

Scheme Name	A40 Glo'shire Cycling (B4063)		Planned Design Yr. 17/18		
Sub MPML	Designated Funds - Cycling				
PIN	560023		Planned Construction Yr. 18/19		
Workshop Date	02/09/2016				
New/Re-VM	New				
OSGR's	Start	Easting	386300	Northing	220047
	End	Easting	391187	Northing	221775
Locality	Cheltenham to Gloucester			Proposed VM Score	
Marker posts	n/a				
County	Gloucestershire			BCR: 2.0	
Related Schemes	A40 Elmbridge Court Improvements (Gloucestershire Highways scheme)				

## VM Summary

<i>Revision</i>	<i>D</i>		
<i>Prepared</i>		<i>Date</i>	30/07/16
<i>Checked</i>		<i>Date</i>	16/08/16
<i>Approved</i>		<i>Date</i>	07/11/16

### Location:

The scheme is located along the B4063, over a distance of approximately 5.1 miles extending from the centre of Gloucester to the western outskirts of Cheltenham.



Fig 1 – General area of works, A40 and B4063 between Gloucester and Cheltenham

### **Background & Scheme Drivers**

Skanska have recently completed an in-depth Cycle Route feasibility study, initially focussed on the A40 between the M5 (at Junction 11) and Longford Roundabout on the A40 to try to find a safer means of cycling on the Highways England network.

The initial aspiration of this study was to provide a straight, continuous cycleway to the latest Highways Standards along the A40 trunk road. Although technically not impossible, the study showed that the A40 options would encounter significant obstacles which would result in extremely high costs and/or a reduced overall quality of the route.

After looking at the issues for cyclists on the A40 over that section, reviewing the surrounding area and undertaking key consultation exercises, the scope was expanded to look at how to actually provide for cyclists of all ages and abilities between the main hubs of Cheltenham and Gloucester looking at all roads and pathways in the area to reduce severance.

Skanska worked closely with Sustrans and Highways England throughout the process which resulted in defining a clear route corridor that avoided the inherent hazards of the A40 and M5 junction and instead uses a clear direct route along the B4063.

Investing in cycle friendly infrastructure on this nearest available alternative route will link into some of the largest employers around Cheltenham and Gloucester and therefore offer the largest potential for modal shift at commuting times. This corridor also features some of highest residential densities outside of the main two conurbations, offering the link to not only Cheltenham and Gloucester but also providing a safe, direct, accessible route from the areas where people live and work.

