A44 & A4260 Corridor Study

Final report

Oxfordshire County Council

21 April 2017

Notice

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Rev 2.0	Final Report	SG/PS	SG	AC	AC	05/04/17
Rev 2.1	Final Report	SG/PS	SG	AC	AC	21/04/17

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Overview

Atkins were commissioned to undertake a study of the A44 & A4260 corridors and key cross links between Upper Campsfield Road (north of London Oxford Airport) and Frieze Way/ Pear Tree Interchange.

The study builds upon objectives set out in the Oxfordshire Local Transport Plan (LTP) – to provide high quality routes for rapid transit, bus, cycle and pedestrian journeys.

This study considers the feasibility of options and priority measures throughout the corridor to provide an overall concept design to deliver the LTP objectives.

1. Introduction

Atkins were commissioned by Oxfordshire County Council (OCC) to undertake a study of the A44 & A4260 corridor and key cross link roads bounded by the A4095 Upper Campsfield Road to the north (north of London Oxford Airport) and the A4260 Frieze Way/Pear Tree Interchange to the south.

The study builds upon objectives set out in the Oxfordshire Local Transport Plan (LTP)[1] – to provide high quality routes that prioritise sustainable transport in the form of bus, rapid transit (RT), cycle and pedestrian measures.

The aim for each of these modes is to provide efficient, safe, and continuous routes along, and within, the corridor. The LTP sets out general aspirations and an expected level of priority for sustainable modes within the corridor - this study builds upon that work through considering the feasibility of a range of options, and generating concept design plans which will help to deliver the LTP objectives.

The study takes account of planned development in the area included in the Cherwell District Council (CDC) Local Plan. At the time of writing, CDC is working on growth options for a partial review of the Local Plan relating to Oxfords un-met housing need, some of which lie on the A44/A4260 corridor study area. Depending on the growth options taken forward from this partial review, some aspects of the proposals in this report may need to be revisited.

1.1. Study extents

A plan showing the extents of the corridor being considered is provided in Figure 1-1 below.

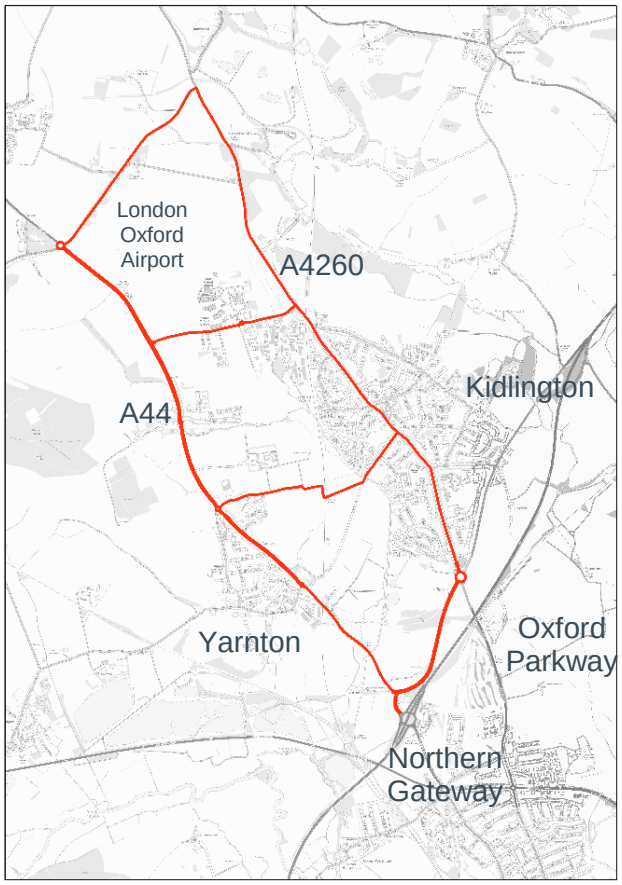
The southern extent of the study is south of Kidlington, where the A4260 meets Bicester Road and the A4260 Frieze Way, and the A44/A34 Pear Tree Interchange junction (The Pear Tree Interchange junction itself is not included in this study). The northern extent is north of London Oxford Airport on the corridor's junctions with the A4095 Upper Campsfield Road.

The study also considers the links between the A4260 and the A44, primarily Langford Lane and Sandy Lane. The study extents lie within Cherwell District, close to the boundary with West Oxfordshire District.

The A4165 (Banbury Road) and A4144 (Woodstock Road) corridors which extend southwards from the study area to Oxford city centre have previously been assessed as part of the A4165 (Banbury Road) & A4144 (Woodstock Road) Corridor Study undertaken by Oxfordshire County Council.

[1] Connecting Oxfordshire: Local Transport Plan 2015-2031. Published 2015. Updated 2016.

Figure 1-1 Plan of study extents



1.2. Methodology

Whilst some of the key issues and objectives for the corridor were established by the LTP, this study will begin with a review of available background data to identify any more specific issues that would guide the development of design options at particular locations in the corridor.

Specialist input was sought from the OCC officer team (including those responsible for development management, network management and public transport) and officers from CDC (Planning, Regeneration and Housing). Site assessments were also undertaken. The findings of this process are presented in Section 2 of this report.

Selected stakeholders were also asked to highlight particular concerns and issues they experience on the corridor. A workshop event was held by OCC to gather feedback, the results of which are also presented in Section 2.

The function of each corridor, and therefore associated levels of service expected for each mode were considered and presented in Section 3. Locations where the current level of service do not meet expectations are highlighted. General design considerations and assumptions such as minimum lanes widths etc. are set out in Section 4.

Scheme options were then developed and assessed based on their relative benefits/disadvantages for each mode and user group. The final scheme design is presented in Section 5, along with notes of key design decisions, and a log of discounted design options. Preliminary cost estimates, based in current year and including optimism bias have been prepared based on the feasibility designs, and are provided in Section 6.

An assessment of potential improvements to journey time reliability achieved by the proposed concept design is provided in Section 7.

2. Issues and opportunities

A review of available background data was undertaken in order to collate key issues to guide the development of design options at particular locations on the corridor.

2.1. Baseline data and evidence

The following sources of background data and information have been reviewed:

- Traffic count data (Automatic Traffic Counters & Manual Classified Counts)
- Journey time and delay data (strat-e-gis)
- Collision statistics (2011-2016)
- Development site details
- Site assessment
- Highways boundary plots

Relevant information gathered through the baseline review is presented on the plans provided in Appendix A. These plans provide a record of the issues and constraints that have guided the development of potential design options. The key points and themes to emerge are summarised in this section.

2.1.1. Traffic count data

Table 2-1 summarises traffic flows along the corridor, for the peak hour in either direction (AM Southbound, PM Northbound, unless stated otherwise). The data originates from 2016, and is based on observed ATC flows and MCC counts.

ATC (Vehicle flows)

Flows on the A44 Woodstock Road are higher than those observed on the A4260 Banbury Road. To the northern end of the corridor (north of the A44 and A4260 junctions with the A4095) vehicle flows are comparable on both corridors, although to the corridor's southern extent, flows on the A44 are considerably higher than those observed on the A4260.

An ATC site on A4260 Banbury Road ('north of The Moors' section) north of Kidlington, was observed to have its AM peak in the northbound direction rather than southbound as may be expected, while its PM peak was southbound. This is likely due to commuters accessing the employment sites located on Langford Lane, and potentially indicates to a degree that AM commuting traffic (heading towards Oxford) routes via Langford Lane to the A44 Woodstock Road. The A44 may be a more appealing routeing option as the A4260 may be subject to delay when passing through Kidlington village centre and a number of access roads. Based on strat-e-gis data, average vehicle speeds southbound on the A4260 during the AM peak is around 21mph, compared to 26mph on the A44.

MCC (Cycling/pedestrian flows)

There is little MCC data available within the study area to allow analysis of cycle flows – a single count shows 14 cycles in peak hours at the A44/Langford lane junction – likely to be utilising the segregated cycle tracks at this location.

