGI-4)	-	Bermuda Park & Ride service to Keresley (P-BPR-1)	-	North-facing slip roads onto A444 (S-NRS-1)
2	Alignment 2 (C-KLR-4)	-	New Jct at B4102 plus Link Road to Meriden (S-NM6J-3 + S-NM6J-6)	Bridge on Blackhorse Rd (C-HLC-2)	-	-	New cycleways to NW of city (P-PCS-1,2,3)	-	Station accessibility improvements at local rail stations (P-SAI-1)	-
3	Alignment 2 (C-KLR-4)	Free-flow left-turn slips (C-M6J3-4)	-	Bridge on Blackhorse Rd (C-HLC-2)	Free-flow left turn lane from Winding House Ln NB (S-RGI-1)	Incorporation of Bus Rapid Transit (S-RGI-5)	New cycleways to NW of city (P-PCS-1,2,3)	-	-	-
4	Alignment 2 (C-KLR-4)	Hamburger-style layout (C-M6J3-3)	-	Link to Stephenson Rd (C-HLC-3)	A444 flyover (S-RGI-2)	-	-	Bermuda Park & Ride service to Keresley (P-BPR-1)	Station accessibility improvements at local rail stations (P-SAI-1)	North-facing sliproads onto A444 (S-NRS-1)
5	Alignment 2a (C-KLR-5)	Close B4113 arm (C-M6J3-7)	-	Link to Stephenson Rd (C-HLC-3)	Hamburger-style layout (S-RGI-3)	-	New cycleways to NW of city (P-PCS-1,2,3)	Bermuda Park & Ride service to Keresley (P-BPR-1)	-	North-facing sliproads onto A444 (S-NRS-1)
6	Alignment 2a (C-KLR-5)	A444 tunnel (C-M6J3-5)	-	Optimisation of level crossing signals (C-HLC-4)	Free-flow left turn lane from Winding House Ln NB (S-RGI-1)	-	-	-	Station accessibility improvements at local rail stations (P-SAI-1)	-

NB: '-' denotes 'do nothing'

5. Package Assessment (Task 4.2/4.3)

5.1. Introduction

The assessment of the packages set out in Section 4.2 took the form of two linked, but separate assessments. Firstly, a traffic modelling assessment of the highway-related elements of the six packages, undertaken in the Coventry Area Strategic Model (CASM) and secondly, a Feasibility Appraisal. This second element consisted of a design feasibility assessment of each of the shortlisted options, considering potential design constraints for construction and assessing the potential timescales, cost and acceptability of each, plus an environmental assessment of each of the shortlisted options, assessing the potential environmental impact and any environmental constraints.

By cross-referencing between the evidence bases created by these two assessments, a judgment of the preferred package is possible.

5.2. Traffic Modelling Assessment

5.2.1. Specification

The traffic modelling of the six packages was undertaken in CASM, the main strategic model covering the Coventry area. While the model has both Public Transport and Variable Demand Modelling (VDM) capability, at this stage, it was agreed with CCC that single-iteration runs of the highway model would provide sufficient detail to inform the options appraisal process.

The model was run for a single year, 2041, which was chosen as an appropriate future year test, given all potential schemes as part of the CNTP and key local plan developments would be complete by this date. As a result, the model runs included the full build-out of the Keresley SUE in the trip matrices. The model was run for AM and PM peaks.

Given only the highway model element of the model was run, only the highway-related schemes within each package were tested. As such, the public transport-related schemes at the A444-Rowley's Green junction, plus the three non-highway schemes (pedestrian and cycleways, Bermuda Park and Ride, and station accessibility improvements) were not tested in the model.

In addition to the six packages, two sensitivity tests of Package 1 were tested (1_A1 and 1_A2), with two different alignments of the full Keresley Link Road in place, instead of the Partial Link Road. This was agreed to be tested to better assess the interplay between a new M6 junction and the Keresley Link Road, as discussed in Section 4.2.

The packages *as tested* are shown in Table 5-1. An assumptions log, detailing the agreed coding of the package schemes, is shown in Appendix B.

Table 5-1 – Modelled Package Summary

Package number	Problem Focus Decision Areas					
	Keresley Link Road	M6 J3	New M6 Jct	Hawkesbury Level Crossing	A444-Rowley's Green Jct (Highway)	A444-Newtown Rd Jct
1	Partial Link Road (C-KLR-2)	-	New Jct at Corley plus Link Road to Eastern Green (S-NM6J-1 + S-NM6J-5)	-	-	North-facing slip roads onto A444 (S-NRS-1)
1_A1	Alignment 2 (C-KLR-4)	-	New Jct at Corley plus Link Road to Eastern Green (S-NM6J-1 + S-NM6J-5)	-	-	North-facing slip roads onto A444 (S-NRS-1)
1_A2	Alignment 2a (C-KLR-5)	-	New Jct at Corley plus Link Road to Eastern Green (S-NM6J-1 + S-NM6J-5)	-	-	North-facing slip roads onto A444 (S-NRS-1)
2	Alignment 2 (C-KLR-4)	-	New Jct at B4102 plus Link Road to Meriden (S-NM6J-3 + S-NM6J-6)	Bridge on Blackhorse Rd (C-HLC-2)	-	-
3	Alignment 2 (C-KLR-4)	Free-flow left-turn slips (C-M6J3-4)	-	Bridge on Blackhorse Rd (C-HLC-2)	Free-flow left turn lane from Winding House Ln NB (S-RGI-1)	-
4	Alignment 2 (C-KLR-4)	Hamburger-style layout (C-M6J3-3)	-	Link to Stephenson Rd (C-HLC-3)	A444 flyover (S-RGI-2)	North-facing sliproads onto A444 (S-NRS-1)
5	Alignment 2a (C-KLR-5)	Close B4113 arm (C-M6J3-7)	-	Link to Stephenson Rd (C-HLC-3)	Hamburger-style layout (S-RGI-3)	North-facing sliproads onto A444 (S-NRS-1)
6	Alignment 2a (C-KLR-5)	A444 tunnel (C-M6J3-5)	-	Optimisation of level crossing signals (C-HLC-4)	Free-flow left turn lane from Winding House Ln NB (S-RGI-1)	-

NB: '-' denotes 'do nothing'

5.2.2. Package Modelling Results

This section provides an outline of the results of the traffic modelling assessment. Full details of the modelled results are provided in Appendix C.

Overview

The modelling results show that, across all metrics (change in flows, journey times and delay), Package 1 (and its variants) is the best performing package, from a traffic perspective. The results suggest only minor differences between P1, P1_A1 and P1_A2, with the partial link road option providing the largest reduction in over-capacity queues in the AM time period, Alignment 2 providing marginally the best reduction in total network delay, and Alignment 2a providing the best reduction in overall travel time in the model. Package 1 generally causes some substantial re-routing of traffic, both on a local level where traffic utilises the Keresley Link Road rather than the existing residential links in the Holbrooks area, and more strategically, with traffic routing from the M42 to the M6 via the newly added junction, and along the A45. This re-routing results in reductions in traffic volumes and therefore delay at M6 J3, subsequently causing improvements in journey times.

The rest of the packages provide more modest improvements in delay and journey time, but there still exists a clear hierarchy of which packages perform best from a purely-traffic perspective. Packages 3 and 6 are the next best performing packages, with P6 performing slightly better in the AM peak, and P3 in the PM peak. Both packages appear to achieve their intended function, at least from a traffic perspective, with both improvements in terms of traffic using the more strategic Keresley Link Road, and reductions in delay at M6 J3.

Packages 2 and 4 are the next best performing packages, albeit with journey time and delay benefits arising in different areas, due to the quite distinct make-ups of the packages. P2, in a similar manner (although not magnitude) to P1, provides some strategic benefits, with traffic on the Strategic Road Network (SRN) re-routing via the new M6 junction. P4 on the other hand, provides more localised benefits, with some improvement in delay at both M6 J3 and the A444-Rowley's Green junction.

Finally, Package 5 provides the least improvements in terms of journey times and delays, and indeed appears to cause a slight disbenefit in terms of vehicle minutes, at least in the configuration tested. This is driven by the interaction of the closure of the B4113 arm at M6 J3, which causes traffic to route further south towards the A444-Rowley's Green junction, and the hamburger arrangement at this junction, which leads to greater delay than in the reference case scenario at this junction.

Overall journey time benefits (vehicle minutes)

To gain some appreciation of the potential of a package when subjected to full economic appraisal using appraisal software such as TUBA, the benefits in terms of vehicle minutes were extracted for the whole model area, utilising a 20-sector sector system to assess where in the model benefits were being gained. Table 5-2 presents the resulting total change in vehicle minutes, when compared to the reference case scenario.

Table 5-2 - Change in journey time benefits (vehicle minutes), compared with reference case scenario

Package	Change in total vehicle minutes from reference case (rank in time period)	
	AM Peak	PM Peak
P1	-1,181,316 (1)	-1,092,711 (2)
P1_A1	-1,135,487 (2)	-1,165,294 (1)
P1_A2	-1,086,124 (3)	-1,021,313 (3)
P2	-234,991 (6)	-137,806 (7)
P3	-302,631 (5)	-375,074 (4)
P4	-183,293 (7)	-249,508 (6)
P5	14,912 (8)	-43,020 (8)
P6	-405,854 (4)	-309,082 (5)

As discussed above, this shows that P1 (and its variants) produce significantly greater journey time benefits across the modelled area than the other packages. P3 and P6 are the next best (dependent upon the time period), followed by P2, P4 and P5. The sectoral breakdown of these results, presented from pages 92-109 of the full outputs in Appendix C help to demonstrate how these benefits impact different areas or journeys within the model, depending upon the options included in each package. The tables show that:

- Package 1 provides strategic benefits, with Origin-Destination (OD) pairs in the wider East Midlands area (Leicester, Derbyshire, Nottinghamshire and Northampton) and Coventry experiencing the greatest improvements in journey times. There is very little difference in the patterns of benefits in P1, compared with P1_A1 and P1_A2.
- The positioning of the new M6 junction in Package 2 leads to quite different patterns of journey time benefits from Package 1, with Warwick, Stratford and Solihull (East) in particular benefitting from the new junction further west near Meriden.
- Packages 3, 4 and 6 produce similar spatial patterns of benefits, with local trips internal to the Coventry sectors, Nuneaton and Warwickshire area seeing larger benefits, whilst still retaining some strategic benefit to the wider Midlands, likely driven by improvements to accessing the SRN at M6 J3.

- Notably, all packages in all time periods experience a disbenefit between Sectors 6 (Bedworth) and 2 (Coventry NE). The reason for this is the junction at Winding House Lane-Wheelwright Lane, for which the signals were optimised as part of the Keresley Link Road coding. Whilst this change in coding, which favours the east-west movement, causes greater use of the Link Road and strategic routes through North-West Coventry, it comes at the price of significant extra congestion for those trips that use Wheelwright Lane/Goodyers End Lane as a route between north Coventry/Bedworth. It is this congestion that shows in these tables, and would have to be considered when arriving at a final package of schemes (see Section 5.5).
- Package 5, while providing some local and strategic benefits, features substantial disbenefits to/from Sector 2 (Coventry NE). This corroborates the above discussion of the impact of closing the B4113 arm at M6 J3, and the interaction with the A444 Rowley's Green junction.