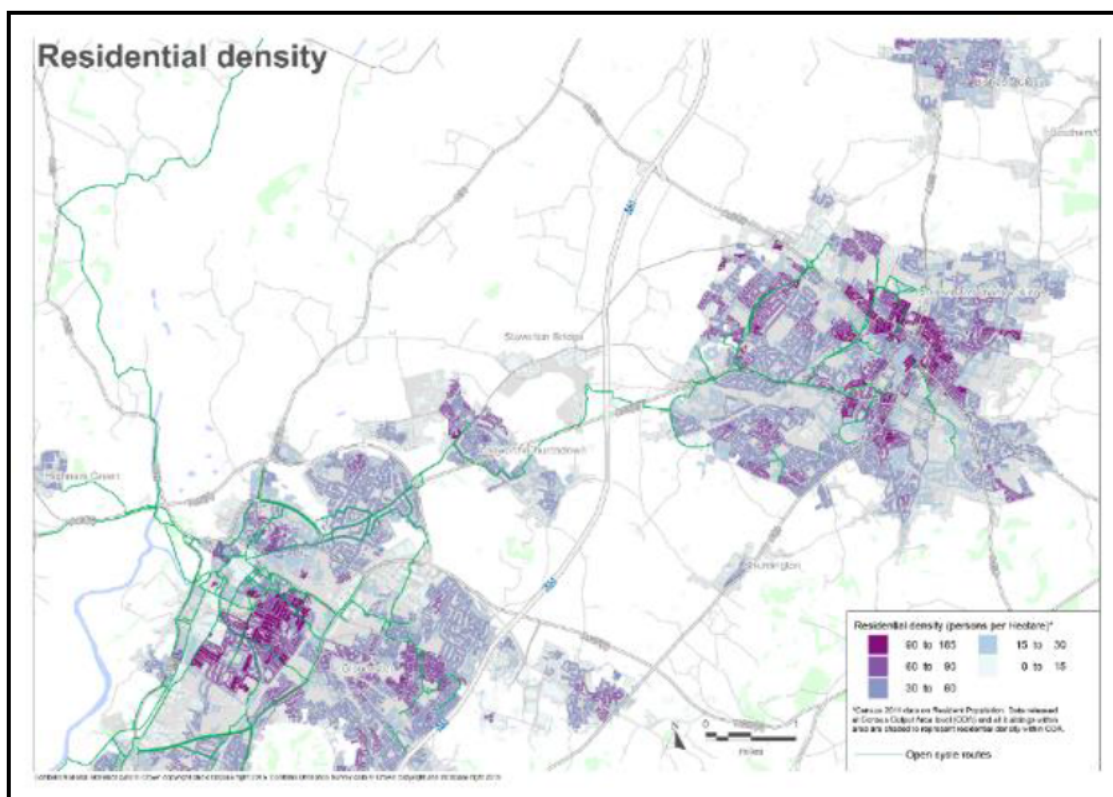


Figure 2 – Residential trip generators within cycling distance of the A40 Study area

Skanska have identified a total package of measures which will also aim to reduce the dependence on the private motor car as well as reducing motor vehicle impact along the B4063. It will create an environment which is more pleasant to walk to school and visit local amenities. In addition to supporting existing cyclists it should encourage more people to try cycling and give parents the confidence to allow their children to walk and cycle to school.

### **Accidents**

An analysis of accidents along this route has been undertaken to assess the road safety record and to reveal if there is a history of incidents involving cyclists. Accidents from 01 January 2011 to 31 December 2015 were analysed. During that period a total of 22 accidents involving pedal cycles occurred (an average of 4.4 PIAs per annum).

Year	Slight	Serious	Fatal	Total
2011	4	2	0	6
2012	2	1	0	3
2013	1	1	0	2
2014	4	1	0	5
2015	4	2	0	6
<b>Total</b>	<b>15</b>	<b>7</b>	<b>0</b>	<b>22</b>

Table 2 Total number of accidents (2011 – 2015, cycles only)  
within scheme extents

The most common accident types involving cyclists are shown in the Table 3 below:

	Slight	Serious	Fatal
Car emerging from a driveway hit cyclist on pavement	1		
Head to tail accident	2	1	
Roundabout accident	5	1	
Overtaking: vehicle hits vehicle travelling same direction	1		
Cyclist overtaking stationary vehicles hits oncoming vehicle		1	
Collision with or due to parked vehicle	1	1	
Vehicle from side road hits vehicle approaching from its right	1		
Vehicle turns right into path of pedal cycle	2	1	
Vehicle pulling out hits passing pedal cycle		1	
Cyclist crossing the carriageway	1		
Right turn crash into an opposing vehicle		1	
Overtaking: vehicle in front turning left	1		
<b>Sub totals</b>	<b>15</b>	<b>7</b>	
<b>Total</b>	<b>22</b>		

Table 3 Cycling Accidents by Cause and Severity

Because the proposed scheme involves complex measures not only focused on provision of the cycle lane but also measures such as junctions re-design, re-design of traffic lights at junctions,

new crossings, alternations to on-street parking, reduced speed limit, footway widening and junction build outs, it can be stated that all accidents types (including accidents involving cyclists) can be targeted by the proposed scheme.

There were 96 accidents across all transport modes (including the 22 involving cyclists) in a 5 year period (2011 – 2015) within the scheme extents, which gives an average of 19.2 PIAs per annum. Because the proposed scheme involves measures that would improve the safety of all modes, it can be stated that all accidents types can be targeted by the proposed scheme. The measures proposed are expected to give savings of 29% (based on above estimation) which gives an overall estimated savings of 5.56 PIAs per annum for this scheme.