Table 2-1 Summary of corridor traffic flows (vehicles)

ATC Data

Corridor	Corridor Section	Peak hour flow southbound (AM unless stated)	Peak hour flow northbound (PM unless stated)
A4260	A4260 south of B4027	749	715
	A4260 north of The Moors	749 (PM)	730 (AM)
	Oxford Road south of A34	973	836
	A4260 Frieze Way	592 (PM)	747(PM)
A44	A44 south of Woodstock	769	871
	A44 south of Yarnton	1239	1246
	A44 north of Five Mile Drive	1188	1292
Other	A4095 (between A44 and A4260)	452	461

MCC Data

Corridor	Corridor Section	Peak hour flow southbound (Cycle)	Peak hour flow northbound (Cycle)
A4260	Banbury Rd/Five Mile Drive	57	25
A44	Woodstock Rd/First Turn	108	10
	A44/Langford Lane junction	14	14

2.1.2. Journey Time & Delay

Table 2-2 presents journey delay data in the study area provided from the strat-e-gis database during the AM peak hour (8am-9am). No data was available for the PM peak hour.

The data indicates that there is high delay in the AM peak southbound, heading inbound towards Oxford city centre, at around 230 to 290 seconds on both the A4260 and A44.

Table 2-2 Summary of journey delay on corridor

Road	Peak journey delay southbound (seconds)	Peak journey delay northbound (seconds)
	AM	AM
A44	235	44
A4260	286	119

Figure 2-1 overleaf shows the locations where delay is experienced on the corridors in more detail:

Figure 2-1 Delay by link on A44 & A4260

Northbound AM **Southbound AM**

Further analysis of the data has revealed the following key issues observed in the AM peak:

- Significant southbound delay approaching the A4260 Kidlington roundabout;
- Northbound and southbound delay on the A4260 through Kidlington;
- Southbound delay on the A44 from Yarnton towards the A34/A44 roundabout;
- Northbound delay near to Oxford Parkway, approaching Water Eaton Bridge and the Oxford Road/A4260 junction;
- Delay per mile increases south of the A44 and A4260's junctions with Sandy Lane/Yarnton Road; and
- In general, less delay to the north of the corridor, although there are some delay hotspots, such as at the Langford Lane/A4260 and A4095/A44 junctions.

  Currently a short length of bus lane on the southbound approach to Kidlington Roundabout is the only opportunity for buses to avoid the delay to general traffic and achieve more reliable journey times. Further analysis is provided in section 7 of this report.

2.1.3. Collision statistics

Observations based on the analysis of the latest available collision data for the previous 5-years (January 2011 – 31st October 2016) is presented below, split according to each road on the corridor.

A44

The available data for the A44 from the Bladon roundabout (A44/A4095) to the junction with the A4260 to the south showed a total of 69 collisions recorded, of which:

- 2 were fatal. Both occurred at the signalised junction with Langford Lane and were caused by driver error;
- 16 were serious; and
- 51 were slight.

In terms of location, the collisions are relatively equally dispersed across the route, with clusters of incidents near some of the larger junctions along the road. These clusters were present at the junction with the A4095, at the signalised junction with Langford Lane, at the roundabout in the centre of Begbroke, and at the roundabout at the northern edge of Yarnton.

In general, there is a higher number of collisions during the summer months, with June-September totalling 32 collisions, whereas November-February totalling 18 incidents across the 5-year period.

Two collisions were related to pedestrians, resulting in 1 serious and 1 slight injury. The serious collision occurred in Yarnton when a Heavy Goods Vehicle (HGV) hit a pedestrian who crossed into its path, whereas the slight injury occurred at a crossing point where a pedestrian crossed in front of a car.

There were a total of 11 cyclist related collisions across the previous 5 years. Of these, 4 resulted in serious injury and 7 in slight injury, with the main causal factor being vehicle drivers not seeing cyclists. Cyclist collisions are spread evenly across the A44 corridor.

A4260

The available data for the A4260 from the junction with the A4095 in the north and the junction with the A44 in the south showed a total of 79 collisions recorded, of which:

- 1 was fatal. This occurred when a mobile scooter driver suffered a fatal head injury after hitting a reversing vehicle;
- 22 were serious; and
- 56 were slight.

The collisions are dispersed along the whole stretch of the A4260, with a higher concentration of incidents towards the southern end of the road in the residential area of Kidlington. The A4260 has a number of junctions (leading to primary and secondary routes) which interacts with the main carriageway and subsequently the majority of the collisions are related to movements at a junction. In particular, there are a cluster of collisions at the priority junction with the A4095, the Langford Lane signalised junction, the Bicester Road signalised junction, and at the A4260 Kidlington roundabout. These clusters are typical along a busy route such as the A4260; however, there is a significant cluster of collisions on the northern approach to the Kidlington Roundabout, all of which resulted in slight injury.

Within the study area, there were a total of 5 pedestrian collisions; 3 of which were slight, and 2 of which were serious. These incidents are dispersed along the road, with 4 of the 5 collisions occurring where the A4260 is within the urban area of Kidlington. All the collisions within Kidlington occurred at existing pedestrian crossings and were either due to vehicles failing to obey the signals, or pedestrians mistaking their crossing time.

On the A4260, there were a total of 27 cyclist collisions across the 5-year period; 15 slight and 12 serious. While the incidents are dispersed across the extent of the A4260, the majority of cycle collisions occurred on the northbound approach to the Kidlington roundabout, or on the roundabout itself. These collisions totalled 10 of the 27 cycle incidents and were a combination of slight and serious.

2.1.4. Development site details

The Northern Gateway site north-west of Wolvercote Roundabout is an allocated future development site to the south of the corridor. When developed, it will become a key employment site with around 90,000m^2 of commercial space, as well as an additional 500 homes and local amenities. The development is also set to deliver an on-site link road scheme between the A40, A44 and A34. The development has a target completion date of 2026.

Other committed development sites along the corridor include Woodstock East site in West Oxfordshire to the north of the study area (c.300 homes) and the restoration of Shipton Quarry located to the east of the A4260, including realignment of the A4095.

Further promoted sites include the Oxford University Press Sports Ground redevelopment (3.65 hectares residential development) near to Cutteslowe and Wolvercote roundabouts and land to the east of Marlborough School, Woodstock (60 dwellings) near to the A44. Furthermore, a review of the green belt is set to be undertaken by Cherwell District Council in order to establish the potential for releasing land in order to accommodate high value employment at both the Langford Lane/Oxford Airport and Begbroke Science Park.

At the time of writing, Cherwell District Council are undertaking a partial review of the Local Plan, considering options for further development required to address Oxford's un-met housing need. Some options under consideration lie on these corridors. Once this update to the Local Plan is complete, any infrastructure required to support further development identified in the study area will be considered in a separate study.

2.2. Stakeholder feedback

In addition to the data sources above, key stakeholders were asked to highlight any particular concerns and issues they felt needed addressing. A workshop session was held with invited stakeholders where their feedback was collected. The invited stakeholders included local County, City and District Councillors, transit operators, cycle user groups, OCC officers (particularly Transport Planners and Network Managers) and other interested parties.

The feedback and comments from stakeholders are provided in Appendix B. The key themes to emerge after analysis of the feedback are:

General

- Concerns in places over the lack of maintenance of some cycle/pedestrian paths, including the need for resurfacing and clearing of vegetation.
- Aspirations for the upgrade of the Canal towpath.

A44

- Safety concerns regarding the pedestrian crossing north of the Begbroke roundabout.
- Bus stops needed to serve Begbroke Science Park.
- Safety concerns regarding the pedestrian/cyclist crossing heading north at Cassington Road roundabout.
- Cycle/pedestrian route on the east side of the A44, south of the Oxford Canal, stops abruptly with no safe crossing.
- Concerns surrounding the safe access to and between the BP and Shell petrol stations in Yarnton.
- A number of junctions provide poor lines of sight for pedestrians/cyclists to cross.

A4260

- Safety concerns regarding the pedestrian/cyclist crossing at Kidlington roundabout.
- Investigate the possibility for the redesign of Oxford Road/Bicester Road junction.
- Investigate the viability of an increased rollout of 20mph zones throughout Kidlington.