Flow differences

The below points summarise the impacts of the packages on flows in the Coventry area, to provide context to the journey time and delay improvements discussed above:

- The most important pattern of change caused by Package 1 (plus P1_A1 and P1_A2) is the re-routing of traffic caused by the addition of the new junction on the M6, and link road between the A45 and M6. Traffic (around 300-400 vehicles, depending on time period/direction) re-routes away from using J7/7a of the M42 to join the M6 and instead uses M42 J6 and the A45, before finally joining the M6 at the new junction at Corley. This change in traffic would have significant impact on the SRN in the area, as well as local traffic on the A45, plus wider economic and environmental impacts beyond the focus of the traffic modelling assessment. The strategic impact of Package 2 is similar, albeit shifted further west along the A45, in line with the location of the new M6 junction closer to the M42.
- The improvements in Package 3, at M6 J3, the A444-Rowley's Green and with the addition of the Keresley Link Road, see a significant increase in traffic utilising the strategic route through from west Coventry to the A444 north of J3, enabled by reduced delay. The nature of the intervention at Rowley's Green, only benefiting traffic turning from Winding House Lane EB to the A444 NB, helps to explain why substantially more benefits are gained from P3 in the PM peak.
- Package 4 sees similar patterns of change to P3, but at a reduced magnitude, with the Hamburger arrangement at J3 adding less capacity to the junction than the left-turn slips in P3. This lack of reduction in delay causes less utilising of the strategic route through NW Coventry created by the Keresley Link Road. Flows on the A444 mainline are improved at Rowley's Green with the addition of the flyover scheme.
- As discussed above, the closure of the B4113 arm, and Hamburger arrangements at Rowley's Green leads to substantial re-routing in Package 5, causing extra delay in total in the network, despite some localised improvements in delay at specific junctions.
- Package 6 leads to similar patterns of change at P3, with an increased use of the strategic route through NW Coventry, enabled by the Keresley Link Road, free-flow left-turn lane at Rowley's Green, and A444 tunnel at J3.
- The schemes at Hawkesbury level crossing appear to have a minimal impact on the local traffic network, beyond, where the bridge on Blackhorse Road is present, increased delay at the junction of Blackhorse Road/Coventry Road (B4113) caused by increased through-flow on the road. In general however, the schemes have a minor traffic impact, in line with the scheme's role, more as a strategic and rail intervention.
- The addition of slip roads at Newtown Road also appear to have a minimal impact on the local traffic network, with flows on the A444 not significantly different between similar packages that include this scheme.

5.3. Feasibility Appraisal

5.3.1. Specification

The Feasibility Appraisal aimed to identify and assess potential constraints, relating to both design and environmental elements, that might impact the construction and operation of the shortlisted schemes. In addition, the appraisal was to summarise the potential impact of the shortlisted schemes in terms of construction timescale, monetary cost, environmental impact and acceptability. The environmental assessment took place separately to the design assessment, with the results summarised in six Environmental Assessment

Reports, covering each of the scheme 'option areas' (e.g. M6 J3; or Hawkesbury Level Crossing). The findings of the overall appraisal, incorporating the separate findings of the environmental assessment, are shown in the Feasibility Appraisal Report (see Appendix D).

The feasibility appraisal followed as far as possible the assumptions used for the traffic modelling assessment, whilst considering additional elements of the shortlisted schemes relevant to feasibility that were not specified for the traffic assessment (e.g. specific alignment of A45-M6 link roads). The options assessed as part of the feasibility appraisal neither included every shortlisted option, nor were limited to those options on the shortlist. In certain cases, namely where significant new infrastructure would not be required as part of the scheme (for example options B-BPR-1 and P-SAI-1), these schemes were excluded from the design feasibility assessment. However in a few other cases, Atkins proposed potential alternative options that were not shortlisted, that may be feasible and still achieve the stated Outcome Objectives, for information purposes.

As a result, the options assessed can be split into three areas; those shortlisted options with significant required infrastructure assessed on both a design and environmental basis, those options not assessed, either because less significant infrastructure would be required for their delivery or the option has not been shortlisted, and finally, some additional alternative (non-shortlisted) options proposed as part of the design feasibility assessment, included for information, and not subject to an environmental assessment. These three areas are shown in Table 5-3 to Table 5-5.

Table 5-3 - Shortlisted options assessed for both design and environmental constraints

Reference	Option
C-KLR-3	Keresley Link Road: Alignment 1
C-KLR-4	Keresley Link Road: Alignment 2
C-KLR-5	Keresley Link Road: Alignment 2A
C-M6J3-3	M6 J3: Hamburger layout for A444
C-M6J3-4	M6 J3: Segregated left turn slips
C-M6J3-5	M6 J3: Tunnel for A444
C-HLC-2	Hawkesbury Level Crossing: Blackhorse Rd bridge
C-HLC-3	Hawkesbury Level Crossing: Stephenson Road new link (existing tunnel)
P-PCS-1*	City centre to Westhill Rd Cycleway
P-PCS-2*	Westhill Rd to Keresley Cycleway
P-PCS-3*	City centre to Eastern Green Cycleway
S-RGI-1	Rowley's Green: Free-flowing lane NB from Winding House Lane to A444
S-RGI-2	Rowley's Green: Mainline A444 north-south flyover
S-RGI-4	Rowley's Green: Incorporation of Very Light Rail
S-RGI-5	Rowley's Green: Incorporation of Bus Rapid Transit scheme
S-NM6J-1	New M6 Junction: at Corley Services
S-NM6J-2	New M6 Junction: at B4098 tunnel
S-NM6J-3	New M6 Junction: at B4102 tunnel
S-NM6J-4	New M6 Junction: at greenfield site
S-NM6J-5	New M6 Junction link road: to A45 at Eastern Green
S-NM6J-6	New M6 Junction link road: to A45 at Meriden
S-NRS-1	A444-Newtown Road junction: north-facing sliproads

* Note: Options not assessed from environmental perspective as expected impact not significant.

Table 5-4 - Options not assessed for design or environmental constraints

Reference	Option	Reason for non-inclusion
C-KLR-1	Keresley Link Road: No Link Road Option	Option not shortlisted
C-KLR-2	Keresley Link Road: Partial Link Road Option	Overlap with other assessed option (C-KLR-3)
C-M6J3-1	M6 J3: No improvement	No significant infrastructure required
C-M6J3-2	M6 J3: Optimising traffic signals on gyratory	No significant infrastructure required
C-M6J3-7	M6 J3: Removal of B4113 at roundabout	No significant infrastructure required
C-M6J3-8	M6 J3: Improvements to signals/lane allocations on gyratory	Option not shortlisted
C-HLC-1	Hawkesbury Level Crossing: No improvement	No significant infrastructure required
C-HLC-4	Hawkesbury Level Crossing: Optimise level crossing operation	No significant infrastructure required
P-BPR-1	Bus Park & Ride services between Bermuda Park and Keresley	No significant infrastructure required
P-SAI-1	Coventry/Nuneaton Station accessibility improvements	No significant infrastructure required
S-RGI-3	Rowley's Green: Mainline A444 north-south hamburger layout	Overlap with other assessed option (S-RGI-2)

Table 5-5 - Additional 'alternative' design options presented for information

Reference	Option
C-M6J3-6	M6 J3: Flyover for A444
C-HLC-2a	Hawkesbury Level Crossing: Blackhorse Rd underpass
C-HLC-3a	Hawkesbury Level Crossing: Stephenson Road link over railway
C-HLC-3b	Hawkesbury Level Crossing: Stephenson Road link under railway
C-HLC-5	Hawkesbury Level Crossing: Closure of Blackhorse Rd
P-PCS-4	Holyhead Rd to Long Ln Cycleway
S-RGI-6	Rowley's Green: Incorporation of Cycleway
S-NRS-1a	A444-Newtown Road junction: Vectos-design NB slip
S-NRS-1b	A444-Newtown Road junction: Sutherland Drive off-slip

It should also be noted that the feasibility appraisal considered each scheme on an option-by-option basis, as opposed to as whole packages.

5.3.2. Results

The results of the feasibility appraisal are summarised below, and discussed in more detail in Appendix D

Keresley Link Road

Building upon the work carried out for the Keresley Link Road Multi-Disciplinary Review, Alignment 2A (C-KLR-5) presents the most attractive option, considering likely timescales, costs, environmental impact and acceptability. Whilst the three assessed alignments all present similar cases, Alignment 2A avoids the requirement for purchasing third party land at Bennetts Road, and also adopts a smoother alignment, avoiding a significant crossing of a Local High Pressure (LHP) gas main. Alignment 1, through the potential need for the purchasing of third-party land, would likely feature longer construction timescales than the other options, while

the outline cost assessment prepared at this stage foresees no significant difference in costs between the options. Alignment 2A may, however, carry a slightly greater environmental impact, namely on Jubilee Woods.

M6 Junction 3

Of the three shortlisted options assessed as part of the feasibility appraisal, both a Hamburger-style layout or J-Links (C-M6J3-3) or the addition of free-flow lanes to/from the M6 where possible (C-M6J3-4) present feasible options for delivery. Specifically, a hamburger arrangement would be feasible within the footprint of the existing junction, and a free-flow lane from the A444SB to the M6 EB would likely be feasible and achieve the stated Outcome Objectives. Both of these options would see moderate timescales and costs driven by relatively orthodox construction processes and an absence of significant constraints. Environmentally, neither option would impact significant environmental resources, with the hamburger arrangement impacting vegetation within the gyratory, and the free-flow lanes requiring a moderate widening of the carriageway.

The shortlisted option for a tunnel under Junction 3 for the A444 (C-M6J3-5) would feature a potentially lengthy, complex and costly construction, with the tunnel located in an area prone to flooding.

New M6 Junction 3 West

The delivery of a new junction on the M6 to the west of Corley Services (S-NM6J-1), plus an accompanying link road to the A45 would be viable, according to the high-level assessments carried out. Specifically, a new junction located at Corley Services itself would be complex but potentially deliverable, resulting in some loss of habitat and woodland resulting from the link road to the A45, as well as some disruption to local traffic during construction. Alternatively, a junction on a new greenfield site along that span of motorway (S-NM6J-4) would require a simpler construction and therefore timescales, and would likely be the least disruptive option for local communities.

The use of the existing bridges at the B4098 or B4102 (S-NM6J-2 and 3) for new junctions are not considered viable, given the insufficient width of the existing tunnels would require significant remodelling and resulting high costs.

Hawkesbury Level Crossing

Of the assessed shortlisted options for the Hawkesbury Level Crossing, the offline highway diversion via the existing tunnel on Stephenson Road (C-HLC-3) presents the most feasible option from a design and environmental perspective, avoiding the visual intrusion and risk of an overbridge on Blackhorse Road (C-HLC-2). However, this option would still feature high costs and land requirements, and the existing Stephenson Road Bridge is inadequate in its current state and would require significant amendments.

The best ‘alternative’ option presented as part of the feasibility appraisal (not a shortlisted option) is for an offline highway diversion that tunnels under the railway (C-HLC-3b). This option would provide a simpler method for crossing the railway than C-HLC-3, with similar timescales and potentially reduced costs.

Cycle Improvements

The three shortlisted cycle improvements assessed are all feasible in their delivery, with a couple of specific points to note. Firstly, the Coundon Cycle Route (P-PCS-1) may feature higher costs due to the potential for utilities to be affected along the route length. The link from Keresley to this Coundon route (P-PCS-2) is deliverable with moderate time, cost and environmental implications. Finally, a preferred alignment for the Eastern Green route (P-PCS-3) is presented, favouring a route via Holyhead Road, which avoids Pickford Brook and private accesses as much as possible along the route length.

An additional route, from Holyhead Road to Long Lane (P-PCS-4), would be a relatively simple addition to this suite of route, albeit not a shortlisted option for the scope of this study.

Rowley’s Green

In terms of the assessed, shortlisted options at the A444-Rowley’s Green junction, a free-flow lane from Winding House Lane to the A444 NB (S-RGI-1) presents one potentially feasible option, with an expected low cost and environmental impact. Similarly, the conversion of the nearby disused rail line into a facility for some form of Mass Rapid Transit (Very Light Rail or Bus Rapid Transit) (S-RGI-4/5) would be an achievable option with potential benefits for sustainable travel in the city. The option of a flyover at the junction for the A444 mainline is not considered particularly feasible, given the likely high cost of the required long-span structure.

An alternative suggested option to utilise the disused rail line as a cycleway would be a low-cost, achievable option.

A444 Newton Road Junction

The most feasible option for the addition of slip roads at the A444-Newtown Road would see the addition of relatively simple northbound merge and diverge slips (S-NRS-1a). This would provide the most feasible method of adding northbound access, avoiding potential signals and stop lines in the tunnel under the A444, as per the shortlisted option based upon a design sketched by Vectos for Warwickshire County Council (S-NRS-1). However, it should be noted that all options for northbound slips would likely incur a high environmental cost, with a loss of visual screening and noise pollutants to adjacent properties.

5.4. Package Summaries

This section provides a short overview for each package, bringing together the traffic assessment and feasibility appraisal evidence discussed in the above sections. The summary table of packages is repeated in Table 5-6 for convenience, while Table 5-7 shows a simplified overview of whether the packages meet the Outcome Objectives of the project.