	Fatal	Serious	Slight	Total
2011	0	7	15	22
2012	0	3	18	21
2013	1	2	10	13
2014	0	1	13	14
2015	0	9	17	26
Total	1	22	73	96

Table 4 Total number of accidents (2011 – 2015, all modes)  
within scheme extents

In the last 2 years there has been 1 serious and 1 fatal accident involving cyclists being struck by vehicles at the slip roads leading from and to M5 J11. As the A40 Golden Valley Bypass is 70mph road with no segregation for cyclists, the likelihood of an accident being serious or fatal is increased. The improved B4063 route is anticipated to draw cyclists away from the A40 and it is anticipated that PIAs associated with cycle accidents will reduce as a consequence of this scheme (estimated 0.18 PIA saving).

### Photographs



Figure 3 – General layout of A40



Figure 4 – A40 Eastbound slip lane down to M5 motorway  
raised roundabout junction



Figure 5 –Existing level of facility on some sections  
of B4063 – shared path and cycle lanes



Figure 6 – Existing level of facility on some sections of B4063 – narrow cycle lanes with potential for upgrade and continuation

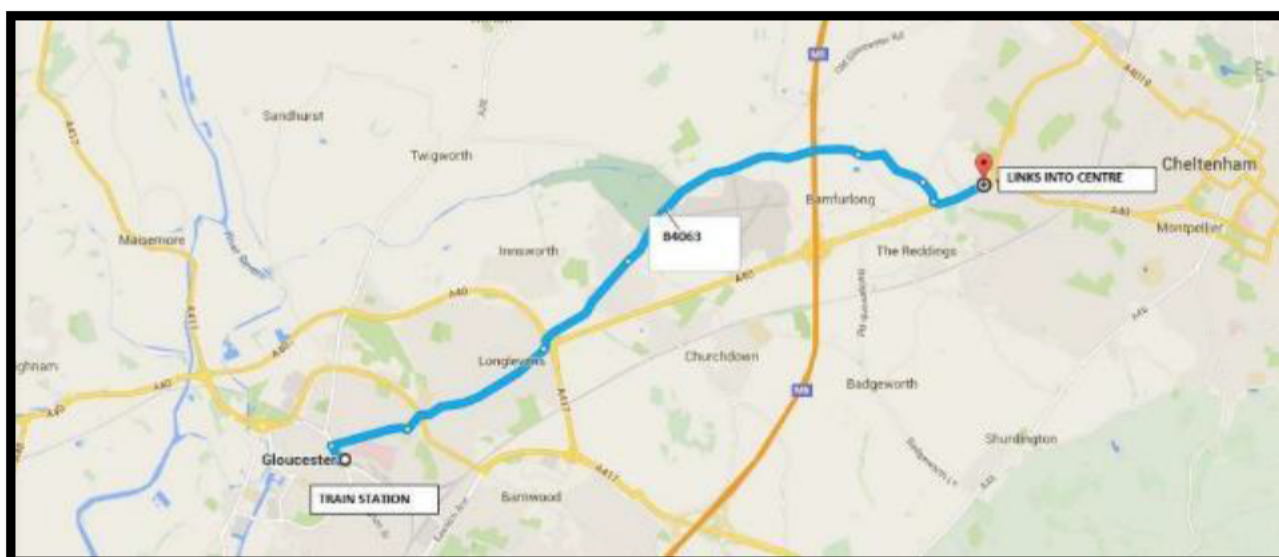


Figure 7 – A40 Eastbound slip lane down to M5 motorway raised roundabout junction

### Surveys Completed

- Route User Intercept Survey & Forecasting Report; Sustrans May 2016
- Desktop census interrogation study (attractors mapping – employment, residential, education sites) – Sustrans April 2016
- A40 & B4063 STATS19 Accident Analysis – Skanska, April 2016
- A40 Speed & Volume study – Skanska/Tracsis, Sept 2015
- Barriers to Cycling Study – Atkins for Gloucestershire County Council. This survey covered the whole of the county and all major towns and villages in Gloucestershire

## **Potential Surveys Required**

Due to the proposed route being off the Highways England network a number of surveys that would typically be completed prior to value management will have to be undertaken prior to/during detailed design. The exact type and scope of surveys will be determined prior to detailed design commencing meeting but could potentially include:

- Topographic surveys
- Statutory undertakers
- Pavement coring
- Environmental surveys
- Drainage CCTV
- Asbestos surveys
- Electrical services

The majority of these surveys will require agreement from the local authority to undertake work on their network.