2.3. SWOT analysis

Table 2-3 summarises the findings of a Strength-Weakness-Opportunity-Threat (SWOT) analysis of the current corridor, which summarises the findings of this baseline review. The analysis provides an overview of the baseline position, both in terms of wider strategic considerations, and issues specific to the corridor.

Table 2-3 SWOT Analysis – A44/A4260 Corridor

Corridor	A44	A4260
Strengths	• Existing segregated cycle infrastructure along majority of corridor – although quality is below required standard • Important inter-urban bus corridor	• Important local corridor serving Kidlington village centre
Weakness	• Single–carriageway section at southern extent of corridor (passing over two bridges) may constrain capacity of whole corridor • Existing roundabout junctions subject to short-term modifications to address historic safety concerns • Low number of cycle trips • Significant southbound delay to Loop Farm Roundabout.	• Relatively constrained corridor with service roads, on-street parking, popular street trees and varying width throughout • High number of private accesses and side road junctions • Journey delay through Kidlington town centre • Significant southbound delay to Kidlington Roundabout. • Fails to reflect village centre location and character in Kidlington • Kidlington Roundabout is a significant barrier and safety concerns for cycle trips.
Opportunity	• Wide corridor gives scope to consider segregated infrastructure for each mode if/where appropriate • Proposed P&R site at Bladon Roundabout could reduce demand for general traffic • Serves a reasonable inter-urban cycle trip between Woodstock and Oxford (c.13km)	• Route of proposed rapid transit lines – high quality public transport links to Oxford • Serves a reasonable inter-urban cycle trip between Kidlington and Oxford (c.9km)
Threat	• A44/A40 link road - may impact on traffic demand • A44/A40 link road - risks being a barrier to cycle trips	• A44/A40 link road - may impact on traffic demand • Local development could increase dominance of traffic in village centre

3. Corridor Function Assessment

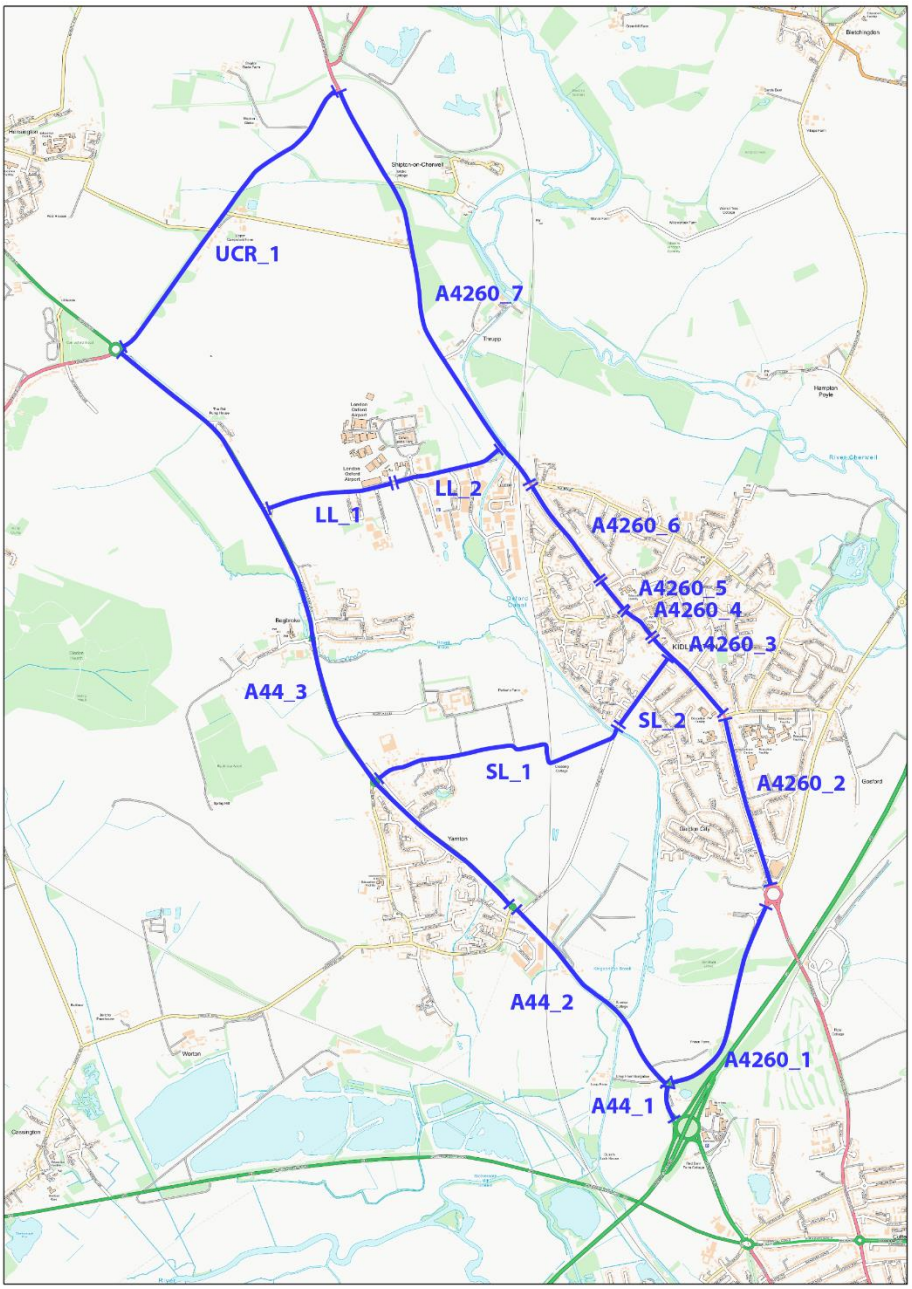
3.1. General principles

Assessment of the corridors' function, and particularly their place within the strategic bus/rapid transit and cycle networks have been considered. Based on this, appropriate target levels of service have been identified in line with industry design guidance and local aspirations set out in the Oxfordshire Local Transport Plan.

Detailed design parameters are set out in the following Section (Section 4).

For the purpose of this assessment, the corridors have been split into sections based on the route profile and character. The sections are show in Figure 3.1 below.

Figure 3-1 Corridor Function Sections



3.2. Bus/Rapid Transit Function

Both the A4260 and A44 corridors currently support important inter-urban public transport services. As set out within the adopted LTP, it is also envisaged that a Rapid Transit service will link a new Park and Ride site (proposed to be located at the Bladon (A4095/A44) roundabout) with Oxford City Centre, via Langford Lane, and the A4260. Clarification on the expected level of service which would be provided through this route is set out within the Oxford Transport Strategy (OTS), as and is summarised in Table 3-1. In the future, both routes will continue to provide an important inter-urban corridor function where it would be essential to provide a high level of service for users.

Table 3-1 Expected Level of Service - Bus/Rapid Transit

Rapid Transit	Premium Bus Route
• Detection and full priority at signals • Fully segregated lanes where achievable • Priority lanes to Stop Lines • Kerbside controls on entire length • Premium bus stop infrastructure	• Detection and priority at key junctions • Bus lanes where possible • Kerbside controls at pinch points

The only bus priority measure currently provided within the corridors is the bus lane on the A4260 southbound approach to Kidlington Roundabout, and therefore bus priority provision requires improvement throughout the study area to meet these requirements.

The A44 and A4260 are both busy corridors. Along both routes, there is a desirability for pedestrian crossing locations to be placed to coincide with bus stops, with the actual stop being downstream of the crossing in both directions. Conversely, additional pedestrian crossings between stops should be discouraged as this would cause disproportionate delays to rapid transport. It is also envisaged that bus stops should be logically located adjacent to crossroads, and at key side turnings, which are the principle pedestrian access points from the residential and commercial hinterland.

For the purposes of the corridor study, both local, inter-urban and rapid transit stops are presented. It is therefore not envisaged that all services would stop at all designated stops on the corridors, this would be considered for detail at later design stages. For example inter-urban services which focus on longer journeys with fewer stops and ‘local’ services which stop more frequently to serve local populations within easy walking distance.

3.3. Cycle Function

The A4260 is identified as a ‘premium’ cycle route in the LTP, expected to deliver a ‘safe, direct well signposted route’ to support local growth in cycle demand.

