

High Wycombe Town Centre Masterplan

Stage 1 Road Safety Audit

Transport for Buckinghamshire
Wycombe District Council

April 2011

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1 Introduction

1.1 Purpose of Report

The Transport for Buckinghamshire (TfB) Alliance between Buckinghamshire County Council (BCC) and Ringway Jacobs was established for the delivery of all transportation services across the County. Jacobs was commissioned by The Alliance and Wycombe District Council (WDC) in December 2010 to carry out a Stage 1 road safety audit on feasibility stage designs for the High Wycombe Town Centre Masterplan. For the purposes of this report, the scheme is referred to simply as ‘The Masterplan’.

The purpose of this report is to give an account of a Stage1 (feasibility) Road Safety Audit which has been carried out to determine any road safety issues that may have arisen as part of the conceptual scheme design of The Masterplan.

1.2 Background

This is a report of the Stage 1 Road Safety Audit carried out on The Masterplan for High Wycombe town centre. This audit forms part of the conceptual design project which is looking to radically alter the relationship between pedestrians and vehicles in High Wycombe town centre. The concept design for the revised town centre highway network has been developed using guidelines contained within Manual for Streets 1 and 2 which advocate applying a user hierarchy to the design process with pedestrians at the top. This means considering the needs of pedestrians first when designing, building, retrofitting, maintaining and improving streets. This report has therefore reviewed the scheme based on guidance contained within Manual for Streets 1 and 2. The audit was undertaken at the request of Transport for Buckinghamshire (TfB) and Wycombe District Council (WDC).

The audit team	A.Chadwick, Principal Engineer, MSc and M.Pilsbury, BA Hons, Traffic Engineer.	
Documents used	Conceptual Scheme Design Sheets 1 – 6 Conceptual Scheme Design Key Plan	
Audit desktop evaluation	Location: Jacobs Winnersh Office	Date: Thursday 10 th February 2011
Site visit daytime	Site visited by: A.Chadwick and M.Pilsbury. Weather: Light/cloudy/dry.	Date: Friday 11 th February 2011
Site visit night-time	Site visited by: N/A Weather: N/A	Date: N/A

Table 1-A Audit Details

1.3 Methodology

The terms of reference of the audit are based on those described in HD 19/03. HD 19/03 is the standard set by The Department of Transport for the methodology for

carrying out mandatory road safety audits on trunk roads and motorways. Whilst the roads within the area of study for the Masterplan are not trunk roads or motorways, and have not been designed to the standards set out in The Department for Transport's Design Manual for Roads and Bridges,(DMRB) the use of the same methodology set out in the standard ensures that the majority of potential issues connected with road safety can be considered and addressed at an early stage of the design process rather than at the later stages of design, implementation or even post completion which are likely to be much more costly. The use of this safety audit process does not imply that the Masterplan does or should conform to any particular part of the DMRB.

The team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the designs to any other criteria.

Each of the auditors' responses is classified as either a 'comment' or a 'problem'. Items classified as a 'problem' denote matters likely to result in significant road safety hazards. Items marked as 'comments' are less serious, but worthy of consideration by the designer and/or by the overseeing organisation.

Where recommendations are made these do not comprise design decisions, and it remains the responsibility of the design team to incorporate any changes into the scheme, and consider any interactions between design elements. The audit team are not 'designers' within the meaning of the Construction (Design and Management) Regulations 1994.

1.4 The Way Forward

As part of the audit process the issues raised at stage 1 will need to be considered by the design team, any appropriate changes to the design can then be made and incorporated into the detailed design. On completion of the detailed design a Stage 2 Road Safety Audit can then be carried out and this will take on board any changes to the scheme as well as considering the additional information presented as part of this detailed design.

1.5 Structure of Report

This report is set out in six main sections describing the process of the how the scheme has been progressed so far, how this audit and report fit into that process, what has been found from the audit process and how it can be taken forward. The contents of the report are outlined below:

- *Section 1 – overview of the report purpose and study background*
- *Section 2 – review of any previous audits*
- *Section 3 – summary of the type of issues covered and those believed to be appropriate for inclusion*
- *Section 4 – detailed review of issues connected with the preliminary design*
- *Section 5 – audit team statement of independence from the design team*
- *Section 6 – summary of problems identified for consideration by the design team*

2**Items raised at previous Audit and Exception Responses**

A previous safety audit “Development of Gas Works Site – Appraisal of Link Road Design Alignment Option 2: Safety Review” (PBA; January 2009) was carried out on a previous design of Gas Works Link Road.