## **Stakeholder Engagement**

The measures have the full support of Sustrans who were closely involved in discussions and collaborative consultation throughout the study. The Local Highway Authority – Gloucestershire Council after close consultation throughout have publically announced their full support (see link): <http://www.gloucestershirelive.co.uk/3-5million-cycle-superhighway-could-be-built-between-gloucester-and-cheltenham/story-29534636-detail/story.html>

## **Options:**

### **Preferred Option: Do Something**

The whole of the route has been examined and assessed against recognised National guidance and criteria for creating cycle friendly infrastructure to determine the most appropriate modification or solution to each site specific issue. The route has two very distinct sections; one fairly rural in nature with industrial, business and employment frontages and subject to high speed limits (Section A in figure 7 below) , the other is more residential , has more junctions and associated traffic movement (Section B). Therefore a full list of treatments are proposed and are different for each section. Without both sections being upgraded the route cannot serve for continuous journeys between Cheltenham and Gloucester.

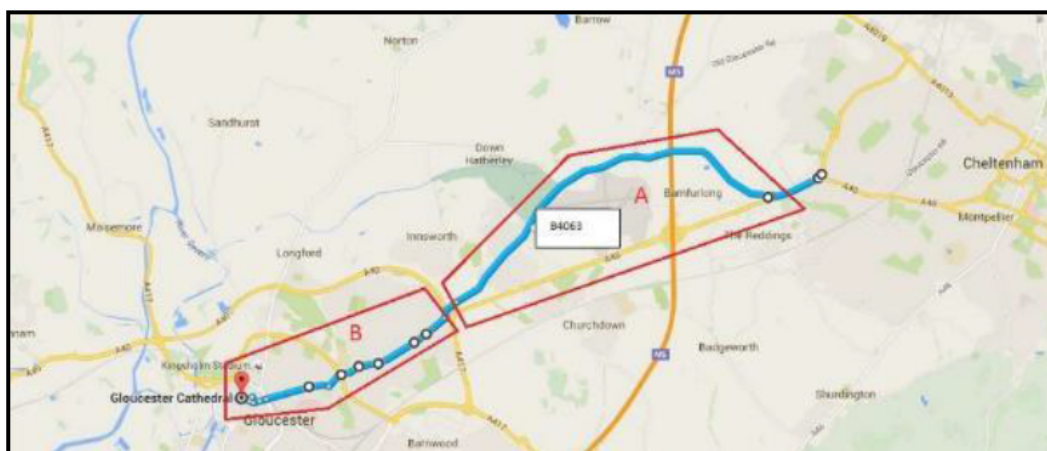


Figure 8 - Proposed route with improvements for each section

The proposed measures are described in more detail in the report “A 40 Gloucestershire Cycling Provision & Route Study 2016” and summarised in the lists below. In order to create a complete and continuous safe route, it is essential to implement all of the measures. Omitting any one section makes the route indirect and could significantly reduce its usefulness.

It is also essential to ensure that the proposed redevelopment of Elmbridge Court roundabout includes fully integrated cycle facilities, ideally at grade.