Table 5-6 - Package Summary

Package number	Problem Focus Decision Areas				Other Decision Areas					
	Keresley Link Road	M6 J3	New M6 Jct	Hawkesbury Level Crossing	A444-Rowley's Green Jct (Highway)	A444-Rowley's Green Jct (PT)	Pedestrian and cycle routes	Bermuda Park & Ride	Station Accessibility	A444-Newtown Rd Jct
1	Partial Link Road (C-KLR-2)	-	New Jct at Corley plus Link Road to Eastern Green (S-NM6J-1 + S-NM6J-5)	-	-	Incorporation of Very Light Rail (S-RGI-4)	-	Bermuda Park & Ride service to Keresley (P-BPR-1)	-	North-facing slip roads onto A444 (S-NRS-1)
2	Alignment 2 (C-KLR-4)	-	New Jct at B4102 plus Link Road to Meriden (S-NM6J-3 + S-NM6J-6)	Bridge on Blackhorse Rd (C-HLC-2)	-	-	New cycleways to NW of city (P-PCS-1,2,3)	-	Station accessibility improvements at local rail stations (P-SAI-1)	-
3	Alignment 2 (C-KLR-4)	Free-flow left-turn slips (C-M6J3-4)	-	Bridge on Blackhorse Rd (C-HLC-2)	Free-flow left turn lane from Winding House Ln NB (S-RGI-1)	Incorporation of Bus Rapid Transit (S-RGI-5)	New cycleways to NW of city (P-PCS-1,2,3)	-	-	-
4	Alignment 2 (C-KLR-4)	Hamburger-style layout (C-M6J3-3)	-	Link to Stephenson Rd (C-HLC-3)	A444 flyover (S-RGI-2)	-	-	Bermuda Park & Ride service to Keresley (P-BPR-1)	Station accessibility improvements at local rail stations (P-SAI-1)	North-facing sliproads onto A444 (S-NRS-1)
5	Alignment 2a (C-KLR-5)	Close B4113 arm (C-M6J3-7)	-	Link to Stephenson Rd (C-HLC-3)	Hamburger-style layout (S-RGI-3)	-	New cycleways to NW of city (P-PCS-1,2,3)	Bermuda Park & Ride service to Keresley (P-BPR-1)	-	North-facing sliproads onto A444 (S-NRS-1)
6	Alignment 2a (C-KLR-5)	A444 tunnel (C-M6J3-5)	-	Optimisation of level crossing signals (C-HLC-4)	Free-flow left turn lane from Winding House Ln NB (S-RGI-1)	-	-	-	Station accessibility improvements at local rail stations (P-SAI-1)	-

NB: '-' denotes 'do nothing'

Table 5-7 - Overview of package performance against outcome objectives

Level	Objective	P1	P2	P3	P4	P5	P6
National	Help unlock opportunities created by national schemes and events (HS2 and UK Central)	✓	✓	✓	✓		✓
	To improve the efficiency and operation of the Strategic Road Network, specifically the M6	✓	✓	✓	✓		✓
Sub-Regional	To improve connectivity between A45 and M6	✓	✓	✓	✓	✓	✓
	Improve journey resilience along A444 corridor connecting Coventry to Nuneaton and Bedworth	✓		✓	✓		✓
	Enable greater rail connections along Leamington Spa-Leicester rail corridor		✓	✓	✓	✓	✓
	To provide greater access to growth sites (eg: universities and employment sites) in area	✓	✓	✓	✓	✓	✓
Local	Reduce local vehicle congestion on nearby highways	✓	✓	✓	✓		✓
	Enhance mass-transit corridor in North Coventry area	✓		✓	✓	✓	
	Support and enable strategic housing growth sites and other local plan allocations	✓	✓	✓	✓		✓
	Improve health and wellbeing via greater active travel		✓	✓		✓	
	Mitigate impact of traffic on local communities			✓			✓
	Reduce environmental impact of traffic			✓			

5.4.1. Package 1 (plus 1_A1 and 1_A2)

From a traffic perspective, Package 1 provides the greatest journey time benefits, with congestion at M6 J3 relieved due to use of a new M6 junction instead, and (in P1_A2), Keresley Link Road alignment 2a providing a more strategic route through NW Coventry. In general Package 1 provides more strategic benefits, with many sectoral benefits arising from longer distance trips. One element of the traffic performance that would require further investigation is whether the routing of traffic along the A45 and new link road to the M6 is preferable to the use of the M42 and M6 as current. The addition of slip roads at Newtown Road appear to have relatively minor impacts.

In terms of feasibility constraints, alignment 2a of the Keresley Link Road is the preferred option; therefore, combined with the traffic results, Package 1_A2 is likely the optimal out of the three Package 1 alternatives. However, taking the package as a whole, the new junction on the M6 at Corley has significant potential deliverability challenges and cost, while the link road from the A45 to the M6 may have detrimental environmental impacts. Incorporation of Very Light Rail (VLR) would require the overcoming of some design constraints, while a Park and Ride service to Bermuda Park, whilst not included in either of the assessments carried out, would likely provide a low-cost additional measure with little new infrastructure required. Given the apparent minimal traffic benefits provided, slip roads at Newtown Road may not be cost effective due to considerable environmental constraints.

5.4.2. Package 2

Due to the positioning of the new M6 junction further west, Package 2 produces much fewer traffic benefits than the Package 1, the only other package to feature a new junction on the M6. This potentially indicates that the location of a new junction is more effective if located at Corley Services.

Regarding Hawkesbury level crossing, a bridge on Blackhorse Road would likely be somewhat beneficial to local traffic, albeit with potential for additional delay at the junction with the B4113. From a feasibility point of view however, delivering a bridge would be a significant engineering challenge, with subsequent impacts on both timescales and costs, as well as causing significant visual intrusion impact and land take. New cycleways serving NW Coventry, plus improvements to rail station access are likely to support public transport and active mode uptake in the north of the city.

5.4.3. Package 3

The combination of the Keresley Link Road, a free-flow left turn at the A444-Rowley's Green junction and the use of free-flow slip roads at M6 J3 is beneficial from traffic perspective, while avoiding the likely large cost of a new junction on the M6. However, it should be noted that from a feasibility point of view, the free-flow slips are likely only feasible to the NE of J3 (from A444 southbound to M6 eastbound), as opposed to on four arms, as tested in the traffic assessment. A free-flow left turn lane at the Rowley's Green junction, from Winding House Lane EB to the A444 NB, features few delivery constraints, and as such is likely a cost-effective option for consideration.

A bridge on Blackhorse Road, as discussed, may have some traffic benefits but also features significant deliverability challenges. Delivery of a Bus Rapid Transit scheme at Rowley's Green would be possible, and, when combined with new cycleways to the north-west of the city, would likely support public transport and active modes.

5.4.4. Package 4

Package 4 provides fewer benefits in terms of journey times and delay than similar packages. The hamburger arrangement at M6 J3 doesn't provide the same capacity improvements as the free-flow lanes tested as part of Package 3, although the addition of a flyover benefits the A444 mainline at Rowley's Green. A new link to Stephenson Road at Hawkesbury would likely be neutral in terms of traffic impacts, while the sliproads at Newtown Road would likely only have a minor impact, as discussed above.

From a constraints perspective, the hamburger arrangement at M6 J3 would be deliverable without major constraints, although the costs of building and maintaining a long-span flyover at Rowley's Green A444 would likely render that particular scheme ineffective value for money. A link to Stephenson Road is a more viable option than a Bridge on Blackhorse Road, although the additional recommendation made in the Feasibility Appraisal Report, of an alternative, more appropriate tunnel linking to Stephenson Road is likely a more cost effective option, given the need to modify the existing tunnel for vehicular use. As with other packages, the sliproads at Newtown Road may not be cost effective given feasibility constraints.

5.4.5. Package 5

Package 5 features alignment 2a of the Keresley Link Road, which marginally provides the best traffic impacts out of the options for the link road. However, the closure of the B4113 arm at M6 J3, and the addition of a hamburger arrangement the A444-Rowley's Green junction, has a detrimental impact on traffic in the north of the city, leading to overall disbenefits from the package, in terms of vehicle time. This is inclusive of the largely neutral traffic impacts of a Stephenson Road link at Hawkesbury and Newtown Road sliproads.

In terms of feasibility, the schemes in the package at M6 J3 and Rowley's Green are largely deliverable, but do not appear to create sufficient benefits for further consideration. The alternative tunnel for a link to Stephenson Road is likely feasible, as are the new cycleways to NW Coventry, while a new Park and Ride site at Bermuda Park would be a potentially cost-effective, small scale additional scheme.

5.4.6. Package 6

Package 6 again features the most effective alignment of the Keresley Link Road from a traffic perspective, plus the measures at Rowley's Green (left-turn slip) and M6 J3 (A444 tunnel) that help contribute to an effective strategic route through the north-west of the city (to roughly the same magnitude as Package 3). The optimisation of the signals at the Hawkesbury Level Crossing appeared to have little impact on traffic in the area.

In terms of feasibility, the A444 tunnel is unfeasible, due to both a lengthy, complex and costly construction, and the tunnel located in an area prone to flooding. As a result, given the benefits produced by the tunnel are only similar in magnitude to that produced by the free-flow slip lanes (see Package 3), it's unlikely this option would be cost-effective. The optimisation of signals at Hawkesbury and improvements to access at rail stations would not involve significant new infrastructure, and as such provide more minor but deliverable schemes as part of the package.

5.5. Preferred Package

Considering the suite of evidence presented in the rest of this chapter, this section will define a single, preferred package for full testing and appraisal for an Outline Business Case (OBC) submission. This will consider the potential traffic, design and environmental implications of each package, plus additional considerations in line

with the project Outcome Objectives defined in Section 1.4. While reference will be made to all areas of the shortlisted options, at this stage the focus will be upon defining a preferred package for modelling in the full CASM Variable Demand Runs that will be used for the economic appraisal of options in the OBC. Given some of the benefits from public transport and active mode options shortlisted cannot be quantified using CASM, the options that are considered potentially beneficial additions to the Core schemes will be highlighted here for further consideration in the OBC.

The evidence presented suggests that a variant of **Package 3** would likely provide the best value for money as the preferred package of transport interventions for Coventry North. The package provides significant transport benefits through small or medium-scale interventions, avoiding the high costs and timescales of a major intervention on the SRN, such as a new junction west of M6 J3. A summary of the preferred package is shown in Table 5-8.

Table 5-8 – Preferred Package Summary

Package number	Problem Focus Decision Areas				Other Decision Areas					
	Keresley Link Road	M6 J3	New M6 Jct	Hawkesbury Level Crossing	A444-Rowley's Green Jct (Highway)	A444-Rowley's Green Jct (PT)	Pedestrian and cycle routes	Bermuda Park & Ride	Station Accessibility	A444-Newtown Rd Jct
3_A1	Alignment 2a (C-KLR-5)	Free-flow left-turn slips (C-M6J3-4) And Hamburger-style layout (C-M6J3-3)	-	Link to Stephenson Rd (C-HLC-3)	Free-flow left turn lane from Winding House Ln NB (S-RGI-1)	Incorporation of Bus Rapid Transit (S-RGI-5) Or Incorporation of Very Light Rail (S-RGI-4)	New cycleways to NW of city (P-PCS-1,2,3)	-	-	-

The preferred package can be split into three areas, reflecting the likely timescales and priorities for delivery:

- Immediate priorities to support Coventry Local Plan developments (delivery by ~ 2025);
- Accompanying schemes in the wider area that will help support the Outcome Objectives; and
- Long-term major schemes with potential to further enhance travel behaviour in Coventry and the local area.

Immediate priorities

From the Core area of shortlisted schemes, **Alignment 2a of the Keresley Link Road (C-KLR-5)** provides an effective intervention that both distributes traffic resulting from the Keresley SUE development, and provides a more strategic route through north-west Coventry, linking the A45 with the A444. It is a more effective traffic intervention than Alignment 2 (C-KLR-4) that was originally tested as part of Package 3, due to the closure of Watery Lane that prevents routing via the Holbrooks residential area. It is also the preferred option from a feasibility perspective, adopting a smoother alignment, and avoiding a significant crossing of a Local High Pressure (LHP) gas main.

In order to avoid the detrimental impact of the Winding House Lane-Wheelwright Lane junction on traffic routing highlighted in Section 5.2.2, the upgrading of this junction, potentially to a roundabout, may be required as a concurrent intervention, although this element will not be included in the testing and appraisal of the preferred scheme.