3 Items raised at this Stage 1 Audit

3.1 Findings

Table 3-A below summarises the findings from this audit, which are described in detail on the following pages.

No.	Item	Comments	Notes
A1	General		
A1.1	Departures from Standards	Comment	The proposed changes are based on guidance from Manual for Streets 1 and 2 and are not based on and do not conform to DMRB standards (see section 1.3). The one exception is the zebra crossing on Queen Alexandra Road which uses DMRB guidance as advised by Manual for Streets 1 and 2.
A1.2	Cross-sections	None	
A1.3	Cross-sectional Variation	None	
A1.4	Drainage	None	
A1.5	Landscaping	None	
A1.6	Public Utilities/Services Apparatus	None	
A1.7	Lay-bys	None	
A1.8	Access	None	
A1.9	Emergency Vehicles	None	
A1.10	Future Widening	None	
A1.11	Adjacent Development	Problem	Traffic was seen queuing to enter Wycombe General Hospital.
A1.12	Basic Design Principles	a) Comment b) Problem c) Comment d) Problem	a) Loss of parking bays along Queen Alexandra Road. b) New build out along Queen Alexandra Road could restrict vehicular access to properties. c) Priority at large junctions. d) Lily's Walk, approach to car park.
A2	Local Alignment		
A2.1	Visibility	None	
A2.2	New/Existing Road Interface	a) Comment b) Comment	a) There are currently no proposals to indicate how the entrances to the new urban realm of the town centre will be emphasised. b) Lily's Walk, proposed design could lead to an

			increase in vehicle speeds.
A2.3	Vertical Alignment	Comment	Steeper gradient on sections of road.

A3	Junctions		
A3.1	Layout	a) Comment b) Comment c) Problem	a) Raised junctions/roundabouts. b) Priority at large junctions. c) Enforcement of left turn only at Lily's Walk/Desborough Road.
A3.2	Visibility	None	
A4	Non Motorised User Provision		
A4.1	Adjacent Land	None	
A4.2	Pedestrians/Cyclists	a) Comment b) Comment c) Comment d) Problem e) Problem	a) Raised junctions/roundabouts. b) Queen Alexandra Road, the existing crossing meets the current desire line. c) Loss of pedestrian crossings. d) Provision for the visually/mobility impaired. e) Existing pedestrian crossing is located very close to car park entrance/exit.
A4.3	Equestrians	None	
A5	Road Signs, Carriageway Markings And Lighting		
A5.1	Signs	Comment	Entrance signs into the zone.
A5.2	Lighting	None	
A5.3	Poles and Columns	None	
A5.4	Road Markings	Comment	Priority at large junctions.

Table 3-A Audit Findings

4 Detail of items raised at this Stage 1 Audit

The tables below show the detailed findings from this audit.

4.1 Comment (Item A1.1) Departures from Standards

Location	Throughout the study area.
Summary	The scheme has been designed using guidance from Manual for Streets 1 and 2 and as such the design (excluding the zebra crossing) is not based on and therefore does not meet DMRB standards.
Description	The scheme has been designed based on guidance from Manual for Streets 1 and 2 whereby there is a greater emphasis on shared space, improved environment for pedestrians and non-motorised users and where vehicular speed is naturally reduced. Therefore this scheme has been designed away from DMRB design principles or regulations. Road markings and signs have been kept to a minimum and pedestrian crossings are informal (with the exception of a zebra crossing on Queen Alexandra Road).
Recommendation	This report will review the scheme based on Manual for Streets 1 and 2 concepts and will highlight areas where the design could create significant confusion or danger to the road users or where the design could prevent The Masterplan from meeting its objectives.

