

PROJECT: EURO-AUDITS

**THE EUROPEAN ROAD SAFETY AUDITOR
TRAINING SYLLABUS**

APPENDIX C – DOCUMENT TEMPLATES

October 2007



A European Commission co-funded project

Appendix C

Document Templates

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Delegate Feedback Form

[Introductory / Advanced] Road Safety Audit Course [dates of course]

Please complete the form and hand in at the end of the session.

Session	poor	fair	good	excellent	Comments

Seminar Room					
Catering					

where applicable

Accommodation - Where did you stay?					
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Any other comments on the course content/presentation

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Any other topics you would be interested in

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Thank you for attending the course and taking the time to complete this form

Evaluation Review Form

[Introductory / Advanced] Road Safety Audit Course [dates of course]

Session	Poor	Fair	Good	Excellent	Comments on the relevance/ content

Seminar Room					
Catering					

where applicable

Accommodation - where did you stay?					
--	--	--	--	--	--

Any other comments on the course content/presentation

Road Safety Audit Brief

Scheme name: Stage:

Information supplied (tick as appropriate):

Design brief	
A3 / A4 location plan	
Scheme drawings (list separately)	
Other details (list separately)	
Departures from Standard	
Accident data	
Traffic survey data	
Previous Audit Reports	
Previous Exception Reports	
Other information (list separately)	

Feasibility Stage Checklist

Site visit		
Date:	Day:	Time:
Location:		
Site Conditions:		
Scheme Summary:		

Audit Team Leader:
Audit Team Members:
Observer(s):
Others present:

General

Geographical location	
Is the location liable to landslide, flooding, avalanche, etc.	

Consistency of standards	
Is the standard consistent with the adjacent road network, especially at tie-ins?	

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Secondary effects	
Are there likely to be any secondary effects on the surrounding road network?	

Preferred option	
Likely safety performance in relation to alternative options.	

Routes

Topography	
Could local topography conflict with sight lines?	

Standard of route	
What are the safety implications of design flows and speed?	

Junction arrangements	
Are the types of junctions consistent with the adjacent network? Are they appropriate to the class and volume of traffic likely to use them? Are the distances between junctions/accesses (public and private) appropriate? Are horizontal and vertical alignments consistent with visibility requirements, both on links and at junctions?	

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Non-motorised road users	
Are facilities to be provided for pedestrians, cyclists and equestrians? Will the scheme have an adverse effect on safe use of adjacent land?	

Special provisions	
Is there provision for peculiar aspects of traffic composition (e.g. a high level of use by a particular type of road user) or environment (e.g. glare at sunrise/sunset, fog or wind)?	

Area Schemes

Safety Plan	
Is the scheme consistent with the overall area safety plan?	

Designated function	
Is the scheme consistent with the designation of functions within the road hierarchy?	

Other observations

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Draft Design Stage Checklist

Site visit		
Date:	Day:	Time:
Location:		
Site Conditions:		
Scheme Summary:		

Audit Team Leader:
Audit Team Members:
Observer(s):
Others present:

General	
Departures from Standards	
Are there any adverse road safety implications of any Departures from Standards or Relaxations?	

Cross-sections	
How safely do the cross-sections accommodate drainage, ducting, signing, fencing, lighting and pedestrian and cycle routes?	

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Cross-sectional Variation	
What are the road safety implications if the standard of the proposed scheme differs from adjacent lengths?	
Drainage	
Will the new road drain adequately?	
Landscaping	
Could areas of landscaping conflict with sight lines (including during windy conditions)?	
Public Utilities / Services Apparatus	
Have the road safety implications been considered?	
Lay-bys	
Has adequate provision been made for vehicles to stop off the carriageway, including picnic areas?	

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Access	
Can all accesses be used safely? Can multiple accesses be linked into one service road? Are there any conflicts between turning and parked vehicles?	
Emergency Vehicles	
Has provision been made for safe access by emergency vehicles?	
Future Widening	
Where a single carriageway scheme is to form part of a future dual-carriageway, is it clear to road users that the road is for two-way traffic?	
Adjacent Development	
Does adjacent development cause interference / confusion? E.g. lighting or traffic signals on adjacent road may affect a road user's perception of the road ahead.	
Basic Design Principles	
Are the overall design principles appropriate for the predicted level of use for all road users?	

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Local Alignment

Visibility	
------------	--

Are horizontal and vertical alignments consistent with required visibility?
 Will sight lines be obstructed by permanent or temporary features, e.g. bridge abutments or parked vehicles?