**Potential Design Solutions to Provide for Cycling - B4063, Part A (see Appendix A for location details)**

- |    |  |
|----|--|
| A. | Review and lowering of speed limits from Arle Court Roundabout to Elmbridge Court Roundabout – introduce the most appropriate limit for the current conditions, sign with entry gateway features and reinforce where possible with appropriate traffic calming measures centred on the areas with most local activity; Consider 20mph Zones in Churchdown/ Innsworth centred around schools; |
| B. | Implement a full robust system of cycle & pedestrian direction signing featuring all local attractions, amenities and facilities with distances symbols and route numbers. This should cover the whole route and the surrounding area route network;   |
| C. | Review all carriageway markings with a view to reallocating road space to cyclists and install cycle lanes;  |
| D. | Widen all existing cycle lanes to recommended standards .Install colour surface treatment to cycle lanes at all locations where hazard or conflict could occur e.g. all junctions, bus stops , entrances, transitions etc.;  |
| E. | Upgrade of existing ‘shared-use’ paths with clear regulation signing and markings. Incorporate raised priority features at all side roads and entrances;   |
| F. | Upgrade signal junctions with ‘Toucan’ facilities on all arms, Advance Stop Lines connected to cycle lanes on all approaches. Provide transition ramps to allow cyclists to reach the crossing facilities or bypass the signals or queuing traffic where feasible. Investigate/trial colour surface ‘lanes’ through the junction;  |
| G. | Convert exist pelican crossings to ‘Toucan’ operation;   |
| H. | Install lighting under the M5 bridge & implement physical segregation from traffic;  |
| I. | Reshape wide bell-mouth side road junctions to reduce cyclists exposure to hazards;  |
| J. | Widen existing paths and convert to ‘shared-use’ with regulatory signs and markings on the approach/exit from the main roundabout junctions and at GCHQ;   |
| K. | Construct new ‘shared-use’ path in the verge on the approach/exit from the Arle Court roundabout junction.   |



Figure 9 - Typical side road crossing detail proposed at all pedestrian cycle cross-over points (point E above)



Figure 10 – Proposed standard of signing throughout whole route and approaches (point K above)



Figure 11a – Typical layout of existing B4063 traffic signal arrangement (this one has a high 50mph approach limit on a bend, access to a bus stop, with no NMU facilities).

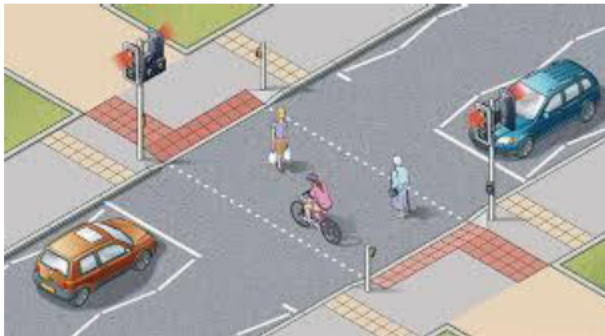


Figure 11b Diagram of proposed 'Toucan' arrangement to be implemented at each similar situation



Figure 12– potentially hazardous shadow areas under M5 with no cycle facilities and inappropriate speed limit



Figure 13 – Proposed preformed segregation kerb units

**Potential Design Solutions to Provide for Cycling - B4063, Part B (see full report for location details)**

- |    |   |
|----|---|
| L. | Review speed limit and implement 20mph Zones along B4063 and extend where appropriate from Elmbridge Court Roundabout to Gloucester –reinforce with appropriate gateway features, highly visible traffic calming measures (bus friendly) e.g. speed cushions;   |
| M. | Implement a full, robust system of cycle & pedestrian direction signing featuring all local attractions, amenities and facilities with distances symbols and route numbers. This should cover the whole route and the surrounding area route network;   |
| N. | Review all carriageway markings with a view to reallocating road space to cyclists and install cycle lanes where gaps exist;  |
| O. | Widen all existing cycle lanes to recommended standards .Install colour surface treatment to cycle lanes at all locations where hazard or conflict could occur e.g. all junctions, bus stops , entrances, transitions etc.;   |
| P. | Upgrade any existing 'shared-use' paths with clear regulation signing and markings. Incorporate raised priority features at all side roads and entrances, implement transitions at regular suitable locations;  |
| Q. | Upgrade signal junctions with 'Toucan' facilities on all arms, Advance Stop Lines connected to cycle lanes on all approaches. Provide transition ramps to allow cyclists to reach the crossing facilities or bypass the signals or queuing traffic where feasible. Investigate/trial colour surface 'lanes' through the junction; |
| R. | Convert exist pelican crossings to 'Toucan' operation;  |
| S. | Reshape wide bell-mouth side road junctions to reduce cyclists exposure to hazards;   |
| T. | Widen existing paths and convert to 'shared-use' with regulatory signs and markings and regularly spaced transitions where an advantage would be gained off-carriageway;  |
| U. | Remove cycle lanes where they are not observed;   |
| V. | Install wide colour surface priority treatments at Refuge Island;   |
| W. | Redesign NMU layout (footway & carriageway) ;   |
| X. | Redesign and remodel roundabout to single lane entry/exit continental style layout.   |