Table 4-A Comment (Item A1.1)

4.2 Problem (Item A1.11) Adjacent Development

Location	Queen Alexandra Road.
Summary	Queuing traffic on the approach to Wycombe General Hospital.
Description	The Masterplan intends to move traffic from the existing road network and onto redesigned existing roads. One of these proposed routes would entail using the Queen Alexandra Road which is also the main access road to Wycombe General Hospital. During the site visit, it was noted that mid-morning the hospital regularly generated queuing traffic on Queen Alexandra Road (up to 4/5 vehicles) as drivers entered the hospital car park (see photo 1). If significant levels of additional traffic were to use this road then further delays could be expected and driver behaviour could become hostile. This could lead to impulsive/reckless driving and possibly result in side swipe or shunt type collisions.
Recommendation	Review traffic data at this location to identify when the busiest times are and what the queue lengths are like. It may well be that the peak times for traffic at the hospital are outside the peak times for general traffic flow. Consider the use of this road and whether or not the hospital entrance can be improved or create more vehicle stacking space within the hospital grounds rather than on Queen Alexandra Road.

Table 4-B Problem (Item A1.11)



Photo 1 - Traffic on Queen Alexandra Road queuing to enter the hospital.

4.3 Comment (Item A1.12a) Basic Design Principles

Location	Queen Alexandra Road, between Loakes Road and Rutland Street.
Summary	It is proposed to relocate the parking bays currently located on the northern side of the carriageway.
Description	It is proposed to move the existing bays to the southern side of the carriageway. The re-location of these bays would significantly reduce the number of parking spaces available as the bays would be adjacent to several properties with dropped kerbs/ driveways (see photo 2). Legally vehicles should not park in front of dropped kerbs and therefore a significant number of spaces will be lost or vehicles may obstruct the driveways. This could involve collisions with parked vehicles as drivers try and enter/exit their properties. Parked vehicles could also reduce the visibility for drivers as they leave their property and enter the carriageway and this could result in side swipe collisions.
Recommendation	Reconsider the need to relocate the bays.

Table 4-C Comment (Item A1.12a)



Photo 2 - It is proposed to locate the bays in front of the properties on the left.

4.4 Problem (Item A1.12b) Basic Design Principles

Location	Queen Alexandra Road/ Suffield Road.
Summary	Proposed new build-out.
Description	The design shows that a build-out is proposed at the junction of Queen Alexandra Road, Suffield Road and the new road linking to Lily's Walk. The design aims to change the main movement of vehicles along the new road rather than along Suffield Road. The build-out in its current position could prevent residents from accessing their driveways. In addition the build-out could encourage pedestrians to cross Queen Alexandra Road where there are a number of vehicle movements. (See photo 3). This could cause conflict between pedestrians and vehicles unless vehicle speeds are reduced.
Recommendation	Provision must be made to accommodate access to existing driveways by either continuing the driveways across the build-out, where this can be done safely or reduce the size of the build-out. Consideration should be give to a raised informal pedestrian crossing near to this location that would encourage reduced vehicle speeds.

Table 4-D Problem (Item A1.12b)



Photo 3 - The proposed layout shows a build-out in front of this driveway.

4.5 Comment (Items A1.12c/A3.1b/A5.4) Basic Design Principles/ Layout/ Road Markings

Location	Throughout the study area.
Summary	Due to a lack of road markings, priority will be difficult to establish.
Description	It is understood that there will be no road markings throughout the area covered by The Masterplan (with a few exceptions). One of the fundamental principles of this type of design is that there is no priority and that this creates a need for all road users to be aware of the movements of other road users. It is noted in MfS 2 that this can be harder to achieve where existing priorities are established and a significant change in streetscape can be required to achieve such a change in driver attitude. This can encourage everyone to be more observant and to take more care. However, this can only be achieved if traffic speeds are kept to a minimum and that all types of traffic are relatively free flowing. The main area of concern is at the junction of West Wycombe Road/Bellfield Road/Oxford Road/Bridge Street. There are likely to be high pedestrian and vehicle flows here due to the close proximity of numerous attractors around this area. There are several turning movements occurring and if traffic speeds are not reduced and excessive traffic speed occurs in this environment the occurrence /severity of collisions could increase.
Recommendation	The successful omission of road markings and traffic controls is dependant on the speed of traffic using the town centre. Consideration should be given to the use of measures to encourage reduced vehicle speeds throughout the scheme but particularly in those areas where greater numbers of manoeuvres take place.

