CAMBRIDGESHIRE COUNTY COUNCIL

ACCIDENT INVESTIGATION TEAM

SAFETY AUDIT
STAGE 3

Scheme: Arbury Park associated highway works

Date of Report: 8th August 2006

Auditor(s): Amanda Mays
Malcolm Mugridge

Information Supplied: No additional plans.

Introduction

The Audit was carried out at the request of:

Name	**Graham Taylor**
Job Title	**Assistant Engineer**
Organisation	**Cambridgeshire County Council**

The terms of reference of the audit are as described in HD 19/03. The audit 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 or design standards. Design standards are quoted only where those standards have road safety implications.

All comments and recommendations are referenced to the detailed design drawings specified above.

Notified Departures from Standard - *None notified*

Scheme outline: *(Description of proposals, reference to appendix or supplementary sketch if required)*. – Improvement and alteration of existing highway and installation of new signalised junctions.

Daytime site visit**:** 31st July 2006

Attending: Amanda Mays, Malcolm Mugridge,
Graham Taylor, John Hillier

Conditions at Visit:
Weather: Fine and dry
Traffic: Steady medium flow.

Other

Nighttime site visit**:** To be arranged

Attending:

Conditions at Visit:
Weather:
Traffic:
Other

Existing Injury Accident Details (Where applicable):

Given the wide variation in the nature of the road through the site the accident records have been split into more relevant sections.

Histon interchange;
The interchange is an accident cluster site on the 2006 list. There have been 11 injury accidents (PIAs) reported between 01/01/2001 and 30/04/2006 (8 slight and 3 serious injuries).
The predominant type(8 of the 11) is rear end shunts.

Cambridge Road and it's junction with Kings Hedges Road;
The junction itself is an accident cluster site on the 2006 list. There have been 11 PIAs reported between 01/01/2001 and 30/04/2006, 9 at the junction and 2 at the farm access to the Old Cambridge Road. All the incidents have been slight injury accidents. Again rear end shunts are the predominant accident type (7 of the 11).
5 incidents involved pedal cycles in some way.

Kings Hedges Road;
All accident number relate to the period 01/01/2001 and 30/04/2006.

There have been 3 PIAs at the junction with Howgate Road.
slight injuries and one serious incident involving a young pedestrian.

There have been 2 slight PIAs involving loss of control in the section between Howgate Road and Arbury Road.

There have been 7 slight PIAs at the junction of Kings Hedges Road, Arbury Road and St Catherine's Square. Most of the incidents are related to turning, or shunts but there is no strong trend towards any one type of accident.

At Buchan Street there has been just one slight injury accident. Involving turning out from the side road.

There have been no recorded PIAs between Buchan Street and Northfield Road.

Items Raised at Previous Audit:

Due to the size and complexity of these works any major outstanding issues will be raised as new points within the main audit.

C1 GENERAL COMMENTS

At the site visit the majority of the works were complete however there were a few items outstanding.

C1.1 Comment

This item relates solely to the A14 trunk road (Highways Agency Road) so is listed here as a comment only.

The Perspex viewing panels within the acoustic fencing are an unusual feature that could potentially be an unexpected distraction for drivers. There is also a potential risk of reflection/dazzle from the sun at certain times of day.

As a regular user of the interchange one of the audit team has been observing the effect of the panels and has so far seen no measurable changes in driver behaviour either eastbound or westbound under free flowing conditions although the panels certainly do momentarily attract the drivers eye when they come into view around the angle of the fence, particularly as they are difficult to see through.

However the situation should be monitored as the level of distraction could increase when active construction works are underway or when traffic is queuing or slow moving.

C1.2 Problem

At the southern kerb line of junction 5 there is a fire hydrant protruding slightly into the carriageway. This could be a hazard particularly for cyclists.

Recommendation

Realign the cover or kerbs to remove the hazard.

C1.3 Problem

In the verge area on the southeast corner of the Arbury Road/ Kings Hedges junction there are electric cables left exposed.

Recommendation

Ensure that any electricity supply has been cut off and terminate the cables properly.