Suitable cycle infrastructure will vary dependant on the character of the route, traffic volumes and speed. In some locations, advisory on-street lanes or complete integration with other road uses will be appropriate, whereas in other locations fully segregated off-carriageway tracks are required. Each section of the corridors has been assessed against design guidance set out in LTN02/08 Cycle Infrastructure Design, and the London Cycle Design Standards (LCDS). The results are presented in Table 3.2 below, and a suitable level of provision identified.

The A44 has an existing off-carriageway route along its length, although concerns over the quality of the route surface and crossing points along the length have been raised.

There is no provision for cyclists on A4260 for nearly its entire length and therefore significant improvements in line with the target level of provision set out in Table 3.2 are required.

Existing and planned sections of Shared Use Path (SUP) on Langford Lane and Sandy Lane provide some off-carriageway provision in these locations but connections to a wider cycle network are required to maximise their effectiveness.

Table 3-2 Expected Level of Service - Cycle

		A44			A4260							Upper Campsfield Road	Langford Lane		Sandy Lane	
	SECTION	**A44_1**	**A44_2**	**A44_3**	**A4260_1**	**A4260_2**	**A4260_3**	**A4260_4**	**A4260_5**	**A4260_6**	**A4260_7**	**UCR_1**	**LL_1**	**LL_2**	**SL_1**	**SL_2**
Existing Provision		Off-carriageway Cycle Track/ SUP	Off-carriageway Cycle Track/ SUP	Off-carriageway Cycle Track/ SUP	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Off-carriageway Cycle Track/ SUP	n/a
LTN 02/08 Specification	VPH	>1000	>1000	>1000	800-1000*	800-1000*/ [150-300]	800-1000*	800-1000*	800-1000*	800-1000*/ [150-300]	800-1000*	300-800	? (Assume 300-800)	? (Assume 300-800)	? (Assume 300-800)	? (Assume 300-800)
	Speed (Estimate)	>40mph	>40mph	>40mph	>40mph	30-40mph/ [20-30mph]	30-40mph**	20-30mph	30-40mph***	30-40mph**/ [20-30mph]	>40mph	>40mph	>40mph	30-40mph***	>40mph	20-30mph
	LTN Recommendation	Cycle Tracks	Cycle Tracks	Cycle Tracks	Cycle Tracks	Cycle Lanes or Tracks [No provision]	Cycle Lanes or Tracks	Cycle Lanes	Cycle Lanes or Tracks	Cycle Lanes or Tracks [No provision]	Cycle Tracks	Cycle Tracks	Cycle Tracks	Cycle Lanes or Tracks	Cycle Tracks	Cycle Lanes might be appropriate
LCDS Specification	PLACE FUNCTION	LOW	LOW	LOW	LOW	LOW [LOW]	LOW	MEDIUM	LOW	LOW [LOW]	LOW	LOW	LOW	LOW	LOW	LOW
	MOVEMENT FUNCTION	ARTERIAL ROAD	ARTERIAL ROAD	ARTERIAL ROAD	ARTERIAL ROAD	CONNECTOR [LOCAL STREET]	CONNECTOR	HIGH STREET	CONNECTOR	CONNECTOR [LOCAL STREET]	ARTERIAL ROAD	CONNECTOR	CONNECTOR	CONNECTOR	CONNECTOR	LOCAL STREET
	CYCLE PROVISION (LCDS) #	Full separation – cycle track	Full separation – cycle track	Full separation – cycle track	Full separation – cycle track	Fully/light segregated on-carriageway lane [Advisory Lane/ Integration]	Fully/light segregated on-carriageway lane /Dedicated lane	On-carriageway lanes (dedicated)	Fully/light segregated on-carriageway lane /Dedicated lane	Fully/light segregated on-carriageway lane [Advisory Lane/ Integration]	Full separation – cycle track	Full separation – cycle track /segregated lane	Full separation – cycle track /segregated lane	On-carriageway lanes (segregated/ dedicated)	Full separation – cycle track /segregated lane	Advisory Lane/ Integration
Target Provision		Off-carriageway Cycle Track/ SUP	Off-carriageway Cycle Track/ SUP	Off-carriageway Cycle Track/ SUP	Off-carriageway Cycle Track/ SUP	On-carriageway Segregated Lane [Advisory lane /integration]	On-carriageway Lightly Segregated/ Dedicated Lane	On-carriageway Dedicated Lane	On-carriageway Lightly Segregated/ Dedicated Lane	On-carriageway Segregated Lane [Advisory lane /integration	Off-carriageway Cycle Track/ SUP	Off-carriageway Cycle Track/ SUP	Off-carriageway Cycle Track/ SUP	On-carriageway Lightly Segregated/ Dedicated Lane	Off-carriageway Cycle Track/ SUP	Advisory lane /integration

* VPH flow recorded between 700 and 800 - category used to provide robust infrastructure for future demand.

** Speed limit 30mph, but no speed control measures in road environment.

[ ] On service roads

Note: LCDS provide a range of recommendations for each street type – the specification shown takes account of vehicle flow and speed on link.

EXISTING CYCLE PROVISION OF CORRECT TYPE – SOME GAPS IN PROVISION AND QUALITY ISSUES

EXISTING CYCLE PROVISION BELOW TARGET ALTHOUGH LINK IS NOT A PRIORITY CYCLE ROUTE

EXISTING CYCLE PROVISION BELOW TARGET ON PRIORITY CYCLE ROUTE

3.4. General Traffic Function

Analysis of the delay on the network has highlighted key locations where congestion occurs – particularly:

- Kidlington village centre;
- Southbound approaches to A34 Pear Tree (A44 & A4260);
- A44 approaches to Langford Lane;
- A4260 approaches to Langford Lane; and
- Upper Campsfield Road southbound approach to A44.

The A4260 corridor is the focus for rapid transit priority and cycle provision, and therefore capacity for general traffic should be seen as a low priority compared to other modes.

The A44 corridor is more suited to possible capacity improvements alongside measures for other modes, particularly as reduced delay for all modes will reduce the need for bus priority measures as well. Improvements to encourage general traffic to move to the A44/P&R site from A4260 on Upper Campsfield Road should be explored.

3.5. Pedestrian Function

Much of the corridor has no particular focus of pedestrian movements, and pedestrian requirements will be met through applying basic footways of suitable widths with appropriate crossing points and facilities.

Kidlington village centre, and particularly where the A4260 joins the High Street and is fronted by commercial premises would benefit from an improved public realm and pedestrian orientated environment. This should be a focus for pedestrian infrastructure and will help emphasise the village centre character of this location.

3.6. Place Function

The Place function of the corridors will help determine a suitable approach to accommodating mixed priorities on each section of the routes. Categorisation against the Place types included in the London Cycle Design Standards are provided in Table 3-2, and show that most of the corridor is categorised as ‘Low’ Place function – this doesn’t infer an unattractive environment – it is a measure of the strategic importance and sense of distinctive character of a street. Locations with a medium/high place function would be reserved for places such as high streets, or more significant town/city squares/spaces.

In general terms, the A4260 through Kidlington has a degree of frontage along most of its length, and the character and quality of the street environment will be an important consideration on this section as infrastructure improvements are considered.

Kidlington village centre has a greater function as a place to the rest of the corridor, and it is appropriate to prioritise measures to emphasise the character of the street in this location. This is supported by Local Plan Policy - Kidlington 2 (Strengthening Kidlington Village Centre) and the Kidlington Framework Masterplan Supplementary Planning Document, that both seek improvements to the public realm in the centre of Kidlington. The complete segregation of modes and focus on minimising vehicle/cycle journey delay may not be an appropriate approach in this section around the High Street.

The A44 corridor is strongly focussed on movement and has little place function. It has very little frontage.