Table 4-E Comment (Items A1.12c/A3.1b/A5.4)

4.6 Problem (Item A1.12d) Basic Design Principles

Location	Lily's Walk.
Summary	Vehicular approach to the existing multi-storey car park.
Description	The design indicates that there will be a dedicated bus lane and a separate general vehicle lane for traffic heading in an easterly direction along Lily's Walk. The bus lane is proposed as being at the northern side of the carriageway, whilst the general eastern bound traffic lane is in the centre of the road. As vehicles enter the car park for the shopping centre they will have to cross over the bus lane which could cause side swipe collisions. The bus lanes will also used by cyclists and two wheeled motor vehicles which can be more difficult to see approaching from the drivers off side. Additionally, if there is congestion as vehicles enter the car park (likely during busy periods) vehicles might queue across the bus lane and consequently delay buses.
Recommendation	Consider switching the two lanes so that buses use the central lane until after the car park entrance, where they then switch back to the northern side of the carriageway.

Table 4-F Problem (Item A1.12d)

4.7 Comment (Items A2.2a/A5.1) New/Existing Road Interface/Signing

Location	Entrances to the new urban realm of the town centre.
Summary	There are currently no proposals to indicate how the entrances to the new urban realm of the town centre will be emphasised.
Description	In order to ensure drivers are aware that they are approaching the new zone and that the speed limit is 20mph there needs to be sufficient signage and a significant change in streetscape to encourage compliance. Every entrance and exit needs to be adequately signed throughout the scheme in order to make sure the change in nature of the zone is emphasised and that vehicle speeds are adequately lowered to reduce the likelihood of collisions.
Recommendation	Provide 'Gateways' on all the entrances and exits to the zone to make drivers aware of the change in conditions and change in priority.

Table 4-G Comment (Items A2.2a/A5.1)

4.8 Comment (Item A2.2b) New/Existing Road Interface

Location	Lily's Walk, outside university.
Summary	Re-alignment of road.
Description	The existing road has been designed in conjunction with the pedestrian area adjacent to Bucks New University. The carriageway area has been treated with the same coloured paving as the footway thus reducing the definition between the areas. The carriageway is narrow and the raised pedestrian area where the existing subway (from Paul's Row) means there is a steady flow of pedestrians. Whilst this is an uncontrolled crossing the nature of the area combined with the strong pedestrian desire line does encourage reduced vehicle speeds. The currently layout is one-way with slight deviations in the road that offer some deflection (see photo 4). The Masterplan proposes to widen the road and make it two-way, although the southbound lane will be a bus lane. The existing design provides very good forward visibility with a gentle curve on the road, this reduced deflection could cause vehicles to travel at increased speeds along this stretch of road and potentially exceed the proposed 20mph speed limit.
Recommendation	During the redesign of this area as a public space/ shared space area features should be retained/introduced to naturally slow traffic or introduce subtle/soft measures in order to reduce forward visibility slightly.

Table 4-H Comment (Item A2.2b)



Photo 4 - The existing layout is narrow with slight bends in the road.

4.9 Comment (Item A2.3) Vertical Alignment

Location	New section of Westbourne Street (approaching West Wycombe Road) and the new road linking Lily's Walk and Queen Alexandra Road.
Summary	Steeper gradient may cause difficulties for less mobile pedestrians or cyclists and may encourage increased vehicle speeds on downward sections.
Description	The two sections of new road are located on quite steep hills although an approximate gradient of 7.5% has now been achieved on the Gas Works Site link. Greater downward gradients can lead to increased vehicle speeds, particularly if a straight horizontal alignment has been used and this could lead to loss of control. It should also be noted that these gradients are likely to be no more excessive than those elsewhere in the locality.
Recommendation	Introduce horizontal deflection where possible to encourage reduced vehicle speeds. When designing any pedestrian/cyclist route signing take into account the gradient at these locations.

Table 4-I Comment (Item A2.3)

4.10 Comment (Items A3.1a/4.2a) Layout/ Pedestrians/ Cyclists

Location	Throughout scheme.
Summary	Raised junction entry treatment.
Description	The proposals indicate that at the junction of Desborough Road and West End Road, as well as at other locations, a raised crossing point is to be introduced across West End Road. Two-wheeled road users can find it difficult to enter a junction, turn and negotiate changes in road level at the same time and this can lead to a loss of control and collisions.
Recommendation	The height of the raised crossings should be kept to a minimum and ramps should not be at an excessive gradient.