Intervention at M6 J3 will take the form of a combination of **free-flow lanes (C-M6J3-4)** and a **hamburger arrangement (C-M6J3-3)**. Following feedback from the feasibility appraisal, the free-flow lanes will only be tested on the North-East of the junction, where the A444 SB meets the M6 EB. This was the only feasible additional slip due to existing constraints on the western side of the junction. Given this limitation to this option, it will be combined with a second option, the hamburger arrangement, that also showed some capacity improvements for only a moderate investment cost, timescale and environmental implication. The combination of these schemes is feasible and should produce significant traffic benefits at the junction.

It should also be noted that these upgrades at M6 J3 are set against the context of concurrent upgrades being investigated by Warwickshire County Council (WCC). These proposals are for a widening of the B4113 arm at the roundabout, with an additional lane, and optimisation of the signals at the junction using a Microprocessor Optimised Vehicle Actuation (MOVA) system. These proposals are designed to be relatively low-cost, quick-to-implement interim measures to assist the function of the interchange in the immediate near future. As such, these proposals will be included in the Do-Minimum scenario of the full VDM runs, with the CNTP proposals outlined above included in the Do-Something scenario, as a more significant intervention.

Away from the Core area of options, the addition of a **left-turn slip at the A444-Rowley's Green junction (S-RGI-1)** will help to reduce delay at this key junction, and provide a link between the Keresley Link Road, and M6 J3. This could be achieved with only a modest investment of time and cost.

Accompanying schemes

To facilitate better rail connections to and from Coventry, the package will include a **new link road at Hawkesbury level crossing, connecting Blackhorse Road to Stephenson Road (C-HLC-3)**. This would enable the closure of Blackhorse Road, and improvement in rail capacity as a result. The traffic assessment found this scheme to have a largely neutral impact on traffic in the area. In terms of the Link Road, this would skirt the new development on the Golf Course site at Hawkesbury, and, following the feasibility assessment, would be most cost effective by using a new tunnel under the railway, as opposed to using the existing pedestrian bridge, modifications to which would likely be challenging and expensive.

The other accompanying scheme that would assist in the achievement of the Outcome Objectives would be **new cycleways serving the north-west of the city (P-PCS-1, 2 and 3)**. All of these cycleways were found by the feasibility assessment to be deliverable with modest time, cost and environmental impacts in the construction phase, and would assist in the uptake of active modes throughout the region of the city.

Long-term major schemes

In the long-term, two more major interventions could be investigated to support the Outcome Objectives and enhance the transport network in North Coventry. Firstly, a new link road and junction on the M6, either at Corley as tested, or at a greenfield site as recommended by the Feasibility Appraisal Report for deliverability reasons, should be investigated in terms of potential value-for-money.

- Whilst this scheme provided significant benefits in terms of vehicle minutes in the package modelling undertaken in CASM, it would be a major intervention, incorporating potential costs, engineering and environmental challenges beyond the scope of the high-level feasibility appraisal undertaken at this stage.
- Combined with the significant re-routing of traffic on the SRN caused by the new junction, it was decided that at this stage, a package of interventions with more localised impacts should be prioritised to facilitate the delivery of the development sites within the adopted Local Plans.
- Importantly, the data to date indicates that the new link road and junction on the M6 would be compatible with the Keresley Link Road, as the new link road would attract more strategic/long distance trips, whereas the benefits of the Keresley Link Road mainly occur within the Coventry area.
- The new link road would help to unlock new employment and housing opportunities, particularly given its close proximity to UK Central, and should therefore be considered for future Local Plan periods.
- In the short to medium term, improvements at the existing M6 Junction 3 are still proposed, as these are required to accommodate the forecast local growth in traffic from planned development. As discussed, the new junction on the M6 would benefit more strategic trips, and therefore improvements at both are mutually beneficial.

Given the significant strategic benefits shown by the package modelling, as well ability to unlock further land parcels, the scheme should be investigated further, separate to this study.

The other long-term intervention that should be considered is the **addition of a VLR or Bus Rapid Transit system line along the disused railway line at Rowley's Green (S-RGI-4 or 5)**. These schemes would provide a significant boost to public transport in North Coventry, and would be feasible for delivery with moderate time, cost and environmental impacts, according to the feasibility appraisal. However, given the benefits of such a scheme cannot be captured in the CASM modelling to be undertaken on the preferred package, and the likely longer timescales for such a scheme as part of a city-wide system, the option has been included as a long-term measure for consideration in the package, as opposed to being appraised fully.

Table 5-9 shows how the chosen preferred package helps to fulfil the Outcome Objectives of the CNTP, in line with the sifting criteria defined for the options appraisal process.

Table 5-9 – Outcome Objectives and Preferred Package

Level	Objective	Relevant sifting criterion	Preferred package benefits
National	Help unlock opportunities created by national schemes and events (HS2 and UK Central)	Qualitative measure of the potential change in the resilience of the M6 and A45, reflecting improved capacity provided on local network.	Addition of Keresley Link Road and upgrades at M6 J3 improve resilience of A45 and M6
	To improve the efficiency and operation of the Strategic Road Network, specifically the M6	Average journey time between M6 Junction 2 and Junction 4	Upgrades at J3 reduce likelihood of queueing onto M6 mainline
		Change in the likelihood of queuing onto mainline from M6 J3	
Sub-Regional	To improve connectivity between A45 and M6	Improvements in connectivity in north-west Coventry	Keresley Link Road and left-turn slip at Rowley's Green provides clear strategic route through NW Coventry
	Improve journey resilience along A444 corridor connecting Coventry to Nuneaton and Bedworth	Likely change in vehicle delays on the A444 between Foleshill Road and Bermuda Park	Improved A444 journey times resulting from J3 upgrade.
	Enable greater rail connections along Leamington Spa-Leicester rail corridor	Changes in access to local rail stations	More regular rail services enabled by removal of Blackhorse Level Crossing
		Qualitative assessment of improvements to capacity resulting from optimisation of Hawkesbury Level Crossing	
	To provide greater access to growth sites (eg: universities and employment sites) in area	Qualitative assessment of connectivity to major strategic growth sites; Prologis Park, Lyons Park and local university sites (Coventry University and University of Warwick)	Keresley Link Road provides link between Prologis, Lyons Park, and through to A45/A46
Local	Reduce local vehicle congestion on nearby highways	The extent to which an option provides an alternative to motor vehicle travel	Cycleways to NW of city, and potential for VLR/Bus Rapid Transit at Rowley's Green
		Qualitative assessment of extent to which additional highway capacity has been provided	Additional capacity via Keresley Link Road, Rowley's Green left-turn and M6 J3 upgrades.
	Enhance mass-transit corridor in North Coventry area	The extent to which an option increases public transport uptake in city	Potential for VLR/Bus Rapid Transit at Rowley's Green

Level	Objective	Relevant sifting criterion	Preferred package benefits
	Support and enable strategic housing growth sites and other local plan allocations	Qualitative assessment based upon the proximity to identified growth sites outlined in the Coventry Local Plan, with consideration given to the size and proposed timeline of development	Keresley Link Road and Hawkesbury link provides distribution and access for new developments, deliverable over shorter timescale.
	Improve health and wellbeing via greater active travel	Extent to which option increases active travel uptake	Cycleways to NW of city provide significant boost to city's cycle network.
	Mitigate impact of traffic on local communities	Qualitative assessment of impacts relating to safety, air quality, noise and severance.	All preferred options avoid significant major environmental impacts
	Reduce environmental impact of traffic	Qualitative assessment of impacts relating to biodiversity, landscape, heritage, flood risk)	

6. Summary and next steps

This OAR has set out the process for and results of the options appraisal process for the Coventry North Transport Package. Following sifting to a shortlist of options, this report sets out the methodology by which these options were sorted into six packages reflecting the priorities of CCC and key stakeholders. It then sets out the evidence gathered in the options appraisal process; both in the traffic modelling assessment of packages, and the feasibility appraisal, which included an environmental assessment of each option. This evidence is then brought together to arrive at an overall assessment of each package compared to the project's Outcome Objectives, and define a single preferred package for full modelling and appraisal, in preparation for an Outline Business Case.

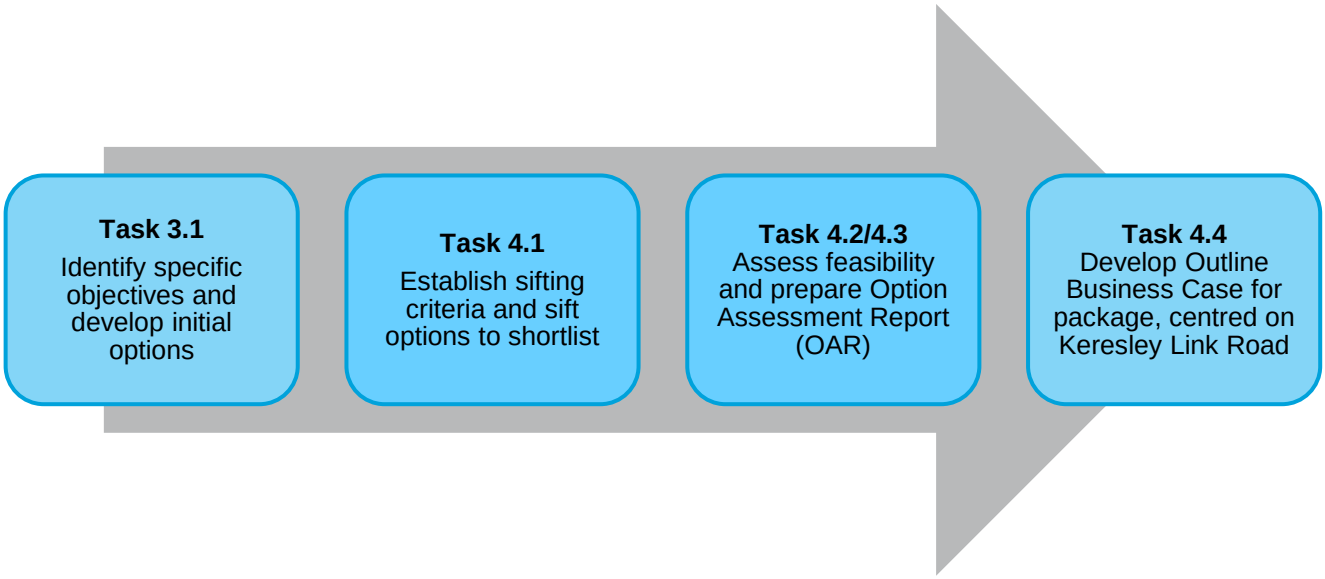
Given its greatest potential to achieve the Outcome Objectives of the study, and provide high value for money, a variant of Package 3 has been chosen as the preferred package for progressing to the next stage. This package helps to improve strategic highway routes through the north of the city via the Keresley Link Road and improvements at Rowley's Green and M6 J3. It also would improve rail connections via improvements at Hawkesbury Level Crossing, a boost active mode and public transport uptake via new cycleways and potential for incorporation of a Very Light Rail or Bus Rapid Transit scheme.

Next steps

A five-stage process has been outlined for the options appraisal process, as shown in Figure 2-1. This report sets out the process and results of Tasks 4.1, 4.2 and 4.3. The next and final step in the appraisal approach is to fully appraise the preferred package, modelling the options in a full Variable Demand run of CASM, and preparing an Outline Business Case for submission to the West Midlands Combined Authority, demonstrating the case for the Keresley Link Road as part of a wider Coventry North Transport Package.

Outside the scope of this project, the package testing has suggested that a new junction on the M6 west of Junction 3, with accompanying link road from the A45, may be a viable option for long-term connectivity in the region. As a result, it is recommended that this scheme is investigated in greater detail than covered as part of this project, with a more detailed traffic and feasibility assessment undertaken to gain a better appreciation of its viability.