4. Design considerations

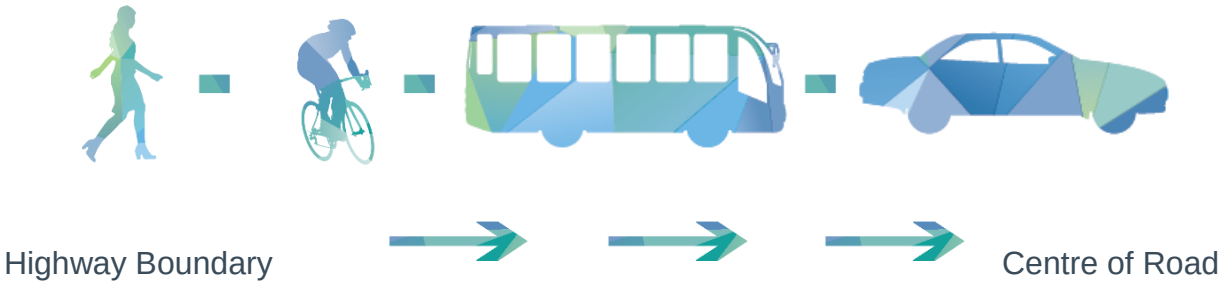
4.1. General principles

Relative position of transport modes within corridor

A key design objective in developing improvements for the corridor has been to maintain a consistent relative position of all modes throughout the corridor, with pedestrians closest to the highway boundary, then cyclists, buses/rapid transit and finally general traffic at the centre of the carriageway.

The degree of separation/segregation between the modes varies dependent on the particular characteristics and requirements of the corridor links, but the relative position of modes is consistent throughout.

Figure 4-1 Relative position of transport modes within corridor



4.2. Rapid transit/Bus design specification

Section 3.2 set out the corridors' bus/rapid transit classification set out in the LTP, and expected level of service on each section.

4.2.1. Bus lane width

Where the speed limit is proposed to be 30mph or less, a minimum bus-lane width of 3m has been used as generally separate cycle facilities are proposed, so there is no expectation that cycles will share the bus lane. Where the speed limit is greater, a minimum bus-lane width of 3.5m has been used to ensure the lane is safe and convenient for larger vehicles.

4.2.2. Traffic Lane Width

Where a bus lane(s) is provided, or the carriageway comprises three or more traffic lanes, a standard lane width of 3m has been used in locations where the speed limit is 30mph or less. Where no bus lanes are provided, and the carriageway consists of just two traffic lanes (one in either direction), a minimum lane width of 3.2m has been used to meet OCC requirements. Where the speed limit exceeds 30mph, a minimum traffic lane width of 3.6m has been used, again to meet OCC requirements.

4.2.3. Intelligent Transport Systems and priority signal measures

Consideration has been given at a high level to the opportunity to integrate priority measures for buses/rapid transit into junction signal control systems. The corridor designs set out appropriate junction/link layouts to accommodate such systems. However, further detailed design and operation testing will be required.

Measures to upgrade existing controlled crossings to include basic bus detection equipment have been included in the scheme cost estimates.

4.2.4. Bus stop infrastructure

All bus stops on the proposed rapid transit route have been designed to be double length, to accommodate existing peak time use, as well as future aspirations to introduce potentially longer rapid transit vehicles. Bus stop location, space and layout has been considered, but details such as shelter design and ticket machines etc. will be subject to further more detailed design and are not within scope of this current commission. Cost estimates presented later in the report assume standard bus stops are upgraded to include shelters with Real Time Passenger Information (RTPI) capability. Rapid transit stops are assumed to include premium shelters, RTPI ticketing and other premium quality infrastructure.

The integration of bus stops, cycle lanes and pedestrian paths is a key design feature that can have a significant impact on the safety and level of service offered to all users. In general, measures to maximise segregation of users at bus stops are preferred. 'Floating' bus stops, where cycle lanes divert behind bus stop islands have been considered to avoid conflict between cycles and bus users, however there is insufficient space to accommodate this arrangement along the full extent of the corridors. Attempts have also been made to maximise footway widths at bus stop locations to accommodate waiting passengers and concentrated pedestrian movements when disembarking, although this can have an impact upon the continuity of cycle lanes.

The optimum bus stop design at each location will be determined by weighing up the available space, level of use at the stop, and likely cycle flows/speed. In addition, the benefits of maintaining a uniform approach along a corridor, or wider area must also be taken into account. As more detailed designs are progressed, the suitability of alternative design options at each bus stop should be considered.

4.3. Cycle design specification

Section 3.3 set out the corridors' cycle route classification set out in the LTP, and expected level of service on each section.

4.3.1. Cycle design standards

Cycle measures for the corridor have been designed taking account of guidance from:

- LTN2/08 – Cycle Infrastructure Design (DfT 2008);
- LTN 1/12 – Shared Use Routes for Pedestrians and Cyclists (DfT 2012);
- London Cycle Design Standards (TfL 2014).

As demonstrated in Table 3-2, given the nature of the corridor in most locations off-carriageway tracks are the preferred option, although on-carriageway measures (with varying degrees of segregation) are appropriate on some sections of the A4260.

Due to the relatively low number of pedestrian movements on much of the corridor where off-carriageway paths are desired, off-carriageway shared-use paths are proposed. Such paths can be provided either segregated (separate spaces delineated for cycles and pedestrians) or unsegregated (the path is fully shared between cycles and pedestrians). Each approach has its merits. Segregated paths maximise segregation of modes, and are widely used within Oxford city. However, they require detailed consideration to ensure the delineation of pedestrian and cycle space is adequate in order to achieve a legible uncluttered environment - otherwise they can offer a poor level of service to all users, particularly if the paths is under 4m in width. Unsegregated paths provide a less cluttered environment making best use of the available space. Where pedestrian volumes are very low, they offer an opportunity to provide high quality level of service to all users without an over-engineered solution that is not necessary to accommodate the demand.

Taking account of the above considerations, unsegregated SUPs, of a minimum 3m width are proposed in such locations.

Where required, on-carriageway measures have been designed to give cycles an appropriate level of priority and segregation from other traffic on the carriageway. Measures range from partially segregated (stepped) cycle lanes, through mandatory cycle lanes to advisory cycle lanes, as identified in Table 3-2.

Partially segregated (stepped/hybrid) lanes have been proposed on some of the corridor – these lanes offer a good degree of segregation for cyclists whilst maximising the available lane widths in constrained locations. Although a physical buffer is not provided (due to the associated width required), vertical delineation between cycles, other traffic and pedestrians leads to a clearly legible environment for users. Cycle lanes have been provided at 2.0m width subject to later stages of more detailed design work and topographic survey work.

In urban location with speed limits of 30mph or lower, a default approach to continue cycle lanes across side roads and through larger junctions has been applied, to maximise the prominence and priority given to cyclists on the corridor. The detailed design of Side Road Entry Treatments (SRETs) can have a significant impact on the perceived priority and safety at side roads/accesses. In later design stages a balance will be required between maintaining consistency along a route, and reflecting the context of each access, such as the need to accommodate larger vehicles, or fast moving vehicle diverges etc.

4.4. Pedestrian design specification

Where cycle provision is on-carriageway this provides a clear, safe footway space for pedestrians. Footways have been provided at a minimum width of 1.8m, and wider where space permits.

Crossing points have been considered throughout the corridors, and particularly close to each pair of bus stops. Existing controlled crossings have generally been retained, and additional facilities added in some locations, taking into account the risk of delay to buses and cyclists. Where uncontrolled crossing points are provided, new/existing refuge islands have been considered where there is sufficient space to accommodate them without compromising the continuity of bus/cycle provision.

Uncontrolled crossings of side roads represent a key feature in determining the level of service given to pedestrians, and particularly disabled users. A standard approach has been used for all minor side roads, including:

- Uncontrolled crossing point on pedestrian desire line
- Appropriate tactile paving
- Raised table crossing giving a level surface to pedestrians and encouraging slow vehicle speeds
- Appropriate markings to raise prominence of crossing to drivers.

5. Corridor improvements - Design

5.1. Design Overview

Plans showing the preferred corridor design are provided in Appendix C.

The operation of selected junctions has been modelled for a future year scenario (2031). The findings are discussed in context below, and presented in detail in Appendix D.