C1.4 Problem

Generally around the works there is quite a lot of debris from the construction. This leaves hazards for motorists, cyclists and pedestrians.

Recommendation

Ensure that any construction related debris is removed; particularly in areas trafficked by vehicles, cyclists or pedestrians.

C2 THE ALIGNMENT

C2.1 Problem

To the east of the 2 new signalised access roads on Kings Hedges Road there are 2 large central islands within the original central hatched area. It is noted that these island have been introduced to prevent overtaking but this could be achieved equally well with smaller islands. The restricted carriageway width can result in problems if drivers attempt to pass cyclists within the pinch point. The county does not normally recommend kerb-to-kerb widths between 3.1m and 3.9m as this range puts cyclists most at risk from inappropriate overtaking.
As pointed out in item B7.1 stage 2 Road Safety Audit report.

Recommendation
Ideally actual kerb to kerb width should not fall within the range 3.1m to 3.9m (4.2m is recommended by some if a high proportion of large vehicles may be expected.)
Using ‘edge lining’ through the pinch point would create a visual narrowing effect. This would reduce the risk of drivers of large vehicles misjudging the gap and trying to overtake too close to cyclists.

C3 NON MOTORISED USERS

C3.1 Problem

The existing cycle path to the east of junction 6 was already quite narrow. The available width has been further reduced by the installation of signal poles. It is noted that this is an existing cycleway but there is available verge width here to allow the path to be widened quite simply, and the contractor has indicated willingness to undertake this as part of the works.

Recommendation
Widen the surfacing past the poles to give a safe width for cyclists.

C3.2 Problem

The Toucan crossings at the Kings Hedges Road accesses are generally quite wide. The Arbury Road junction in particular which is around 17m across. Elderly or infirm pedestrians will need a long time to cross this width safely.

Recommendation
The width of any single leg of crossing should be less than 15m (and ideally less than 11m) as recommended in LTN 2/95. At the Arbury Road crossing consider the extending the length of the central island to create a 2 stage crossing. Where the width is between 11m and

15m provision should be made for extended time within the on crossing detection.

C3.3 Comment

The staggered barriers on the eastern splitter island at junction 4 (Arbury road junction) are installed so that they restrict the pedestrian/cycle route width to 2m. Although this does meet the required minimum this leaves a large area of 'wasted space' on the island, and creates an unnecessary bottleneck. This is likely to be a well used route between the development and the school on Arbury Road so there may be large numbers of children crossing together at school times.

Recommendation

The existing barrier panels could easily be rearranged to give much more space for pedestrians and cyclists using the crossing.

C3.4 Problem

The eastern end of the barrier on the northside of the road at the Howgate crossing stops short of the edge of the path leaving a gap where pedestrians could walk straight out into the carriageway rather than using the crossing.

Recommendation

For the barrier to be fully effective it should be extended to close the gap.

C3.5 Problem

The kerb upstand at controlled crossings should be 0mm to 6mm to ensure that wheelchairs and pedestrians with walking difficulties can use them safely. Several of the crossings have upstands in excess of 6mm.

Recommendation

Ensure that all dropped kerbs at crossings do not exceed 6mm.

C3.6 Problem

At the dedicated left turn lane on Cambridge Road the antiskid stops at the stop line. There is a pedestrian phase on this arm.

Recommendation

Where there is a pedestrian facility the antiskid should extend to the stud line.

C4 SIGNS AND ROAD MARKINGS

C4.1 Problem

On the westbound A14 offslip road the map type ADS sign at the bottom of the slip road (nearside above the acoustic fence) has been offset on its posts to accommodate the fencing works. In this location visibility from the nearside lane is poor.

Recommendation
Slide the sign back across on the mounting posts so that it may be seen properly from the nearside lane.

C4.2 Comment
This item relates solely to the A14 trunk road (Highways Agency Road) so is listed here as a comment only.
The first ADS for this junction is right at the bottom of the slip road and is difficult to see in advance particularly when there are HGVs in the nearside lane. This could lead to late decisions and sudden manoeuvres such as cutting across from lane 2 to take the offslip.