Figure 6-1 - Summary of appraisal approach



Appendices

Appendix A. Options Shortlist (Full table)

[Table starts on next page]

Table A-1 - Options Shortlist (National Objectives)

Reference	Option name	Retained?	Unlock opportunities from national schemes		Improve operation of SRN	
C-KLR-1	Keresley Link Road: No Link Road Option	×	Neutral	Does not unlock or enable any opportunities presented by national schemes	Neutral	Has no impact on SRN
C-KLR-2	Keresley Link Road: Partial Link Road Option	✓	Neutral	Impact in relation to national schemes likely to be negligible	Neutral	Unlikely to impact SRN
C-KLR-3	Keresley Link Road: Alignment 1	✓	Strongly positive	Provides key link from A45 through to M6	Neutral	Unlikely to impact SRN
C-KLR-4	Keresley Link Road: Alignment 2	✓	Strongly positive	Provides key link from A45 through to M6	Neutral	Unlikely to impact SRN
C-KLR-5	Keresley Link Road: Alignment 2A	✓	Strongly positive	Provides key link from A45 through to M6	Neutral	Unlikely to impact SRN
C-M6J3-1	M6 J3: No improvement	✓	Slightly adverse	May limit opportunities presented by national schemes	Slightly adverse	With forecast increases in traffic on SRN, no improvement may lead to decreased operation of SRN in area
C-M6J3-2	M6 J3: Optimising traffic signals on gyratory	✓	Positive	Would improve function of Exhall Interchange, enabling connectivity between A444 and M6	Positive	Improves Exhall Interchange, likely to reduce risk of slip road queues onto mainline.
C-M6J3-3	M6 J3: Hamburger layout for A444	✓	Positive	Would improve function of Exhall Interchange, enabling connectivity between A444 and M6	Positive	Improves Exhall Interchange, likely to reduce risk of slip road queues onto mainline.
C-M6J3-4	M6 J3: Segregated left turn slips	✓	Positive	Would improve function of Exhall Interchange, enabling connectivity between A444 and M6	Strongly positive	Improves Exhall Interchange, likely to significantly reduce risk of slip road queues onto mainline.
C-M6J3-5	M6 J3: Tunnel for A444	✓	Positive	Would improve function of Exhall Interchange, enabling connectivity between A444 and M6	Positive	Improves Exhall Interchange, likely to reduce risk of slip road queues onto mainline.
C-M6J3-6	M6 J3: Flyover for A444	×	Positive	Would improve function of Exhall Interchange, enabling connectivity between A444 and M6	Positive	Improves Exhall Interchange, likely to reduce risk of slip road queues onto mainline.
C-M6J3-7	M6 J3: Removal of B4113 at roundabout	✓	Positive	Would improve function of Exhall Interchange, enabling connectivity between A444 and M6	Positive	Improves Exhall Interchange, likely to reduce risk of slip road queues onto mainline.
C-M6J3-8	M6 J3: Improvements to signals/lane allocations on gyratory	×	Positive	Would improve function of Exhall Interchange, enabling connectivity between A444 and M6	Positive	Improves Exhall Interchange, likely to reduce risk of slip road queues onto mainline.
C-HLC-1	Hawkesbury Level Crossing: No improvement	✓	Neutral	Does not unlock or enable any opportunities presented by national schemes	Neutral	Has no impact on SRN
C-HLC-2	Hawkesbury Level Crossing: Blackhorse Rd bridge	✓	Neutral	Does not unlock or enable any opportunities presented by national schemes	Neutral	Unlikely to impact SRN
C-HLC-3	Hawkesbury Level Crossing: Stephenson Road new link	✓	Neutral	Does not unlock or enable any opportunities presented by national schemes	Neutral	Unlikely to impact SRN
C-HLC-4	Hawkesbury Level Crossing: Optimise level crossing operation	✓	Neutral	Does not unlock or enable any opportunities presented by national schemes	Neutral	Unlikely to impact SRN
P-PCS-1	City centre to Westhill Rd Cycleway	✓	Positive	Provide cycle link between new employment areas and city centre (and Coventry rail station)	Neutral	Unlikely to impact SRN
P-PCS-2	Westhill Rd to Keresley Cycleway	✓	Positive	Provide cycle link between new employment areas and city centre (and Coventry rail station)	Neutral	Unlikely to impact SRN
P-PCS-3	City centre to Eastern Green Cycleway	✓	Positive	Provide cycle link between new employment areas and city centre (and Coventry rail station)	Neutral	Unlikely to impact SRN
P-BPR-1	Bus Park & Ride services between Bermuda Park and Keresley	✓	Neutral	Does not unlock or enable any opportunities presented by national schemes	Neutral	Unlikely to impact SRN beyond minor impact on Exhall Interchange
P-SAI-1	Coventry/Nuneaton Station accessibility improvements	✓	Positive	Helps to provide improved rail hubs in area, assisting opportunities created by national schemes	Neutral	Unlikely to impact SRN

Reference	Option name	Retained?	Unlock opportunities from national schemes		Improve operation of SRN	
S-RGI-1	Rowley's Green: Free-flowing lane NB from Winding House Lane to A444	✓	Positive	Improves function of Rowley's Green junction, helping to provide link between A45 and A444/M6	Neutral	Unlikely to impact SRN
S-RGI-2	Rowley's Green: Mainline A444 north-south flyover	✓	Positive	Improves function of Rowley's Green junction, helping to provide link between A45 and A444/M6	Slightly adverse	Without signals at Rowley's Green, risk that mainline A444 traffic causes greater congestion at M6 J3/Exhall Interchange
S-RGI-3	Rowley's Green: Mainline A444 north-south hamburger layout	✓	Positive	Improves function of Rowley's Green junction, helping to provide link between A45 and A444/M6	Neutral	May lead to more traffic at M6 J3, but uncertain without modelling
S-RGI-4	Rowley's Green: Incorporation of Very Light Rail	✓	Positive	Provides transit link between employment areas and city centre	Neutral	Unlikely to impact SRN
S-RGI-5	Rowley's Green: Incorporation of Bus Rapid Transit scheme	✓	Positive	Provides transit link between employment areas and city centre	Neutral	Unlikely to impact SRN
S-NM6J-1	New M6 Junction: at Corley Services	✓	Strongly positive	Key interchange close to UK Central	Neutral	Uncertain impact without modelling (may relieve pressure at current J3, but other, potentially adverse impacts (eg weaving)
S-NM6J-2	New M6 Junction: at B4098 tunnel	✓	Strongly positive	Key interchange close to UK Central	Neutral	Uncertain impact without modelling (may relieve pressure at current J3, but other, potentially adverse impacts (eg weaving)
S-NM6J-3	New M6 Junction: at B4102 tunnel	✓	Strongly positive	Key interchange close to UK Central	Neutral	Uncertain impact without modelling (may relieve pressure at current J3, but other, potentially adverse impacts (eg weaving)
S-NM6J-4	New M6 Junction: at greenfield site	✓	Strongly positive	Key interchange close to UK Central	Neutral	Uncertain impact without modelling (may relieve pressure at current J3, but other, potentially adverse impacts (eg weaving)
S-NM6J-5	New M6 Junction link road: to A45 at Eastern Green	✓	Strongly positive	Links Coventry to new interchange, close to UK Central	Neutral	Uncertain impact without modelling (may relieve pressure at current J3, but other, potentially adverse impacts (eg weaving)
S-NM6J-6	New M6 Junction link road: to A45 at Meriden	✓	Strongly positive	Links Coventry to new interchange, close to UK Central	Neutral	Uncertain impact without modelling (may relieve pressure at current J3, but other, potentially adverse impacts (eg weaving)
S-NRS-1	A444-Newtown Road junction: north-facing sliproads	✓	Neutral	Does not unlock or enable any opportunities presented by national schemes	Neutral	Unlikely to impact SRN

Table A-2 - Options Shortlist (Sub-Regional Objectives)

Reference	Option name	Retained?	Connectivity between A45 and M6		Improve journey resilience along A444 corridor		Improve rail connections in region		Provide greater access to growth sites	
C-KLR-1	Keresley Link Road: No Link Road Option	×	Neutral	Has no impact on connectivity between the A45 and M6	Neutral	Does not impact the A444 corridor	Neutral	No impact on local rail connections	Neutral	No impact on connections to growth sites
C-KLR-2	Keresley Link Road: Partial Link Road Option	✓	Neutral	Does not achieve complete link through from A45 to M6	Neutral	Does not impact the A444 corridor	Neutral	No impact on local rail connections	Neutral	No impact on connections to growth sites
C-KLR-3	Keresley Link Road: Alignment 1	✓	Strongly positive	Provides strategic orbital route	Neutral	May lead to re-routing away from A444, or encourage greater flows	Neutral	No impact on local rail connections	Strongly positive	Provides direct connection between growth

Reference	Option name	Retained?	Connectivity between A45 and M6		Improve journey resilience along A444 corridor		Improve rail connections in region		Provide greater access to growth sites	
						onto A444; modelling required for confirmation				sites (Lyons Park, Prologis, UoW)
C-KLR-4	Keresley Link Road: Alignment 2	✓	Strongly positive	Provides strategic orbital route	Neutral	May lead to re-routing away from A444, or encourage greater flows onto A444; modelling required for confirmation	Neutral	No impact on local rail connections	Strongly positive	Provides direct connection between growth sites (Lyons Park, Prologis, UoW)
C-KLR-5	Keresley Link Road: Alignment 2A	✓	Strongly positive	Provides strategic orbital route	Neutral	May lead to re-routing away from A444, or encourage greater flows onto A444; modelling required for confirmation	Neutral	No impact on local rail connections	Strongly positive	Provides direct connection between growth sites (Lyons Park, Prologis, UoW)
C-M6J3-1	M6 J3: No improvement	✓	Neutral	Has no impact on connectivity between the A45 and M6	Neutral	Does not impact the A444 corridor	Neutral	No impact on local rail connections	Neutral	No impact on connections to growth sites
C-M6J3-2	M6 J3: Optimising traffic signals on gyratory	✓	Positive	Improves interchange with M6	Positive	Improves Exhall Interchange (extent to be determined by modelling)	Neutral	No impact on local rail connections	Positive	Improves connectivity between SRN and growth sites in Coventry and Bedworth/Nuneaton
C-M6J3-3	M6 J3: Hamburger layout for A444	✓	Positive	Improves interchange with M6	Strongly positive	Bypasses Exhall Interchange for A444 mainline (extent to be determined by modelling)	Neutral	No impact on local rail connections	Positive	Improves connectivity between SRN and growth sites in Coventry and Bedworth/Nuneaton
C-M6J3-4	M6 J3: Segregated left turn slips	✓	Positive	Improves interchange with M6	Positive	Improves Exhall Interchange (extent to be determined by modelling)	Neutral	No impact on local rail connections	Positive	Improves connectivity between SRN and growth sites in Coventry and Bedworth/Nuneaton
C-M6J3-5	M6 J3: Tunnel for A444	✓	Positive	Improves interchange with M6	Strongly positive	Bypasses Exhall Interchange for A444 mainline (extent to be determined by modelling)	Neutral	No impact on local rail connections	Positive	Improves connectivity between SRN and growth sites in Coventry and Bedworth/Nuneaton
C-M6J3-6	M6 J3: Flyover for A444	×	Positive	Improves interchange with M6	Strongly positive	Bypasses Exhall Interchange for A444 mainline (extent to be determined by modelling)	Neutral	No impact on local rail connections	Positive	Improves connectivity between SRN and growth sites in Coventry and Bedworth/Nuneaton
C-M6J3-7	M6 J3: Removal of B4113 at roundabout	✓	Positive	Improves interchange with M6	Neutral	Improves Exhall Interchange but pushes more traffic onto A444 (extent to be determined by modelling)	Neutral	No impact on local rail connections	Positive	Improves connectivity between SRN and growth sites in Coventry and Bedworth/Nuneaton