5.2. Design Notes by Mode

5.2.1. General Traffic

A general approach to accommodate strategic traffic movements on the A44 corridor, and discourage traffic movements from the A4260 through Kidlington has been followed. This reflects the function of the two routes, and also aims to reduce delay through Kidlington where there is less opportunity for segregated priority measures for buses/rapid transit vehicles. It also supports wider policy objectives contained in the CDC Local Plan and Kidlington Masterplan.

Lane configurations at the A4095 Upper Campsfield Road/A4260 junction have been designed to accommodate a high movement of vehicles across to the A44 corridor, and the proposed P&R site at Bladon Roundabout. The junction operation has been tested (as detailed in Appendix D) and shown to operate adequately albeit with a moderate queue in the PM peak hour (16 pcus) on the western and southern arms. Longer filter lanes on the northern arm would improve operation of the junction but the available width at this location is constrained by a bridge. Designs requiring widening of the bridge have not been considered. Operation of an indicative roundabout design was also tested and shown to fail – it also provides no control to encourage diversion to the A44/P&R.

A44

At Bladon Roundabout, a left-turn filter lane is provided to allow vehicles to join the A44 without giving way. As the P&R access designs are developed, the viability of this filter lane will need to be assessed, and options such as restricting it to P&R traffic only considered.

Two-lane entries have been reinstated to the A44 roundabout junctions to re-establish their capacity – indicative geometric updates to the junctions to accommodate this are shown. These capacity improvements have not been tested or quantified. Concern remains that the single carriageway section at the southern end of the corridor will constrain the overall capacity of the corridor and strategic testing of the benefit of these junction upgrades is required to ensure they do not just facilitate traffic joining the back of a queue to the south more quickly.

At the time of writing, plans for an A44/ A40 link road at Loop Farm are proposed. Details of the design are still being developed and are not shown on the plans. Indicative design options at the Loop Farm junction may be subject to change once further details of the link road design are known.

The speed limit at the northern extent of the corridor is proposed to be reduced to 50mph to be consistent with the remainder of the corridor due to the addition of bus lanes on this sections (see below).

Langford Lane

The A44/Langford Lane junction has been modified to include bus priority measures and a two lane approach on the eastern arm (Langford Lane) to address existing delay and provide reliable rapid-transit journey times through the junction. This configuration is shown to operate well within capacity and therefore avoids causing delay to bus/rapid transit vehicles on Langford Lane where no bus lane can be provided.

The A4260/Langford Lane junction has also been modified to include bus-priority measures where possible. The signal timings tested have been configured to deliberately restrict southbound traffic flow from this junction to reduce delay through Kidlington Village centre where no bus lanes can be provided. The queue deliberately held on the northern arm is shown to reach 14 vehicles. This approach is considered consistent with the overall objectives for the corridor, but risks a small delay to the existing S4 inter-urban bus service between Oxford and Banbury. Strategic network modelling is required to fully understand the impact of this measure.

The western section of Langford Lane is currently subject to a 60mph speed limit - consideration could be given to a 50mph speed limit on this section to manage potential conflict with stopping rapid transit vehicles – it may be beneficial in safety terms once rapid transit vehicles start using the route, without resulting in a significant delay to vehicles or the rapid transit service (<20s).

A4260

Either side of Kidlington village centre, the existing service roads have been retained with their current function – providing access and parking, and an appropriate environment for some groups of cyclists. Options to re-define the function of the service roads, remove parking and remove the existing verges/trees were considered but would be unlikely to receive local support if progressed. Whilst not identified on the plans, localised widening of the hardstanding areas around bus stops located adjacent to the service roads to provide larger passenger waiting facilities could be explored. This could be combined as a potential traffic calming measures along the service roads. It is expected that this could be explored in further detail at subsequent design stages.

Sandy Lane

It is proposed that Sandy Lane be closed to through traffic at the railway line – removing the level crossing. This will ensure vehicular traffic is constrained to access only, and facilitate creation of a street environment that is acceptable for pedestrians and cyclists in an otherwise very constrained location. Associated works to calm traffic movements and create a comfortable environment for cyclists and pedestrians are therefore also proposed. An indicative new pedestrian/cycle bridge is shown to maintain safe through movement for these modes.

5.2.2. Bus & Rapid Transit

A44

Recognising its importance as an inter-urban bus corridor, a southbound bus lane has been provided along the entire length of the A44 corridor from Bladon Roundabout to Pear Tree Roundabout. This option gives buses maximum segregation from other modes and would deliver fast, reliable journey times along this section which is subject to significant delay currently.

It is recognised that this option has a very high cost, and that some parts of the route do not currently have a bus service (Sandy Lane to Cassington Road). Alternative, lower cost options not shown include to only provide the bus lane on approach to junctions where traffic may be queuing, or to re-allocate one of the existing traffic lanes as a bus lane without carriageway widening. Both options could be delivered at lower cost than the full bus lane shown, but clearly risk delay and unreliability to bus services and or general traffic. For the purposes of this feasibility design, the full length bus lane plus two traffic lanes is shown to demonstrate how it could be delivered if required. In the short term, the alternative measures may provide a viable option worthy of consideration

subject to wider assessment of the network performance. As noted in Section 5.2.1 above, efforts to improve general capacity of the links and junctions on the northern part of the corridor risk just allowing vehicles to join the queue to the south more quickly, where the corridor is more constrained.

At the A44 Langford Lane junction, the bus lane does not continue to the stop line. Junction modelling has shown the proposed arrangement to operate well within capacity, and buses will clear the junction within a single cycle and could still benefit from priority calls within the junction operation if required.

There is no eastern arm to the A44/Spring Hill Road roundabout and hence the bus lane is shown through the junction with no requirement to give-way. Bus gates and new pedestrian crossing points are provided close to each of the roundabout junctions to aid bus turning movements where required, or to simply allow buses to move-off ahead of general traffic.

The single-carriageway section of the corridor to the south passes over two bridges which constrain the available width. The designs shown are subject to detailed topographical assessment, and alternative options requiring new pedestrian/cycle bridges to carry the SUP are shown should the available width of the existing structures be insufficient.

As designs are developed for the A44/Loop Farm Link Road junction, measures to prioritise north/south bus and cycle movements should be incorporated.

North of Langford Lane, a northbound bus lane is also provided to achieve the rapid transit route target specification. A bus gate is provided on approach to Bladon Roundabout to allow RT vehicles to move across and perform a right-turn/U-turn to access the P&R site.

Langford Lane

Langford Lane forms part of the proposed rapid transit route. There is insufficient width to provide bus lanes along the majority of the length and hence the junction design/operation at either end have been configured to minimise delay on Langford Lane in order to achieve reliable journey times for rapid transit vehicles. A bus-only filter lane is provided at the A44 junction, and a small length of bus lane on approach to the A4260 allows RT vehicles to be released ahead of general traffic. Cyclists will also benefit from this feature – a push button may be required to call the dedicated phase. It is recommended that Selected Vehicle Detection is built into all signal systems on the rapid transit route and priority calls given to approaching RT vehicles.

A4260

A southbound bus-lane is provided along the majority of this corridor (south of Langford Lane) to reflect the rapid transit route specification and address the existing delay experienced throughout its length. The exception is within Kidlington village centre where the available width is insufficient, and the character of the route accommodates ‘place’ as well as ‘movement’ priorities. North-bound bus lanes are provided on approach to key junctions that are existing sources of delay to allow RT vehicles to be released ahead of general traffic.

A bus gate has been provided at the southbound entry to Kidlington Roundabout including part-signalisation of the circulatory carriageway – the intention is that as a bus/RT vehicle is approaching, general traffic in the A4260 and the circulatory carriageway is held to allow the bus/RT vehicle to proceed without delay. When considered alongside the southbound bus lane passing the existing significant queueing on this approach this will secure significant benefits for journey time and reliability. No detailed assessment of this part-signalisation approach has been undertaken, and further assessment is required to understand how it may operate.

Bus stops are provided close to their existing locations. In Kidlington village centre, a more detailed review of bus stop locations and service routing may be required to ensure good integration of local services, future rapid transit services and wider public realm objectives. There may be an opportunity to rationalise the number of bus stops north of the village centre to Langford Lane. On the southern section of the corridor, build-outs into the service roads could be provided at bus stops to provide additional waiting space if required – these have not been shown on the plans as removal of parking would be required – a measure that is unlikely to receive local support.