Recommendation
Ensure that an advance direction sign is installed above the acoustic fencing a suitable distance prior to the offslip.

C4.3 Problem
This location is actually on the A14 slip road (Highways Agency Road) but this item may have some effect upon the local authority roads.
On the westbound A14 offslip road there is a wide based post carrying the traffic signals ahead warning sign. This post exceeds the 89mm maximum size for unprotected standard posts on high-speed roads. (High speed refers to 50mph and above).
(The DMRB and IRRRS guidance for protection of roadside hazards and/or use of passively safe signposts is mandatory for the trunk road system)

Recommendation
To comply the post should be either: a) protected with safety barrier, b) changed for a passively safe alternative (proprietary ‘passive’ type or less than 89mm standard post) or c) relocated more than 4.5m from the carriageway edge.

C4.4 Problem
On the northeast corner of the large splitter island on Cambridge Road there is a wide based post carrying the direction sign. This post exceeds the 89mm maximum size for unprotected standard posts on high-speed roads. (High speed refers to 50mph and above).
(The DMRB and IRRRS guidance for protection of roadside hazards and/or use of passively safe signposts is county policy/good practice although it is not mandatory for non trunk roads)
The original direction sign still remains in position, and is in poor condition. This means there are several posts in close proximity. Multiple posts increase the potential damage to any errant vehicle.
Barrier would not be appropriate in this location, and it would be difficult to locate the sign more than 4.5m from all carriageways.

Recommendation
The circulatory carriageway is technically derestricted however actual traffic speeds are likely to be well below 50mph. The risks associated

with a large based post here are acceptable in light of actual traffic speeds, and conditions. Replacing the posts in this location between 2 carriageways with a safety barrier or shear off posts would create safety issues of comparable scale, and would also add to costs for no benefit. The old direction signposts should be removed.

C4.5 Comment

On the southbound Cambridge Road between the interchange and Kings Hedges Road there are 2 large direction signs/lane discipline signs. These signs give almost identical information and are quite close together. Removing the northernmost sign would reduce clutter and give a simpler message.

C4.6 Problem

The splitter hatching alongside the dedicated left lane into Kings hedges Road leads directly into the corner of the kerbed island.

Recommendation

Remark the line around 200mm further out to guide the driver or rider past the kerbs.

C4.7 Problem

Several of the blue and white cycling signs are incorrect, and some give a misleading impression about the status of the shared use paths or the carriageway.

E.g. At the southeastern corner of Kings Hedges Road/ Cambridge Road junction and also near Howgate Road there are cycling prohibited signs (diag 951), it appears that these should be end of cycle route signs (diag 965).

Recommendation

Use correct signage as per the TSRGD for all cycle routes, lanes and paths.

C4.8 Problem

There are a few areas where the markings are not quite complete. i.e. the hatching/chevrons between eastbound lanes at junction 6 are missing, and there are 3 white lines on the westbound approach to junction 4 that should be removed. These were discussed on site with the Engineers Technical Director.

Recommendation

Complete any missing lines and remark any incorrect ones as discussed.

C4.9 Problem

Some of the temporary signing ‘New Road layout ahead’ are mounted too low over the foot/cycleways.

There is also a cycleway direction sign mounted too low over the section of path between Howgate Road and Cambridge Road.

Recommendation
Ensure that sign mounting height over footways are at least 2.1m (2.4m minimum (and ideally 2.7m which is the city standard) for cycle/footways)

C4.10 Comment
The markings on the circulatory carriageway have been adjusted and now generally work well for most traffic. There are still some potential concerns regarding traffic using the interchange form the A14 slip roads. The audit/signals teams may wish to discuss these with the designer/contractor in more detail.

C5 SIGNALS AND LIGHTING

C5.1 Comment
The installation was substantially complete at the time of the site visit. But the level of traffic from the side roads is obviously very low compared to the anticipated final traffic flows.

C5.2 Comment
At the site visit there was significant damage to 2 of the signals poles. These were as a result of RTAs and repair is the responsibility of the County Council, so these are not raised as comments in this report.