New / Existing Road Interface	
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Will the proposed scheme be consistent with standards on adjacent lengths of road and, if not, is this made obvious to the road user?
 Does interface occur near any hazard, e.g. crest, bend after steep gradient?

Vertical Alignment	
--------------------	--

Are climbing lanes provided?

Junctions

Layout	
--------	--

Is provision for right-turning vehicles required?
 Are acceleration / deceleration lanes required?
 Are splitter islands required on minor arms to assist pedestrians or formalise road user's movements to or from the junction?
 Are there any unusual features that affect road safety?
 Are widths and swept paths adequate for all road users? Will large vehicles overrun pedestrian or cycle facilities?
 Are there any conflicts between turning and parked vehicles?
 Are any junctions sited on a crest?

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Visibility	
Are sight lines adequate on and through junction approaches and from the minor arm? Are visibility splays adequate and clear of obstructions, such as street furniture and landscaping?	

Non-motorised user provision

Adjacent Land	
Will the scheme have an adverse effect on safe use of adjacent land?	

Pedestrians / Cyclists	
Have pedestrian and cycle routes been provided where required? Do shared facilities take account of the needs of all user groups? Can verge strip dividing footways and carriageways be provided? Where footpaths have been diverted, will the new alignment permit the same users free access? Are footbridges / subways sited to attract maximum use? Is specific provision required for special and vulnerable groups, i.e. the young, elderly, mobility and sight impaired? Are tactile paving, flush kerbs and guard railing proposed? Is it specified correctly and in the best location? Have needs been considered, especially at junctions? Are these routes clear of obstructions, such as signposts, lamp columns, etc?	

Equestrians	
Have needs been considered? Does the scheme involve the diversion of bridleways?	

Road Signs, Carriageway Markings and Lighting

Signs	
Are sign gantries needed?	

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Lighting	
Is scheme to be lit? Has lighting been considered at new junctions and where tying in to existing roads? Are lighting columns located in the best positions, e.g. behind safety fences?	

Poles / Columns	
Will poles / columns be appropriately located and protected?	

Road Markings	
Are any road markings proposed at this stage appropriate?	

Other observations

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Detailed Design Stage Checklist

The audit team should satisfy itself that all issues raised at Stage 1 have been resolved. Items may require further consideration where significant design changes have occurred.

If a scheme has not been subject to a Stage 1 audit, the items listed in Stage 1 Checklist should be considered as well as the items listed below.

Site visit		
Date:	Day:	Time:
Location:		
Site Conditions:		
Scheme Summary:		

Audit Team Leader:
Audit Team Members:
Observer(s):
Others present:

General	
Departures from Standards	
Consider the road safety implications of any Departures granted since Stage 1.	

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Drainage	
<p>Do drainage facilities (e.g. gully spacing, flatspots, crossfall, ditches) appear to be adequate? Do features, such as gullies obstruct cycle routes, footpaths or equestrian routes? Do locations of features, such as manhole covers give concern for motorcyclist / cyclist stability?</p>	
Climactic Conditions	
<p>Is there a need for specific provision to mitigate effects of fog, wind, sun glare, snow or icing?</p>	
Landscaping	
<p>Could planting (new or when mature) encroach onto carriageway or obscure signs or sight lines (including during windy conditions)? Could mounding obscure signs or visibility? Could trees (new or when mature) be a hazard to a vehicle leaving the carriageway? Could planting affect lighting or shed leaves onto the carriageway? Can maintenance vehicles stop clear of traffic lanes?</p>	
Public Utilities / Services Apparatus	
<p>Can maintenance vehicles stop clear of traffic lanes? If so, could they obscure signs or sight lines? Are boxes, pillars, posts and cabinets located in safe positions? Do they interfere with visibility? Has sufficient clearance of overhead cables been provided? Have any special accesses / parking areas been provided and are they safe?</p>	
Lay-bys	
<p>Have lay-bys been positioned safely? Could parked vehicles obscure sight lines? Have lay-bys been adequately signed? Are picnic areas properly segregated from vehicular traffic?</p>	