5.2.3. Cycle

A44

In line with the required level of service set out in Table 3-2, an off-carriageway SUP is provided along the entire length of the A44 corridor. Due to the function of the route and speed of vehicles, on-carriageway provision is not suitable. North of Cassington Road, there is an SUP on both sides of the corridor. South of Cassington Road, the SUP is only provided on the western side due to the available width – adequate controlled and uncontrolled crossing points are provided to allow cyclists to cross to the western side. Uncontrolled crossing points at junctions have been remodelled to ensure they offer a good level of service, including adequate refuge islands whilst accommodating turning movement by larger vehicles. In those locations where there are service roads, and the configuration is safe to do so, on-carriageway provision is preferred to a SUP. However, where there is a risk of conflict at the service road diverge point, a SUP is provided.

A4260

On-carriageway cycle lanes are provided throughout the corridor – the only exception being through the village centre where narrow mixed traffic lanes better reflect the objectives for the space. Hybrid lanes are provided on the majority of the route to give cycles a good degree of segregation from general traffic and pedestrians. Where there are frequent private accesses, mandatory cycle lanes (1.5m width) are shown as they give better continuity than hybrid lanes in this environment.

A northbound cycle by-pass is provided at the A4260/Bicester Road junction to avoid the need for cycles to stop at the signals.

At the southern end of the corridor, the signed cycle route is proposed to follow the western side of the road to link with an on-ward SUP on Banbury Road to the south and around Cutteslowe Roundabout - proposed through a previous study. Cyclists can use controlled crossing points to move to/from the western side at both ends of this arrangement, and to access Parkway station. With this focus on the western side, consideration could be given to a pedestrian/cycle bridge over the A4260 Frieze Way arm of the Kidlington Roundabout, as this is currently an intimidating and dangerous environment for cyclists, as demonstrated in the collision statistics. Although a high-cost option, a bridge is the only feasible option to address the very poor safety record for cyclists at this location that will not have an unacceptable impact upon capacity. During detailed design, consideration will need to be given to ensure any ramps to access the bridge do not impede access arrangements to existing and potential future access points in the vicinity.

No cycle provision is proposed on A4260 Frieze Way as demand currently is and would be expected to remain very low. Improved cycle and pedestrian facilities for connections between the A44 and A4260 are separately highlighted for Yarnton Lane. Alternative off-line links between Parkway station/Kidlington and the proposed Northern Gateway site have been considered in a previous study, and if delivered will provide a more suitable and attractive route for cyclists towards the proposed Northern Gateway site.

Upper Campsfield Road

An indicative SUP is shown on the feasibility plans, although the existing number of cycle movements is very low and insufficient to justify the path. However, demand should be monitored once the P&R site is built to assess if all or part of the path may be beneficial. In particular, improved crossing provision around Bladon Roundabout will improve access to the P&R site from Woodstock, linking with the existing SUP on the northern arm.

Langford Lane

The previously agreed developer-led SUP along the southern side of Langford Lane between the Airport access and the A44 is shown. To the east linking to the A4260, on-carriageway hybrid cycle lanes are shown to match the target specification set out in Table 3-2, and tie in with cycle provision on the A4260.

Sandy Lane

No specific cycle measures have been proposed as the available carriageway widths are very narrow. However, traffic calming measures, and the closure of the route to through traffic are expected to deliver a safe and comfortable environment for cyclists in the absence of being able to provide segregated facilities.

Green Lane

Green Lane, linking Sandy Lane/Yarnton Road and the A44 at Yarnton is currently an unsurfaced footpath providing a good link between Kidlington and Yarnton. Were it improved to become a cycle track it would provide a valuable transport link between these destinations and onwards to the proposed Northern Gateway site and other cycle routes into the City. Further detailed design stages will need to consider construction viability of this option.

5.2.4. Pedestrians

In those locations with little frontage pedestrians are generally accommodated on SUPs – whilst this results in some risk of conflict with cyclists, the relatively low volume of movements (particularly pedestrians) in these locations and adequate path widths will mean they offer a good level of service to all users.

Where there is more frontage and pedestrian movement – generally on the A4260 – the segregation of cyclists from pedestrians' on-carriageway will provide a safe and comfortable footway environment for pedestrians.

There is a localised pinch-point on the A4260 between Benmead Road and Lyne Road (north of the village centre) where the available highway width may be insufficient to provide adequate footways. Detailed assessment with a full topographic survey is required to understand the severity of the constraint, and over what distance before a solution is considered in later design stages.

Standardised junction treatments to highlight the presence of pedestrians will ensure a consistent, good level of service throughout the corridor.

5.2.5. Kerbside controls

Kerbside parking is either restricted (at any time in Kidlington village centre) or does not occur along the majority of the corridor and therefore in general no further controls are proposed. However, if parking practices change restrictions should be extended along the corridors to prevent obstruction of cycle lanes and bus lanes.

Parking in the A4260 service roads is retained as existing as its removal would likely be met with local objection, and these are a small number of commercial premises served by these spaces. However, it is suggested a small section is removed at the very southern extent of the corridor in order to provide a two-way segregated cycle track at this location.

5.2.6. Public realm

The majority of the corridor has little active frontage. The significant exception is Kidlington village centre where there are aspirations to re-define the character of the A4260 at this location as set out in the CDC Local Plans and Kidlington Masterplan. Two options have been developed - one narrowing the carriageway down to a minimum to provide wide footways and space to develop further public realm initiatives either side. The second option includes a central median to maximise the opportunity for pedestrians to cross informally and highlight to vehicle drivers the change in character of the environment. Rapid transit stops servicing the village High Street are incorporated. The configurations presented do not include existing right-turn lanes and flares at junctions. Wider efforts to reduce the traffic flow through the Village will off-set this, however more detailed assessment is required to ensure this does not result in unacceptable delay to the Rapid Transit and other bus services.

5.3. Design decisions

Further to the design notes provided above, a record of all design options considered throughout the corridor is provided in Appendix E.

Notes are provided against each option to indicate why each particular option was or was not included in the final scheme design. This provides a complete record of design decisions taken through the development of the preferred scheme design.

The notes provided against each option include comments received from OCC and CDC officers during development of the scheme.

5.4. Detailed design issues

The following points should be noted during preliminary or detailed design stages:

- Topographic Survey – the corridor design has been prepared in the absence of a detailed topographic survey. In some locations, measures for buses and cycles have been designed based on the assumed available width. However, should the detailed topographic survey indicate additional corridor width is available, any opportunity to provide higher quality measures than those proposed should be considered. Examples include providing physically segregated cycle lanes with a buffer to other modes instead of stepped lanes; and providing wider cycle lanes and footways.

- Geotechnical survey – no survey of existing ground conditions or carriageway construction has been undertaken. Indicative cost estimates to reconfigure existing carriageway assume that full reconstruction will not be required, but this is subject to further investigation, and therefore costs may be higher.

- Combined Kerb drainage – Efforts to avoid placing gullies in cycle lanes should be taken, including combined kerb drainage where appropriate.

- The location of statutory undertaker's apparatus has not been considered. The indicative cost estimates used account for typical works to services that may be expected, but are subject to change once detailed searches and surveys are undertaken.

- A suitable design approach for bus stops should be considered in detail taking account of the relative space, use and cycle flows at each stop.

- Lighting – with the addition of bus lanes to the sections of existing unlit road – particularly the A44 subject to a 50mph limit – there may be a benefit to consider lighting of these sections to mitigate safety concerns. Further operational and environmental assessments will be required to determine if lighting is appropriate, or whether alternative options such as illuminated road studs are would be suitable. An indicative cost for lighting is included in the cost estimate presented in section 5, subject to change depending on the details design and specification.

- Kidlington Roundabout – the part-signalised arrangement shown has not been assessed in detail, and further assessment is required to understand how it may operate.