Figure 14– Cyclists currently forced against kerb by road layout and traffic speeds



Figure 15 – Example of high contrast colour surfacing to make the cycle route prominent (Plymouth)



Figure 16 – Proposed reallocation of road space with lower speed limit and advisory cycle lanes



Figure 17 – Sketch of verge that could accommodate a 'shared-use' path

Total cost to HE (for Budgetary Purposes): **£4,174,814** (as detailed in Stage 2 Cycling SAR)

Forecast	2017/18 (Yr. 1)	2018/19 (Yr. 2)	2019/20 (Yr. 3)	2020/21 (Yr. 4)	2021/22 (Yr. 5)	Total
Design (N2)	£256,144					£256,144
Supervision (N3)		£105,490				£105,490
TM Cost (N4)		£449,718				£449,718
Works (N4) Excl. TM		£2,548,077				£2,548,077
Risk (N4)		£254,808				£254,808
Sub-Total Cost (excl. VAT)	£256,144	£3,358,093	£0	£0	£0	£3,614,237
HE Direct/Third Party Costs						£0
VAT applicable to N4 costs		£560,577				£560,577
<b>Total cost (inc. VAT)</b>	<b>£256,144</b>	<b>£3,918,670</b>	<b>£0</b>	<b>£0</b>	<b>£0</b>	<b>£4,174,814</b>

It should be noted that the diversion route and Traffic Management site set up costs (diversion routes, temporary accommodation etc.) associated with this scheme amounts to £99,782 and are included in the above N4 works costs. This amount should be considered with the above N4 TM Costs, in order to understand the overall scheme budget estimate for Traffic Management.

**These costs do not include surveys which will be required prior to detailed design commencing. As these are considered Stage 1b under Annex 20 of the ASC and therefore cost reimbursable, a TRF1 will be required.**

### **Scheme Benefits**

#### **Cycling**

A Route User Intercept Survey (RUIS) was carried out by Sustrans in January 2016 and is available as an appendix item to this summary. Key findings from responses to this survey include:

1. 41% of cyclists surveyed used the B4063 route for at least ½ mile of their journey
2. Annual usage estimate (AUE) of cycle trips at survey site on the Cheltenham end (at Hatherley Brook, close to where the A40 and B4063 join) of the B4063 was 62,104
3. Results from automatic counter survey of cyclists at the Gloucester end of the B4063 give an AUE of 69,364
4. The report estimates a 15% uplift in users of this route based on the median average for on-road cycle improvement projects that they have been involved in and monitored post-opening.
5. A 15% uplift equates to an additional 9,860 users (18,734 trips when applying default 90% proportion return journeys) per annum (based on 65,734 current users, the average of the count sites mentioned in 2 and 3 above).

#### **Safety**

- Estimate PIA saving of 5.56 in opening year, inclusive of all transport modes along entirety of scheme extents.
- Expectation that as cycling trips on A40 decrease as users switch to the improved B4063 route, the accidents on the A40 will also reduce. However, these accidents are not part of the overall PIA saving calculated as even though trips on the A40 may reduce, some will continue to cycle on that route and the risk of accidents will remain.

**Integration**

- Improved access for cyclists to local employment, education, housing
- Reduced severance between Cheltenham and Gloucester and local points along B4063 route.