Table 4-J Comment (Items A3.1a/4.2a)

4.11 Problem (Item A3.1c) Layout

Location	Lily's Walk/Desborough Road.
Summary	Enforcement of left turn only.
Description	The proposed junction arrangement could enable determined drivers to turn right across the central median. This could result in pedestrian/vehicle or side swipe type collisions as other road users would not be expecting this manoeuvre to be made.
Recommendation	Introduce some form of street furniture/soft landscaping on this central median to prevent this manoeuvre whilst retaining good visibility.

Table 4-K Problem (Item A3.1c)

4.12 Comment (Item A4.2b) Pedestrians/ Cyclists

Location	Queen Alexandra Road (eastern end).
Summary	Proposed pedestrian crossing.
Description	Currently there is one zebra crossing at the entrance/ exit of the roundabout on Queen Alexandra Road that serves the existing desire line for pedestrians walking between Marlow Hill and the town centre (see photo 5). The Masterplan however removes this crossing and introduces two new uncontrolled crossings, away from the Marlow Hill desire line. Whilst this has been done to try and accommodate desire lines between Bucks New University (BNU) and the hospital pedestrians may continue to try and cross near the roundabout and this could result in pedestrian/vehicle collisions.
Recommendation	Consider retaining the existing zebra crossing and removing one of the proposed crossings (east of the Staples car park entrance). Pedestrians using Marlow Hill are unlikely to deviate away from their desire line and walk along Queen Alexandra Road in order to cross the road but this would still provide a pedestrian crossing point for the BNU/hospital desire line.

Table 4-L Comment (Item A4.2b)



Photo 5 - The existing zebra crossing follows the current desire line.

4.13 Comment (Item A4.2c) Pedestrian Crossings

Location	Throughout the scheme.
Summary	Loss of/ lack of controlled pedestrian crossings.
Description	The scheme is based on a concept of shared use where no road users have priority. However, crossings, formal or informal are needed to assist some pedestrians to cross in the safest locations. The proposal shows the existing crossing on Bellfield Road is to be removed and pedestrians could find themselves having to cross two sets of two traffic lanes.
Recommendation	Consider providing a crossing point (informal or formal) into the design on Bellfield Road.

Table 4-M Comment (Item A4.2c)



Photo 6 - The existing pedestrian crossing on Bellfield Road provides access to the Job Centre

4.14 Problem (Item A4.2d) Visually/Mobility Impaired

Location	Throughout scheme.
Summary	Provision for the visually/mobility impaired.
Description	Whilst the detail of provision for the visually/mobility impaired such as tactile paving would not be expected at this stage of the design process, this is an area that needs to be considered. A lack of suitable facilities could lead to pedestrians inadvertently entering the carriageway which could result in pedestrian/vehicle collisions.
Recommendation	Safe crossing points should be provided throughout the scheme with appropriate measures to facilitate their use by the visually/mobility impaired.

Table 4-N Problem (Item A4.2d)

4.15 Problem (Item A4.2e) Pedestrian Crossing

Location	Lily's Walk, west of car park entrance/ exit.
Summary	Location of existing pedestrian crossing.
Description	There is an existing zebra crossing to the west of the Eden Centre car park entrance. During the site visit it was noted that the pedestrian crossing was located very close to the car park exit (see photo 7). Drivers exiting the car park have to consider vehicles approaching from two directions as well as pedestrian movements. The design of the scheme does not look to improve this situation; in fact the situation could worsen with an additional lane being added on Lily's Walk.
Recommendation	Relocate the crossing slightly further away (westward) from its current location.