Reference	Option name	Retained?	Connectivity between A45 and M6		Improve journey resilience along A444 corridor		Improve rail connections in region		Provide greater access to growth sites	
C-M6J3-8	M6 J3: Improvements to signals/lane allocations on gyratory	×	Positive	Improves interchange with M6	Positive	Improves Exhall Interchange (extent to be determined by modelling)	Neutral	No impact on local rail connections	Positive	Improves connectivity between SRN and growth sites in Coventry and Bedworth/Nuneaton
C-HLC-1	Hawkesbury Level Crossing: No improvement	✓	Neutral	Has no impact on connectivity between the A45 and M6	Neutral	Does not impact the A444 corridor	Neutral	No impact on local rail connections	Neutral	No impact on connections to growth sites
C-HLC-2	Hawkesbury Level Crossing: Blackhorse Rd bridge	✓	Neutral	Has no impact on connectivity between the A45 and M6	Neutral	Does not impact the A444 corridor	Strongly positive	Removal of level crossing enables signficant increase in trains per hour along corridor	Neutral	No impact on connections to growth sites
C-HLC-3	Hawkesbury Level Crossing: Stephenson Road new link	✓	Neutral	Has no impact on connectivity between the A45 and M6	Positive	Closure of level crossing may enable removal of signals at Blackhorse Rd-B4113, providing faster alternative to A444 (modelling to determine extent)	Strongly positive	Removal of level crossing enables signficant increase in trains per hour along corridor	Neutral	No impact on connections to growth sites
C-HLC-4	Hawkesbury Level Crossing: Optimise level crossing operation	✓	Neutral	Has no impact on connectivity between the A45 and M6	Neutral	Does not impact the A444 corridor	Positive	Optimisation of level corssing enables increase in trains per hour along corridor	Neutral	No impact on connections to growth sites
P-PCS-1	City centre to Westhill Rd Cycleway	✓	Neutral	Has no impact on connectivity between the A45 and M6	Positive	Provides alternative for city centre-Keresley (Prologis) trips	Neutral	No impact on local rail connections	Strongly positive	Provides alternative for city centre-Keresley (Prologis) trips
P-PCS-2	Westhill Rd to Keresley Cycleway	✓	Neutral	Has no impact on connectivity between the A45 and M6	Positive	Provides alternative for city centre-Keresley (Prologis) trips	Neutral	No impact on local rail connections	Strongly positive	Provides alternative for city centre-Keresley (Prologis) trips
P-PCS-3	City centre to Eastern Green Cycleway	✓	Neutral	Has no impact on connectivity between the A45 and M6	Neutral	Does not impact the A444 corridor	Neutral	No impact on local rail connections	Strongly positive	Provides alternative for city centre-Eastern Green trips
P-BPR-1	Bus Park & Ride services between Bermuda Park and Keresley	✓	Neutral	Has no impact on connectivity between the A45 and M6	Strongly positive	Removes car trips from A444 corridor	Neutral	No impact on local rail connections	Strongly positive	Provides connectivity directly between growth sites

Reference	Option name	Retained?	Connectivity between A45 and M6		Improve journey resilience along A444 corridor		Improve rail connections in region		Provide greater access to growth sites	
P-SAI-1	Coventry/Nuneaton Station accessibility improvements	✓	Neutral	Has no impact on connectivity between the A45 and M6	Positive	May remove trips from A444 by encouraging rail trips along corridor	Strongly positive	Directly improves accessibility to rail stations along the corridor	Positive	May provide better connections to Coventry city centre growth sites, Bermuda Park etc.
S-RGI-1	Rowley's Green: Free-flowing lane NB from Winding House Lane to A444	✓	Positive	Reduces delay on A45-A444-M6 route	Neutral	May add traffic to A444 (modelling to determine extent)	Neutral	No impact on local rail connections	Strongly positive	Provides free-flowing link from Prologis/Lyons Park to north
S-RGI-2	Rowley's Green: Mainline A444 north-south flyover	✓	Positive	Reduces delay on A45-A444-M6 route via improved junction operation	Strongly positive	Significant improvement in journey time consistency along corridor	Neutral	No impact on local rail connections	Neutral	No impact on connections to growth sites
S-RGI-3	Rowley's Green: Mainline A444 north-south hamburger layout	✓	Positive	Reduces delay on A45-A444-M6 route via improved junction operation	Positive	Improvement in journey time consistency along corridor	Neutral	No impact on local rail connections	Neutral	No impact on connections to growth sites
S-RGI-4	Rowley's Green: Incorporation of Very Light Rail	✓	Neutral	Has no impact on connectivity between the A45 and M6	Strongly positive	Provides direct alternative for city centre-Keresley trips	Neutral	No impact on local rail connections	Positive	Direct connection between city centre and Prologis
S-RGI-5	Rowley's Green: Incorporation of Bus Rapid Transit scheme	✓	Neutral	Has no impact on connectivity between the A45 and M6	Strongly positive	Provides direct alternative for city centre-Keresley trips	Neutral	No impact on local rail connections	Positive	Direct connection between city centre and Prologis
S-NM6J-1	New M6 Junction: at Corley Services	✓	Positive	Provides interchange for M6, close to A45	Positive	Likely to shift traffic away from A444 corridor, improving journey time consistency	Neutral	No impact on local rail connections	Positive	Provides connection between A45 (UoW, Eastern Green, Lyons Park) and M6
S-NM6J-2	New M6 Junction: at B4098 tunnel	✓	Positive	Provides interchange for M6, close to A45	Positive	Likely to shift traffic away from A444 corridor, improving journey time consistency	Neutral	No impact on local rail connections	Positive	Provides connection between A45 (UoW, Eastern Green, Lyons Park) and M6
S-NM6J-3	New M6 Junction: at B4102 tunnel	✓	Positive	Provides interchange for M6, close to A45	Positive	Likely to shift traffic away from A444 corridor, improving journey time consistency	Neutral	No impact on local rail connections	Positive	Provides connection between A45 (UoW, Eastern Green, Lyons Park) and M6
S-NM6J-4	New M6 Junction: at greenfield site	✓	Positive	Provides interchange for M6, close to A45	Positive	Likely to shift traffic away from A444 corridor, improving journey time consistency	Neutral	No impact on local rail connections	Positive	Provides connection between A45 (UoW, Eastern Green, Lyons Park) and M6

Reference	Option name	Retained?	Connectivity between A45 and M6		Improve journey resilience along A444 corridor		Improve rail connections in region		Provide greater access to growth sites	
S-NM6J-5	New M6 Junction link road: to A45 at Eastern Green	✓	Strongly positive	Direct link between A45 and M6	Positive	Likely to shift traffic away from A444 corridor, improving journey time consistency	Neutral	No impact on local rail connections	Strongly positive	Provides direct connection between A45 (UoW, Eastern Green, Lyons Park) and M6
S-NM6J-6	New M6 Junction link road: to A45 at Meriden	✓	Strongly positive	Direct link between A45 and M6	Positive	Likely to shift traffic away from A444 corridor, improving journey time consistency	Neutral	No impact on local rail connections	Positive	Provides connection between A45 (UoW, Eastern Green, Lyons Park) and M6
S-NRS-1	A444-Newtown Road junction: north-facing sliproads	✓	Neutral	Has no impact on connectivity between the A45 and M6	Neutral	May add traffic to A444 northern section (modelling to determine extent)	Neutral	No impact on local rail connections	Positive	Provides northbound connections (towards Bermuda Park, for example)

Table A-3 - Options Shortlist (Local Objectives)

Reference	Option name	Retained?	Reduce local road congestion		Enhance mass-transit network		Enable housing and Local Plan allocations		Improve health and wellbeing via active modes		Mitigate impact of traffic on local community		Reduce environmental impact of traffic	
C-KLR-1	Keresley Link Road: No Link Road Option	×	Slightly adverse	Lack of link road, combined with concurrent increases in traffic in area, would lead to increase in congestion on local network	Neutral	No change to mass-transit network	Neutral	No impact on supporting housing growth	Neutral	No impact on active travel	Slightly adverse	Lack of link road, combined with concurrent increases in traffic in area, would lead to increase in congestion on local network	Neutral	No net change in traffic
C-KLR-2	Keresley Link Road: Partial Link Road Option	✓	Positive	Would reduce congestion on Sandpits Lane, Moseley Ave etc.	Neutral	No change to mass-transit network	Positive	Connection to Bennetts Road for Keresley SUE	Positive	Addition of cycleway alongside Link Road provides cycle link in area	Positive	Would reduce traffic on Sandpits Lane, Moseley Ave etc.	Slightly adverse	May cause slight increase in overall traffic levels by providing strategic link through north-west of city
C-KLR-3	Keresley Link Road: Alignment 1	✓	Positive	Would reduce congestion throughout Holbrooks residential areas	Neutral	No change to mass-transit network	Strongly positive	Distributor for Keresley SUE (plus Prologis, Eastern Green)	Positive	Addition of cycleway alongside Link Road provides cycle link in area	Positive	Would reduce traffic throughout Holbrooks residential areas	Slightly adverse	May cause slight increase in overall traffic levels by providing strategic link through north-west of city

Reference	Option name	Retained?	Reduce local road congestion		Enhance mass-transit network		Enable housing and Local Plan allocations		Improve health and wellbeing via active modes		Mitigate impact of traffic on local community		Reduce environmental impact of traffic	
C-KLR-4	Keresley Link Road: Alignment 2	✓	Positive	Would reduce congestion throughout Holbrooks residential areas	Neutral	No change to mass-transit network	Strongly positive	Distributor for Keresley SUE (plus Prologis, Eastern Green)	Positive	Addition of cycleway alongside Link Road provides cycle link in area	Positive	Would reduce traffic throughout Holbrooks residential areas	Slightly adverse	May cause slight increase in overall traffic levels by providing strategic link through north-west of city
C-KLR-5	Keresley Link Road: Alignment 2A	✓	Strongly positive	Would reduce congestion throughout Holbrooks residential areas, particularly given stopping up of Watery Lane	Neutral	No change to mass-transit network	Strongly positive	Distributor for Keresley SUE (plus Prologis, Eastern Green)	Positive	Addition of cycleway alongside Link Road provides cycle link in area	Strongly positive	Would reduce traffic throughout Holbrooks residential areas, particularly given stopping up of Watery Lane	Slightly adverse	May cause slight increase in overall traffic levels by providing strategic link through north-west of city
C-M6J3-1	M6 J3: No improvement	✓	Neutral	No impact in reducing congestion	Neutral	No change to mass-transit network	Neutral	No impact on supporting housing growth	Neutral	No impact on active travel	Neutral	No mitigation of local traffic and its impact	Neutral	No net change in traffic
C-M6J3-2	M6 J3: Optimising traffic signals on gyratory	✓	Positive	Reduction in congestion at Exhall Interchange, and may pull traffic back towards A444 (from alternatives)	Neutral	No change to mass-transit network	Positive	Improved connectivity to significant planned developments in area surrounding J3	Neutral	No impact on active travel	Neutral	No mitigation of local traffic and its impact	Slightly adverse	May cause slight increase in overall traffic levels by improving function of J3
C-M6J3-3	M6 J3: Hamburger layout for A444	✓	Positive	Reduction in congestion at Exhall Interchange, and may pull traffic back towards A444 (from alternatives)	Neutral	No change to mass-transit network	Positive	Improved connectivity to significant planned developments in area surrounding J3	Neutral	No impact on active travel	Neutral	No mitigation of local traffic and its impact	Slightly adverse	Likely to cause increase in traffic along A444 as a result of quicker journey times
C-M6J3-4	M6 J3: Segregated left turn slips	✓	Positive	Reduction in congestion at Exhall Interchange, and may pull traffic back towards A444 (from alternatives)	Neutral	No change to mass-transit network	Positive	Improved connectivity to significant planned developments in area surrounding J3	Neutral	No impact on active travel	Neutral	No mitigation of local traffic and its impact	Slightly adverse	May cause slight increase in overall traffic levels by improving function of J3
C-M6J3-5	M6 J3: Tunnel for A444	✓	Positive	Reduction in congestion at	Neutral	No change to mass-	Positive	Improved connectivity to	Neutral	No impact on active travel	Neutral	No mitigation of local traffic and its impact	Slightly adverse	Likely to cause increase in traffic