**Other benefits**

Table 5, taken from the Cycling SAR, shows a synopsis of the economic benefits of the scheme based on the data input to the workbook (using a 20 year assessment period):

<b>AMCB</b>	
Noise	£ 1,437
Local Air Quality	£ 5
Greenhouse Gases	£ 5,842
Journey Quality	£ 484,535
Physical Activity	£ 1,829,194
Absenteeism	£ 80,127
Accidents	£ 5,396,409
Economic Efficiency (Decongestion)	£ 214,882
Wider Public Finances (Indirect Tax Revenues)	-£ 27,474
Present Value of Benefits (PVB)	£ 7,984,958
<b>Broad Transport Budget</b>	
Present Value of Costs (PVC)	£ 3,928,297
<b>OVERALL IMPACTS</b>	
Net Present Value (NPV)	£ 4,056,661
Benefit to Cost Ratio (BCR)	2.0

Table 5 Economic benefits attributed to A40 Gloucestershire Cycling scheme

The scheme is also anticipated to reduce private motor car traffic to local employment, education and housing.

**Key Deliverables**

It is to be determined whether outputs can be claimed for this scheme as all improvements being proposed are off the HE SRN.

**Works Programme**

Design 2017/18, build 2018/19 pending VM approval and funding.

**Traffic Management**

Traffic management requirements will vary according to the measure being installed and its location on the B4063. The most likely types of TM required to implement the scheme would include single lane closures with 2 way lights in place and diversion routes.

**Discounted Options**

The initial aspiration of this study was to provide a straight, continuous cycleway to the latest Highways Standards along the A40 trunk road. Although technically not impossible, the study showed that the A40 options would encounter significant obstacles which would result in extremely high costs and/or a reduced overall quality of the route.

The most significant of these barriers is the crossing of the M5 at J11. A safe crossing within the current road space and overbridge at Junction 11 would not be possible due to required slip road crossing and a profile on the A40 over bridge across the M5 that is too narrow for a safe cycle provision.

A range of alternatives were considered, the most viable were looked at in detail (refer to "A 40 Gloucestershire Cycling Provision & Route Study 2016") which were summarised in a matrix (see Figure 18 below).

ROUTE		CRITERIA																	Notes	Additional cost (£1.77m)	Score
		Convenience	Directness	Accessibility	Safety	Personal Security	Comfort	Coherence	Attractiveness	Connects Cheltenham to Gloucester	Deliverability	Potential Planning/Land Issues	Environmental Impact	Connectivity to Attractions	Additional Road Safety Benefits for Community	Connects to NCN 41	Links to Stations	Modal Shift			
1	A40 Verge -All Options	●	●	●	●X	●	●	●	●	●	●	●	●	●	●	●	●	tdc	*£5.28	* THIS WILL ALSO REQUIRE B4063 -Part B IMPROVEMENTS TO BE IMPLEMENTED TO FORM A FULL ROUTE.	4
2	B4063	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	tdc	£3.53		15
3	GCC Blue Route	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	tdc	*£5.28+	* THIS WILL ALSO REQUIRE B4063 -Part B IMPROVEMENTS TO BE IMPLEMENTED TO FORM A FULL ROUTE.	3
4	GCC Green Route/NCN41	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	tdc	*£4.75	* THIS COST DOES NOT INCLUDE SIGNIFICANT LAND PURCHASE COSTS REQUIRED FOR THIS ROUTE PROPOSAL.	5

KEY

●	YES /GOOD
●	NO/BAD
●X	NOT SAFE UNLESS LINKED TO GLOUCESTER BY IMPROVED B4063

Figure 18 – Matrix of Criteria of alternative route options

## Potential Constraints/Risks

- Almost the entire route is on local authority Gloucestershire Council/ Highway land
- Scheme requires full support of GCC in order to deliver successfully and improve the safety of cyclists and pedestrians as well as improving rates of walking and cycling in the local area. Without this, elements of the scheme may not be built which would be detrimental to the whole route and jeopardise the safety of cyclists and pedestrians
- Responsibilities for design and construction need to be discussed and agreed between Highways England and Gloucestershire County Council

## Notes for Asset Solutions Team

### Opportunities

- There is a potential that sections of the scheme could be funded by developer contributions. Areas along the B4063 have been identified for development including residential and commercial premises.