6. Corridor improvements - Cost estimate

Cost estimates have been prepared for the presented corridor scheme. The elements that make up the scheme options have been broken down into their constituent parts, with measurements taken from the corridor design drawings presented in Appendix C. The unit costs / costs per km for each scheme element have been derived from the Oxford Transport Strategy cost calculations, and costs previously provided by the OCC Commercial Project team (2015 price base increased to 2017 prices). They represent high-level typical scheme costs, taking account of 'normal' scheme requirements for such works.

A summary of the total scheme costs are provided in Table 6-1 below. The full cost estimate calculations are provided in Appendix F.

Table 6-1 Cost estimate summary, 2017 Prices

	SECTION	COST	SECTION	COST
COST ESTIMATE	A44_1 - Pear Tree to Loop Farm	£145,822	A4260_1 - Loop Farm to Kidlington Roundabout	£0
	A44_2 - Loop Farm to Cassington Road	£1,274,552	A4260_2 - Kidlington Roundabout to Bicester Rd	£764,819
	A44_3 - Cassington Road to Bladon Roundabout	£9,845,316	A4260_3 - Bicester Road to Sterling Road Approach	£893,912
	LL_1 - Langford Lane, A44 to Airport	£1,630,244	A4260_4 - Sterling Road Approach to Lyne Road	£326,103
	LL_2 - Langford Lane, Airport to A4260	£416,160	A4260_5 - Lyne Road to Benmead Road	£266,509
	SL_1 - Sandy Lane, A44 to Canal	£273,885	A4260_6 - Benmead Road to Langford Lane	£448,496
	SL_2 - Sandy Lane, Canal to A4260	£5,117	A4260_7 - Langford Lane to Upper Campsfield Road	£111,801
	UCR_1 - Upper Campsfield Road, A44 to A4260	£899,988		
TOTAL COST				**£17,302,784**
DESIGN COST	Preliminary & Detailed design (15%), Preliminaries (20%)			**£6,055,975**
OPTIMISM BIAS	Optimism bias (45% - 30% Contingency + 15% Risk Allowance)			**£10,511,441**
TOTAL COST				**£33,870,200**

Cost estimate assumptions

The following assumptions have been made in calculation of the scheme cost estimates:

- Services diversions – the costs for reconfiguration of road space take account for some need to divert services and statutory undertaker's apparatus. However, the location of statutory undertaker's apparatus has not been considered in detail, and costs may vary significantly.
- A preliminaries figure of 20% is included at OCCs request. The required traffic management for work on this corridor will be significant, and this figure may need revising in future stages of design.
- A significant optimism bias (OB) of 45% has been applied at OCCs request, nominally comprising 30% contingency and 15% risk allowance. This closely mirrors the standard OB (from WebTAG) applied to schemes at the feasibility stage of design (44%), and reflects the fact that many costs remain uncertain until more detailed design and investigations have been undertaken.
- A Quantified Risk Assessment (QRA) is not considered appropriate at this stage but will be required as more detailed design work is undertaken and specific design and delivery risks are better understood. At such as a point there will be specific QRA risk budgets for each corridor/scheme rather than the generic 45% uplift being applied.
- Costs exclude inflation that would need to be estimated and included once the future development and build programme has been established.

7. Journey Time Evaluation

Journey time reliability forecasts have been produced in order to provide an indication of how bus/rapid transit and cycles are affected by the A44/A4260 schemes outlined in this report, in terms of reliable journey times.

In order to undertake forecasts of journey time reliability, the following methodology has been devised and used on both corridors the A44 and A4260, northbound and southbound from the proposed Park & Ride site to Pear Tree interchange and Kidlington roundabout respectively:

Buses/rapid transit

- Where there is a bus lane, journeys should be reliable and progress without delay.
- Where there is not a bus lane, delay figures from strat-e-gis are used.
- However, where measures to reduce delay have been outlined (Langford Lane junctions and Kidlington centre southbound), strat-e-gis delay figures have been reduced by 30%.
- At each signalised junction, 30 seconds of delay is applied to account for cycle time. However, it is recognised that priority signals will be delivered for buses.
- Journey time variability figures are produced through totalling the variability.

Cycles

The majority of delay for cycles is assumed to occur at junctions:

- Uncontrolled crossings required for cyclists – 20 seconds delay per crossing.
- Controlled crossings required – 30 seconds delay per crossing.
- Signalised junctions to pass through (if cycles are on carriageway) – 60 seconds delay per crossing.
- Kidlington stretch with no cycle lanes – strat-e-gis delay data figures, reduced by 30%.

For buses/rapid transit, the above methodology has been applied for both existing and proposed configurations of the corridor to enable a comparison to be made. It is impractical to quantify cycle journey time improvements for cyclists based upon improved provision on links, as it will vary considerable for each user – hence calculations have only been undertaken based on the proposed configuration. The results are shown in Table 7-1 below.

Table 7-1 Journey time variability (AM Peak)

Corridor	Direction	Bus/RT variability (mins)		Cycle variability (mins)
		Existing	Proposed	
A4260 (from P&R site along BRT alignment through Kidlington to Kidlington Roundabout)	Northbound	5.15	4.59 (-0.56)	4.10
	Southbound	6.71	4.37 (-2.34)	4.58
A44 (from P&R site along A44 to Pear Tree Interchange)	Northbound	1.6	1.56 (-0.04)	2.67
	Southbound	5.01	3.14 (-1.87)	2.67

The link extents over which delay data is provided through start-e-gis do not correlate well with the proposed extent of bus lanes on the corridors – hence a conservative approach has been taken in which delay on link partially covered by proposed bus lanes is assumed to remain and impact upon bus/rapid transit services. The results of the assessment show a 35% reduction in delay/variability on the southbound A4260, and a 37% reduction on the southbound A44. Short lengths of bus lane at key locations achieve an 11% reduction on the A4260 northbound. Little delay and limited proposed bus lane provision results in a marginal reduction in delay/variability on the northbound A44.

8. Recommendations

This feasibility study has shown that good quality provision for buses/RT, cycles, pedestrians and general traffic that meets the aspirations of the LTP can be made on these corridors. In general, target levels of service for all modes can be achieved to ensure safe, reliable and fast journey times for all modes.

Further study and analysis is required to clarify remaining uncertainties and inform later design stages. These include:

- Topographic Survey – the corridor design has been prepared in the absence of a detailed topographic survey. In some locations, measures for buses and cycles have been designed based on the assumed available width. However, should the detailed topographic survey indicate additional corridor width is available, any opportunity to provide higher quality measures than those proposed should be considered. Examples include providing physically segregated cycle lanes with a buffer to other modes instead of stepped lanes; and providing cycle lanes of up to 2.0m width, rather than 1.5m

- Geotechnical survey – no survey of existing ground conditions or carriageway construction has been undertaken. Indicative cost estimates to reconfigure existing carriageway assume that full reconstruction will not be required, but this is subject to further investigation, and therefore costs may be higher.

- Combined Kerb drainage – Efforts to avoid placing gullies in cycle lanes should be taken, including combined kerb drainage where appropriate.

- The location of statutory undertaker's apparatus has not been considered. The indicative cost estimates used account for typical works to services that may be expected, but are subject to change once detailed searches and surveys are undertaken.

- A suitable design approach for bus stops should be considered in detail taking account of the relative space, use and cycle flows at each stop.

- Lighting – with the addition of bus lanes to the sections of existing unlit road – particularly the A44 subject to a 50mph limit – there may be a benefit to consider lighting of these sections to mitigate safety concerns. Further operational and environmental assessments will be required to determine if lighting is appropriate, or whether alternative options such as illuminated road studs are would be suitable. An indicative cost for lighting is included in the cost estimate presented in section 5, subject to change depending on the details design and specification.

- Kidlington Roundabout – the part-signalised arrangement shown has not been assessed in detail, and further assessment is required to understand how it may operate.

Appendix A
Baseline review plans

Appendix B

Stakeholder comments

Appendix C

Preferred corridor design drawings

Appendix D

Junction modelling results

Appendix E

Design options & decisions

Appendix F

Cost estimates

Pete Salvin
Atkins
The Hub
500 Park Avenue
Aztec West
Bristol
BS32 4RZ

pete.salvin@atkinsglobal.com
+447812 319 290