Reference	Option name	Retained?	Reduce local road congestion		Enhance mass-transit network		Enable housing and Local Plan allocations		Improve health and wellbeing via active modes		Mitigate impact of traffic on local community		Reduce environmental impact of traffic	
				Exhall Interchange, and may pull traffic back towards A444 (from alternatives)		transit network		significant planned developments in area surrounding J3						along A444 as a result of quicker journey times
C-M6J3-6	M6 J3: Flyover for A444	×	Positive	Reduction in congestion at Exhall Interchange, and may pull traffic back towards A444 (from alternatives)	Neutral	No change to mass-transit network	Positive	Improved connectivity to significant planned developments in area surrounding J3	Neutral	No impact on active travel	Neutral	No mitigation of local traffic and its impact	Adverse	Likely to cause increase in traffic along A444 as a result of quicker journey times
C-M6J3-7	M6 J3: Removal of B4113 at roundabout	✓	Positive	Reduction in congestion at Exhall Interchange, and may pull traffic back towards A444 (from alternatives)	Neutral	No change to mass-transit network	Positive	Improved connectivity to significant planned developments in area surrounding J3	Neutral	No impact on active travel	Positive	May reduce importance of B4113 link, removing traffic from local communities area	Slightly adverse	May cause slight increase in overall traffic levels by improving function of J3
C-M6J3-8	M6 J3: Improvements to signals/lane allocations on gyratory	×	Positive	Reduction in congestion at Exhall Interchange, and may pull traffic back towards A444 (from alternatives)	Neutral	No change to mass-transit network	Positive	Improved connectivity to significant planned developments in area surrounding J3	Neutral	No impact on active travel	Neutral	No mitigation of local traffic and its impact	Slightly adverse	May cause slight increase in overall traffic levels by improving function of J3
C-HLC-1	Hawkesbury Level Crossing: No improvement	✓	Neutral	No impact in reducing congestion	Neutral	No change to mass-transit network	Neutral	No impact on supporting housing growth	Neutral	No impact on active travel	Neutral	No mitigation of local traffic and its impact	Neutral	No net change in traffic
C-HLC-2	Hawkesbury Level Crossing: Blackhorse Rd bridge	✓	Positive	Removes delays at level crossing (although may simply 'move' delay elsewhere)	Positive	Improves number of trains per hour on rail corridor in area	Positive	Provides access to School Ln/Hawkesbury Golf Course sites without level crossing delays	Neutral	No impact on active travel	Slightly adverse	May cause slight increase in trips along Blackhorse Rd due to decreased journey time	Positive	Slight decrease in traffic overall, enabled by improved rail connections
C-HLC-3	Hawkesbury Level Crossing: Stephenson Road new link	✓	Positive	Removes delays at level crossing (although may simply 'move' delay elsewhere)	Positive	Improves number of trains per hour on rail corridor in area	Strongly positive	Provides direct access Hawkesbury Golf Course site without level crossing	Neutral	No impact on active travel	Positive	Removes traffic from Blackhorse Road following closure of level crossing. Increased traffic largely confined to industrial estate.	Positive	Slight decrease in traffic, enabled by improved rail connections

Reference	Option name	Retained?	Reduce local road congestion		Enhance mass-transit network		Enable housing and Local Plan allocations		Improve health and wellbeing via active modes		Mitigate impact of traffic on local community		Reduce environmental impact of traffic	
								delays, via link road						
C-HLC-4	Hawkesbury Level Crossing: Optimise level crossing operation	✓	Neutral	No impact in reducing congestion	Positive	Improves number of trains per hour on rail corridor in area	Neutral	No impact on supporting housing growth	Neutral	No impact on active travel	Neutral	No mitigation of local traffic and its impact	Positive	Slight decrease in traffic, enabled by improved rail connections
P-PCS-1	City centre to Westhill Rd Cycleway	✓	Positive	Provides alternative method of travel within city, reducing vehicle trips	Neutral	No change to mass-transit network	Positive	Provides cycle access to new developments in north-west of city	Strongly positive	Will encourage cycling in north-west Coventry	Positive	Will lead to reduced traffic on local roads, and provides alternative method of travel for local communities	Strongly positive	Will encourage cycling in area
P-PCS-2	Westhill Rd to Keresley Cycleway	✓	Positive	Provides alternative method of travel within city, reducing vehicle trips	Neutral	No change to mass-transit network	Positive	Provides cycle access to new developments in north-west of city	Strongly positive	Will encourage cycling in north-west Coventry	Positive	Will lead to reduced traffic on local roads, and provides alternative method of travel for local communities	Strongly positive	Will encourage cycling in area
P-PCS-3	City centre to Eastern Green Cycleway	✓	Positive	Provides alternative method of travel within city, reducing vehicle trips	Neutral	No change to mass-transit network	Positive	Provides cycle access to new developments in north-west of city	Strongly positive	Will encourage cycling in north-west Coventry	Positive	Will lead to reduced traffic on local roads, and provides alternative method of travel for local communities	Strongly positive	Will encourage cycling in area
P-BPR-1	Bus Park & Ride services between Bermuda Park and Keresley	✓	Positive	Provides alternative to car travel on A444 corridor	Strongly positive	Provision of new Park & Ride service for north of the city	Positive	Provides link between Keresley SUE and employment sites	Neutral	No impact on active travel	Positive	Will lead to reduced traffic on local roads, and provides alternative method of travel for local communities	Positive	Will reduce the overall number of vehicle trips along A444 corridor
P-SAI-1	Coventry/Nuneaton Station accessibility improvements	✓	Neutral	Unlikely to have significant impact on local highway network	Positive	Improves quality of rail network in area	Neutral	No direct impact on housing growth	Neutral	No impact on active travel	Neutral	No significant impact on local communities	Positive	Encourages greater rail travel in area
S-RGI-1	Rowley's Green: Free-flowing lane NB from Winding House Lane to A444	✓	Positive	Enables use of A45-KLR-A444 strategic route, as opposed to local residential routes	Neutral	No change to mass-transit network	Positive	Provides free-flowing link from Prologis/Lyons Park to north	Neutral	No impact on active travel	Positive	By encouraging traffic along A45-Link Road-A444, this pulls traffic away from more local routes	Slightly adverse	May cause slight increase in overall traffic levels by providing strategic link through north-west of city

Reference	Option name	Retained?	Reduce local road congestion		Enhance mass-transit network		Enable housing and Local Plan allocations		Improve health and wellbeing via active modes		Mitigate impact of traffic on local community		Reduce environmental impact of traffic	
S-RGI-2	Rowley's Green: Mainline A444 north-south flyover	✓	Neutral	Modelling required to understand impact	Neutral	No change to mass-transit network	Neutral	No impact on connections to growth sites	Neutral	No impact on active travel	Neutral	No mitigation of local traffic and its impact	Adverse	Would cause increase in traffic along A444, encouraged by quicker journey times
S-RGI-3	Rowley's Green: Mainline A444 north-south hamburger layout	✓	Neutral	Modelling required to understand impact	Neutral	No change to mass-transit network	Neutral	No impact on connections to growth sites	Neutral	No impact on active travel	Neutral	No mitigation of local traffic and its impact	Adverse	Would cause increase in traffic along A444, encouraged by quicker journey times
S-RGI-4	Rowley's Green: Incorporation of Very Light Rail	✓	Positive	Provides alternative to car travel on A444 corridor	Strongly positive	Provision of VLR route for north of city	Positive	Direct connection between city centre and Keresley SUE	Neutral	No impact on active travel	Positive	Would lead to some shift away from use of vehicles for local trips	Strongly positive	Provides viable alternative to vehicular travel along A444 corridor
S-RGI-5	Rowley's Green: Incorporation of Bus Rapid Transit scheme	✓	Positive	Provides alternative to car travel on A444 corridor	Strongly positive	Provision of BRT route for north of city	Positive	Direct connection between city centre and Keresley SUE	Neutral	No impact on active travel	Positive	Would lead to some shift away from use of vehicles for local trips	Strongly positive	Provides viable alternative to vehicular travel along A444 corridor
S-NM6J-1	New M6 Junction: at Corley Services	✓	Positive	Junction would be expected to pull traffic away from north-west Coventry as it provides directly A45-M6 link	Neutral	No change to mass-transit network	Positive	Provides connection between A45 (Eastern Green, Keresley)	Neutral	No impact on active travel	Neutral	No mitigation of local traffic and its impact	Adverse	Would likely lead to overall increase in traffic due to improved connections
S-NM6J-2	New M6 Junction: at B4098 tunnel	✓	Positive	Junction would be expected to pull traffic away from north-west Coventry as it provides directly A45-M6 link	Neutral	No change to mass-transit network	Positive	Provides connection between A45 (Eastern Green, Keresley)	Neutral	No impact on active travel	Neutral	No mitigation of local traffic and its impact	Adverse	Would likely lead to overall increase in traffic due to improved connections
S-NM6J-3	New M6 Junction: at B4102 tunnel	✓	Positive	Junction would be expected to pull traffic away from north-west Coventry as it provides directly A45-M6 link	Neutral	No change to mass-transit network	Positive	Provides connection between A45 (Eastern Green, Keresley)	Neutral	No impact on active travel	Neutral	No mitigation of local traffic and its impact	Adverse	Would likely lead to overall increase in traffic due to improved connections

Reference	Option name	Retained?	Reduce local road congestion		Enhance mass-transit network		Enable housing and Local Plan allocations		Improve health and wellbeing via active modes		Mitigate impact of traffic on local community		Reduce environmental impact of traffic	
S-NM6J-4	New M6 Junction: at greenfield site	✓	Positive	Junction would be expected to pull traffic away from north-west Coventry as it provides directly A45-M6 link	Neutral	No change to mass-transit network	Positive	Provides connection between A45 (Eastern Green, Keresley)	Neutral	No impact on active travel	Neutral	No mitigation of local traffic and its impact	Adverse	Would likely lead to overall increase in traffic due to improved connections
S-NM6J-5	New M6 Junction link road: to A45 at Eastern Green	✓	Positive	Junction would be expected to pull traffic away from north-west Coventry as it provides directly A45-M6 link	Neutral	No change to mass-transit network	Strongly positive	Provides direct connection between A45 (Eastern Green, Keresley) and M6	Neutral	No impact on active travel	Neutral	No mitigation of local traffic and its impact	Adverse	Would likely lead to overall increase in traffic due to improved connections
S-NM6J-6	New M6 Junction link road: to A45 at Meriden	✓	Positive	Junction would be expected to pull traffic away from north-west Coventry as it provides directly A45-M6 link	Neutral	No change to mass-transit network	Positive	Provides connection between A45 (Eastern Green, Keresley)	Neutral	No impact on active travel	Slightly adverse	Increases traffic in Meriden area	Adverse	Would likely lead to overall increase in traffic due to improved connections
S-NRS-1	A444-Newtown Road junction: north-facing sliproads	✓	Positive	Provides direct link to north, re-routing traffic away from Bedworth town centre	Neutral	No change to mass-transit network	Strongly positive	Provides important access to proposed Woodlands development	Neutral	No impact on active travel	Positive	May lead to decrease in traffic routing through Bedworth as northern connections now permitted	Slightly adverse	Would cause overall increase in traffic by enabling northbound trips from Newtown Road

Appendix B. Modelling Assumptions Log

Appendix C. Detailed Modelling Results

Appendix D. Feasibility Appraisal Report

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FAITHFUL GOULD
Member of the SNC-Lavalin Group

Keresley Link Road
Cost Estimate

Item	Description	Quantity	Unit	Rate	£ p
	Main Summary				
	Link Road				12,690,252.36
	Junctions				2,797,895.61
				Total	15,488,147.97

Item	Description	Quantity	Unit	Rate	£ p
	Link Road				
	SERIES 200: SITE CLEARANCE **Main Summary**				
A	General site clearance	71,736	m2	0.30	21,520.80
B	Vegetation clearance	1	Psum	2,000.00	2,000.00
C	Take up or down and remove to tip off Site				
D	Fence	1,320	m	10.00	13,200.00
E	'Rail track; including rail, sleepers, fittings and junctions	1,600	m	10.00	16,000.00
	SERIES 500: DRAINAGE				
F	Culvert to Hall Brook; approximately 1200mm diameter x 42m long, including headwalls	1	item	62,000.00	62,000.00
	SERIES 600: EARTHWORKS				
G	Excavation to formation level; set aside for re-use	59,453	m3	4.50	267,539.00
H	Deposition of fill; to form embankments	59,453	m3	5.50	326,992.00
I	Imported fill material; to form embankments	26,668	m3	36.43	971,515.00
J	Topsoil; to slopes of embankments/cuttings	3,803	m3	30.73	116,878.00
K	Excavate, hard dig and disposal of existing rail track ballast; assumed 450mm deep	2,736	m3	51.60	141,178.00
	SERIES 700: PAVEMENTS & SERIES 1100: KERBS, FOOTWAYS AND PAVED AREAS				
L	New carriageway and footpath construction; overall 21.3m wide	2,143	m	1,556.64	3,335,984.69
M	Carriageway tie-in detail	29	m	27.07	790.44
N	Saw cutting	29	m	5.00	146.00
	SERIES 1200: TRAFFIC SIGNS AND ROAD MARKINGS				
O	Allowance for new signage	1	Psum	25,000.00	25,000.00
	SERIES 3000: LANDSCAPING				
P	Landscaping allowance	1	Psum	50,000.00	50,000.00
					5,350,743.93
Q	Contingency	25%		5,350,743.93	1,337,685.98
R	Prelims	22%		6,688,429.91	1,471,454.58
S	Traffic Management	8%		8,159,884.49	652,790.76
T	Optimism Bias	44%		8,812,675.25	3,877,577.11
				Total	12,690,252.36