C5.3 Comment
Lighting is installed and appears to be of good standard this will be confirmed at the night time visit for the full stage 3.

C5.4 Comment
The general public is not currently using signalised junction the At the main Arbury Road/Arbury Park access. However it was noted that that a great proportion of the workmen who are using this junction to leave the site were not complying with the primary stop line. Most were driving over the pedestrian crossing and stopping at the secondary stop line.
Given that this is currently a site access and the Toucan crossings are not yet operational the current situation may not represent the way the finished junction will operate, and a similar behaviour was also seen at one of the eastern junctions where there is only a single stop line. However it does highlight a potential problem. Further action or monitoring may be required if the non-compliance is becomes a long-term issue.

C5.5 Problem
At junction 6 (road 8) visibility to the signal head for westbound traffic on Kings Hedges Road is restricted by vegetation.

Recommendation
Trim back any vegetation and ensure that the maintenance regime is sufficient to avoid repetition of the problem.

C5.6 Problem

The current county standard distance between the stop line and studs where there are pedestrian facilities is 3m (as stated in TA5/05). At some facilities the distance is less than this.

Recommendation

Where possible the distance between the studs and the stopline should be at least 3m.

C5.7 Problem

The positioning of push button units is important for optimum pedestrian safety. Generally the units are quite well positioned however at least 2 units on the side road crossing points are positioned more than the recommended 600mm from the edge of the tactile paving.

Recommendation

All push button units for pedestrian crossing must be within arms length (600mm maximum) of the tactile paving.

C5.8 Problem

At the junction with Road 6 the signal loop cables are exposed making them susceptible to damage.

Recommendation

Carry out the necessary remedial works.

C5.9 Comment

There is some potential for confusion and false starts at the junction 4 exit from Arbury Park due to the different timings for the dedicated turn arrows.

Recommendation

Louvers on the primary head and also those on poles 15 and 17 would reduce this risk.

C5.10 Problem

Visibility to the primary signal head at junction 3 (one way entry only junction) is restricted by a lamp column and one way arrow sign.

Recommendation

There must be 90m minimum clear visibility to primary signal heads. Relocate the signal or the column to provide this minimum distance.

C5.11 Problem

A few lamp columns are located in the new areas of cycleway/footway at the western end of the site. These could be a hazard particularly at night.

Recommendation

Where possible street furniture should be located on the edges of paths and cycleways.

The lamps in question are generally set around 3m back from the carriageway on paths with a total width of 3.5m. These short sections of slightly reduced width are likely to be acceptable, however reflective strips or bands should be used to improve conspicuity of any obstruction at night.

Audit Team Statement

We certify that we have examined the drawings and documents listed at the commencement of this report. 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 have been noted in this report together with associated safety improvement suggestions which we recommend should be studied for implementation. No one in the Audit Team has been involved with the scheme design.

Amanda Mays
Accident Investigation Team
Office of Environment & Community Services
ET1018
Cambridgeshire County Council
Shire Hall
Cambridge
CB3 0AP

Signed ----------

Date ----------

Malcolm Mugridge
Accident Investigation Team
Office of Environment & Community Services
Cambridgeshire County Council
ET1018
Shire Hall
Cambridge
CB3 0AP

Signed ----------

Date ----------

CAMBRIDGESHIRE COUNTY COUNCIL
ACCIDENT INVESTIGATION TEAM

RESPONSE TO STAGE 3 SAFETY AUDIT

Scheme: ----------

Date of Report: ----------

Auditor(s): ----------

The Audit was carried out at the request of:

Name ----------

Job Title ----------

Organisation ----------

Please give your comments on the points raised in the audit in the table below, continuing on the attached sheet as necessary. For CCC personnel, this form is also available electronically in the '*ET Shared/Accinv/Audit Responses*' folder, or a copy may be obtained by emailing Sue.Parsons@cambridgeshire.gov.uk.

Item Reference	***Accepted (Y/N)***	***Action Taken/Reasons for Non-Compliance***

Respondent's Name

Signed ----------

Date ----------

Received by Audit Team

Date ----------

Item Reference	***Accepted (Y/N)***	***Comments***