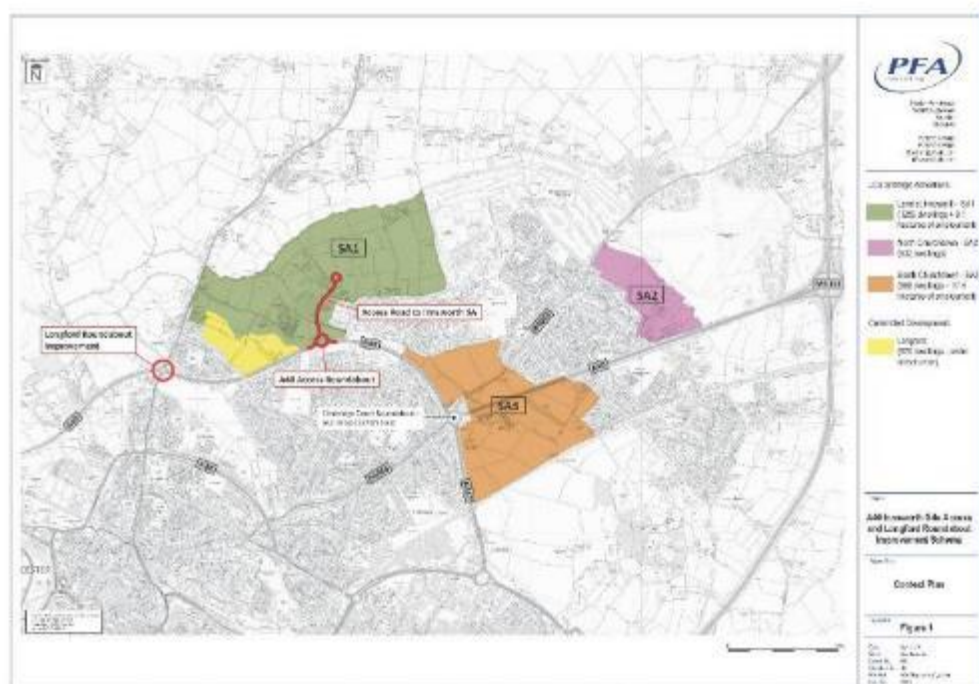


Figure 19 – Areas identified by the Joint Core Strategy\* for residential and employment development near the route

- There is potential that junctions along the route suggested to be upgraded by Skanska are already proposed to be modernised e.g.; designs for signal upgrades etc. could include 'Toucan' crossing facilities at little extra cost;
- During routine maintenance of carriageway surface and road markings, new road layouts including cycle lanes and safety improvements could be put back at no extra build cost;

\* Joint Core Strategy consists of Gloucester City Council, Cheltenham Borough Council, and Tewkesbury Borough Council



Figure 20 – Typical substandard cycle lanes and wide hatching on B4063 which could be modified at no extra cost during carriageway maintenance

- National Cycle Network routes are due to be expanded and extended (e.g. Cheltenham Train Station link) which could be used to form a longer route, more connectivity and achieve more modal shift at no additional cost to this scheme. It is recommended that Sustrans are considered as a stakeholder in this scheme to maximise the potential for route connectivity and utility.
- Many of the measures to assist cyclists (toucan crossings, junction improvements, side road cross-over details) will also assist pedestrians and people with mobility impairments. This will achieve integration and reduce barriers to accessing the network. It will also achieve targets set in the DDA Compliance Programme.

### Attachments

- Cycling SAR v2.0 Rev B
- Risk Register (Stage 1)
- A40 Gloucestershire Cycling Road User Intercept Survey (Sustrans, Feb 2016)
- A40 Gloucestershire Cycling Forecasting (Sustrans, May 2016)
- Sustrans Mapping
  - B4063 Employment Areas,
  - B4063 Residential Density,
  - B4063 Education Facilities
- B4063 Traffic Growth Forecasting
- B4063 Accident Plot (supplied by Gloucestershire County Council)
- B4063 Accident Analysis and Savings
- B4063 Cycling Scheme Measures – maps A and B.
- A40 Gloucestershire Development Strategic Allocations (November 2014)

**Appendix A: Scheme Overview Drawings**