Table 4-O Problem (Item A4.2e)

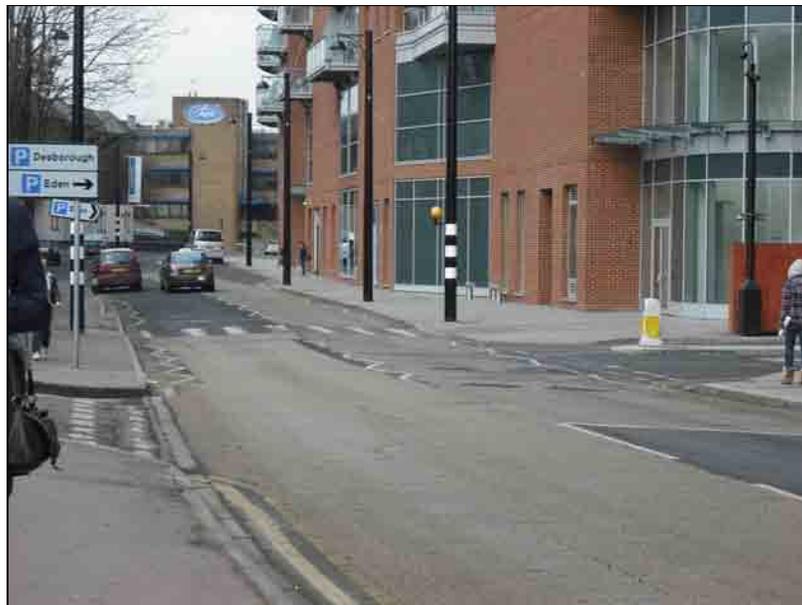


Photo 7 - The existing zebra crossing is located very close to the car park exit.

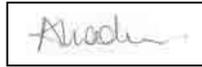
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Audit Team Statement

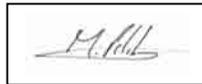
We certify that we have examined the documents listed in this report and have visited the site. The examination has been carried out with the sole purpose of identifying any features of the design that could be removed or modified in order to improve the safety of the scheme. The problems identified in this report together with associated safety improvement suggestions that we recommend should be studied for implementation. No member of the audit team has been involved with the scheme design.

Signed on behalf of Jacobs

A.Chadwick
Principal Engineer
Date 10/03/2011



M. Pilsbury
Engineer
Date 10/03/2011



6 Stage 1 Road Safety Audit – Safety Audit Exception Response

Stage 1 Road Safety Audit SAFETY AUDIT EXCEPTION RESPONSE Scheme Name: High Wycombe Town Centre Masterplan –Conceptual Scheme Design		
The issues categorised in the safety audit as ‘Problem’ matters are those causing serious concern and are summarised below. The purpose of this form is for the scheme designer or Overseeing Organisation to respond to the ‘Problem’ matters. Responses should be sent to: Paul Smith, Divisional Director, Jacobs, 1180 Eskdale Road, Winnersh, Wokingham RG41 5TU ‘Comments’ in the report are made for the benefit of the designer, and are not referred to below.		
Paragraph	Summary of Problem	Designer's Response
4.2	Queuing traffic on the approach to Wycombe General Hospital.	Queuing length to be determined by the Traffic Modelling team. Highway design team is unable to comment on this aspect. Creation of vehicle stacking space and alterations to the hospital entrance layout are currently outside the scope of works. However these can be investigated once agreed with the Client.
4.4	Proposed new build-out on Queen Alexandra Road.	The loss of driveways at the front has been discussed with the Client. The properties have vehicular access at the back. The tight horizontal radius coupled with the vertical gradient of the Gas Works Link Road is anticipated to reduce vehicle speeds sufficiently to allow safe movements by pedestrians. A raised informal crossing point has not been provided at this location as this can lead to grounding of vehicles.
4.6	Vehicular approach to the existing multi-storey car park.	In subsequent revisions to the drawings, the east bound vehicular lane has been switched to the northern side of the carriageway with the bus lane at the centre up to the car park access.

4.11	Enforcement of left turn only.	Street furniture has not been provided at this location as requested by the Client to allow emergency and winter maintenance vehicles to carry on along Lily's Walk and on to Desborough Road. As such an exception is proposed at this location.
4.14	Provision for the visually/mobility impaired.	Safe and convenient crossing points are provided for visually/mobility impaired users by the raised crossings. The exact layout of the crossing facilities e.g. positioning of tactiles, etc. are to be undertaken as the design progresses through the preliminary and detailed design stages.
4.15	Location of existing pedestrian crossing.	An informal raised crossing is provided further west of the existing Zebra crossing.

Table 6-A Safety Audit Exception Response