Keresley Link Road
Cost Estimate

FAITHFUL GOULD
Member of the SNC-Lavalin Group

Item	Description	Quantity	Unit	Rate	£ p
	Junctions				
	SERIES 200: SITE CLEARANCE				
A	General site clearance	3,906	m2	0.30	1,171.83
B	Vegetation clearance	1	Psum	6,000.00	6,000.00
C	Take up or down and remove to tip off Site				
D	Kerbs	770	m	5.85	4,504.50
E	Small sign and post	6	Nr	41.85	251.10
F	Lighting column	8	Nr	250.00	2,000.00
G	Fence	165	m	5.00	825.00
H	Bus stop sign	2	Nr	120.00	240.00
I	Demolition of building; approximately 100m2 x 4m high; Prologis Estate Management Centre	1	item	20,000.00	20,000.00
J	Demolition of houses; approximately 234m2 x 12m high; Cloverdale Close	1	item	140,400.00	140,400.00
	SERIES 600: EARTHWORKS				
K	Excavate, hard dig and disposal of existing road; assumed 790mm deep; Watery Lane	2,216	m3	51.60	114,346.00
L	Excavate, hard dig and disposal of existing road; assumed 790mm deep; Tamworth Road	672	m3	51.60	34,675.00
M	Excavate, hard dig and disposal of existing road; assumed 790mm deep; Bennetts Road	336	m3	51.60	17,338.00
N	Excavate, hard dig and disposal of existing car park; assumed 500mm deep; off roundabout (Central Boulevard)	84	m3	51.60	4,334.00
O	Partially infill existing attenuation pond; assumed 2m deep	816	m3	36.43	29,726.88
	SERIES 700: PAVEMENTS				
P	New roundabout 30m diameter	1	item	145,500.00	145,500.00
Q	New roundabout 45m diameter	2	item	185,000.00	370,000.00
R	Alterations to existing roundabout; to add new link road	1	item	50,000.00	50,000.00
S	New access to properties, on Watery Lane, including Hare and Hounds Public House	1	item	20,000.00	20,000.00
T	New access to properties, on Bennetts Lane	1	item	40,000.00	40,000.00
	SERIES 1200: TRAFFIC SIGNS AND ROAD MARKINGS				
U	New Bus Stop incl shelter	2	nr	40,000.00	80,000.00
					1,081,312.31
V	Contingency	25%		1,081,312.31	270,328.08
W	Prelims	25%		1,351,640.39	337,910.10
X	Traffic Management	15%		1,689,550.49	253,432.57
Y	Optimism Bias	44%		1,942,983.06	854,912.55
				Total	2,797,895.61

ASSUMPTIONS AND EXCLUSIONS

Main Summary

Assumed land provided for site compound and materials storage

Assumed unrestricted daytime working

Based date Q1 2020

Assumed carriageway construction, 250mm capping layer, 250mm type 1, 190mm base course, 60mm binder course, 40mm surface course

Assumed footpath construction, 150mm type 1, 190mm base course, 60mm binder course, 40mm surface course A 1200mm dia culvert has been included under the carriageway for Hall Brook

Assumed three new roundabouts and amendments to one existing on route of new road

Assumed railway tracks remove 100m either side of new road extents

Assumed works to add new access to Hare & Hounds Public House and other properties to Watery Lane are required

Assumed no roundabout is to be signalised

Assumed all excavated material is inert and can be used as general fill

Assumed no existing topsoil to be removed

Assumed heights of existing buildings / houses to be demolished

Assumed depth of rail track ballast to be removed is 450mm and width is 3.8m

Assumed depth of existing attenuation pond to be infilled is 2m

Assumes no ground remediation required

Excludes:

Works to public footpath

Demolition works to farm buildings, or other buildings/structures Improvement works to Fivefields Road, such as carriageway widening

Works to improve junction of Fivefields Road and Tamworth Road

Works to offsite junctions and Link Impacts

Contaminated ground excluded

Asbestos surveys and removal excluded

Decontamination excluded (Hazardous materials/ needles/ pigeon guano) to areas within the site

Stats / service diversions or protection of existing excluded

Relocation of HV overhead power lines and associated tower on route of new road

Relocation of LV overhead power lines and associated poles on route of new road

Night working

Phasing of works

Value Added Tax

Survey Fees

Legal fees

Statutory fees and charges

Development Taxes

Specialist installations e.g. CCTV, security systems

Any works associated with fibre optics

Commuted Sums

Compensation events, rights of light, etc. Site Acquisition costs

Archaeological Investigations

Works beyond the curtilage of the site

Any site Abnormals other than those specifically stated

Finance charges

Land costs

Any changes in government policy, taxation or HSE legislation

No provision for Vacuum extraction excavation

Professional Fees

Regulation and soft spots excluded

Environmental mitigation

M6 JUNCTION 3 HAMBURGER + FREE FLOW SLIP
ORDER OF COST ESTIMATE

Jan-21

OPTION 6

Item	Description	Total
	CONSTRUCTION WORKS	
1	Construction Works Total	8,405,797
2	Preparation (10%)	840,580
3	Supervision (5%)	420,290
4	Risk (15%)	1,260,870
5	Contingencies (15%)	1,260,870
6	*Land Costs - Excluded*	
	ESTIMATE TOTAL (Excl.. VAT)	**12,188,406**
	OPTIMISM BIAS	
7	Allowance of 15% of Estimate Total - Stage 2 Outline Business Case	1,828,261
	TOTAL (Excl. VAT)	**14,016,667**

M6 JUNCTION 3 HAMBURGER + FREE FLOW SLIP
ORDER OF COST ESTIMATE
OPTION 6
Jan-20

Basis
Powerpoint Document CNTP_Final Package Assumptions v1.0
Costs are based dated 1Q 2021 with no allowance for inflation.

Assumptions

No Scale Drawings available; Quantities generated from indicative layouts and measurement from Google Maps Data.

New Link Road from School Lane crossing Gyratory - Jimmy Hill Way assumed 600m length.
Widening A444 towards Bedworth assumed 600m length @ 6m width.
Widening A444 towards M6 on-slip assumed 150m length @ average 9m width.
Widening M6 on-slip assumed 295m length @ 6m width.
A provisional allowance for utilities diversion works has been included, however this work is undefined
Allowance for relocation of comms/feeder pillars etc in widened Highways England On-Slip
Allowance for relocation of comms/feeder pillars etc in existing Gyratory
Allowance for works to existing viaduct where new Link Road passes under - the works are undefined
Allowance for 2 x 100m sections of existing gyratory to be resurfaced to facilitate new roadmarkings.
No Allowance for structures to new carriageways i.e. retaining walls. Rates allow for embanknents on approx 50% of length

Exclusions
Land acquisition/CPO costs
Inflation
Extraordinary site investigation works
Local Authority and / or service provider fees and charges
Marketing costs
Insurances excepting those provided by the Main Works Contractor
Administration costs
Operation and maintenance costs
Legal fees
Finance fees and charges
Currency fluctuations
Future increases in taxes and duties imposed by government
Changes in Government or Local Authority legislation
Works outside the site boundary
Fees, charges and or commuted sums associated with the discharge of Section Agreements
Value Added Tax
Capital allowances or other incentive grants
Development taxes, levies or other 'planning gain' items
Treatment or removal of contaminated materials
Any direct party wall payments to be made by the Employer
Reinforcement costs of the local electrical network
No allowance has been included for ecology or conservation works
Costs associated with the discovery of abnormal ground conditions, unexploded ordnance, burial grounds or the like
Treatment of invasive weeds (i.e. Japanese knotweed) is excluded
Feature site hoardings are excluded
Allowance for sustainability measures above Part L requirements

A444 ROWLEYS GREEN FREE FLOW SLIP
ORDER OF COST ESTIMATE

Jan-21

OPTION 6		
Item	**Description**	**Total**
	CONSTRUCTION WORKS	
1	Construction Works Total	1,518,536
2	Preparation (10%)	151,854
3	Supervision (5%)	75,927
4	Risk (15%)	227,780
5	Contingencies (15%)	227,780
6	*Land Costs*	
	ESTIMATE TOTAL (Excl.. VAT)	**2,201,878**
	OPTIMISM BIAS	
7	Allowance of 15% of Estimate Total - Stage 2 Outline Business Case	330,282
	TOTAL (Excl. VAT)	**2,532,159**

A444 ROWLEYS GREEN
ORDER OF COST ESTIMATE

Jan-21

Basis
Powerpoint Document CNTP_Final Package Assumptions v1.0
Costs are based dated 1Q 2021 with no allowance for inflation.

Assumptions

No Scale Drawings available; Quantities generated from indicative layouts and measurement from Google Maps Data.

Widening to Winding House Lane & A444 assumed 200m length.
Allowance for modification of 3 nr existing signals to Widening House Lane/Gyratory. Not installation of new

Nominal £200,000 allowance for moving existing telecoms mast and outbuilding adjacent A444 - this is a significant risk.
A provisional allowance for utilities diversion works has been included, however this work is undefined
Allowance for relocation of comms/feeder pillars etc to Gyratory
Allowance for 1 x 100m sections of existing gyratory to be resurfaced to facilitate new roadmarkings.
No Allowance for structures to new carriageways

Exclusions
Land acquisition/CPO costs
Inflation
Extraordinary site investigation works
Local Authority and / or service provider fees and charges
Marketing costs
Insurances excepting those provided by the Main Works Contractor
Administration costs
Operation and maintenance costs
Legal fees
Finance fees and charges
Currency fluctuations
Future increases in taxes and duties imposed by government
Changes in Government or Local Authority legislation
Works outside the site boundary
Fees, charges and or commuted sums associated with the discharge of Section Agreements
Value Added Tax
Capital allowances or other incentive grants
Development taxes, levies or other 'planning gain' items
Treatment or removal of contaminated materials
Any direct party wall payments to be made by the Employer
Reinforcement costs of the local electrical network
No allowance has been included for ecology or conservation works
Costs associated with the discovery of abnormal ground conditions, unexploded ordnance, burial grounds or the like
Treatment of invasive weeds (i.e. Japanese knotweed) is excluded
Feature site hoardings are excluded
Allowance for sustainability measures above Part L requirements

Hawkesbury Level Crossing: Off Line Highway Diversion_Underbridge

Cost Estimate Nr 1

SECTION E - SUMMARY & ANALYSIS - OPTION: UNDERBRIDGE

Rev

Section	Element / Sub-Element	ELEMENTAL COST BENCHMARKS			ELEMENT COST	%
		Element Unit Unit Quantity	Unit	Element Unit Rate (£)	£	
1	Hawkesbury Level Crossing					
	Option: Underbridge					
1.1	Series 200 Site Clearance	1	Item	6,984.00	6,984	0%
1.2	Series 500 Site Drainage	1	Item	100,000.00	100,000	1%
1.3	Series 600 Earthworks	1	Item	68,575.00	68,575	1%
1.4	Series 700 Pavement	1	Item	337,260.00	337,260	4%
1.5	Series 1100 Kerbs, Footways, Paved Areas	1	Item	51,000.00	51,000	1%
1.8	Series 1700 Structural Concrete	1	Item	2,119,150.00	2,119,150	27%
1.9	Series 2500 Special Structures	1	Item	423,000.00	423,000	5%
	Sub-total			3,105,969	3,105,969	39%
ET1	DIRECT CONSTRUCTION - TOTAL	-	-	3,105,969	3,105,969	39%
4	MAIN CONTRACTOR PRELIMINARIES					
4.1	Preliminaries	1	Item	776,819.00	776,819	10%
	Sub-total - Preliminaries			776,819.00	776,819	10%
5	MAIN CONTRACTOR OVERHEAD & PROFIT	1	Item	349,451.00	349,451	4%
6.1	CONSTRUCTION COST INFLATION	1	Item	402,060.00	402,060	5%
T.C.S	TOTAL CONSTRUCTION CONTRACT SUM:	-	-	4,634,299	4,634,299	58%
6.2	Project/ Design Team Inflation	1	Item	36,880.00	36,880	0%
6.3	Other Costs Inflation	1	Item	89,910.00	89,910	1%
7	Project/ Design Team Fees	1	Item	388,246.00	388,246	5%
8	Statutory Undertakers Works	1	Item	846,448.00	846,448	10.6%
9	Other Client Costs - Possessions	1	Item	100,000.00	100,000	1.3%
10	Risk/ Contingency	1	Item	1,853,720.00	1,853,720	23%
	Sub-total:	-	-	3,315,204	3,315,204	42%
	TOTAL PROJECT COST:				7,949,503	