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Access	
<p>Is the visibility to and from the access adequate? Are the accesses of adequate length to ensure all vehicles clear the main carriageway? Do all accesses appear safe for their intended use?</p>	
Skid Resistance	
<p>Are there locations where a high skid resistance surfacing would be beneficial, e.g. on approaches to junctions and crossings? Do surface changes occur at locations where they could adversely affect motorcycle stability?</p>	
Agriculture	
<p>Have the needs of agricultural vehicles and plant been taken into consideration (e.g. room to stop between carriageway and gate, facilities for turning on dual-carriageways)? Are such facilities safe to use and are they adequately signed?</p>	
Fences and Road Restraint Systems	
<p>Is there a need for road restraint systems to protect road users from signs, gantries, abutments, steep embankments or water hazards? Do the restraint systems provided give adequate protection? Are the restraint systems long enough?</p>	
Adjacent Developments and Roads	
<p>Has screening been provided to avoid headlamp glare between opposing carriageways, or any distraction to road users? Are there any safety issues relating to the provision of environmental barriers or screens?</p>	

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Local Alignment

Visibility	
Obstruction of sight lines by: <ul style="list-style-type: none"> a) Safety fences b) Boundary fences c) Street furniture d) Parking facilities e) Signs f) Landscaping g) Structures h) Environmental barriers i) Crests j) Features such as buildings, plant or materials outside the highway boundary Is the forward visibility of at-grade crossings sufficient to ensure they are conspicuous?	

New / Existing Road Interface	
Where a new road scheme joins an existing road, or where an on-line improvement is to be constructed, will the transition give rise to potential hazards? Where environment changes (e.g. urban to rural, restricted to unrestricted), is the transition made obvious by signing and carriageway markings?	

Junctions

Layout	
Are the junctions and accesses adequate for all vehicular movements? Are there any unusual features, which may have an adverse effect on road safety? Have guard rails / safety fences been provided where appropriate? Do any roadside features (e.g. guard rails, safety fences, signs or traffic signals) intrude into the driver's line of sight? Are splitter islands and bollards required on minor arms to assist pedestrians or formalise road users' movements to or from the junction? Are parking or stopping zones for buses, taxis and public utilities' vehicles situated within the junction area? Are they located outside visibility splays?	

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Visibility	
Are sight lines adequate at and through the junctions and from minor roads? Are visibility splays clear of obstruction?	
Signing	
Is the junction signing adequate and easily understood? Have the appropriate warning signs been provided? Are signs appropriately located and of the appropriate size for approach speeds? Are sign posts protected by safety barriers, where appropriate?	
Road Markings	
Do the carriageway markings clearly define routes and priorities? Are the dimensions of the markings appropriate for the speed limit of the road? Have old road markings and road studs been adequately removed?	
T, X and Y Junctions	
Have ghost islands and refuges been provided where required? Do junctions have adequate stacking space for turning movements? Can staggered crossroads accommodate all vehicle types and movements?	
All Roundabouts	
Are the deflection angles of approach roads adequate for the likely approach speed? Are splitter islands necessary? Is visibility on approach adequate to ensure drivers can perceive the correct path through the junction? Is there a need for chevron signs? Are dedicated approach lanes required? If provided, will the road markings and signs be clear to all users?	

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Mini Roundabouts	
Are the approach speeds for each arm likely to be appropriate for a mini roundabout? Is the centre island visible from all approaches?	
Traffic Signals	
Will speed discrimination equipment be required? Is the advance signing adequate? Are signals clearly visible in relation to the likely approach speeds? Is “see-through” likely to be a problem? Would lantern filters assist? Is the visibility of signals likely to be affected by sunrise / sunset? Would high intensity signals and / or backing boards improve visibility? Would high-level signal units be of value? Are the markings for right-turning vehicles adequate? Is there a need for box junction markings? Is the phasing appropriate? Will pedestrian / cyclist phases be needed? Does the number of exit lanes equal the number of approach lanes? If not, is the taper length adequate? Is the required junction inter-visibility provided?	
Adjacent Land	
Are accesses to and from adjacent land / properties safe to use? Has adjacent land been suitably fenced?	

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Pedestrians	
<p>Are facilities required for NMUs at:</p> <ul style="list-style-type: none"> a) Junctions b) Pelican / zebra crossings c) Refuges d) Other locations? <p>Are crossing facilities placed and designed to attract maximum use?</p> <p>Are guard rails / fencing present / required to deter pedestrians from crossing the road at unsafe locations?</p> <p>For each type of crossing (bridges, subways, at-grade) have the following been fully considered:</p> <ul style="list-style-type: none"> a) Visibility both by and of pedestrians b) Use by mobility and sight impaired c) Use by elderly d) Use by children / schools e) Need for guard rails in verges / central reserve f) Signs g) Width and gradient h) Surfacing i) Provision of dropped kerbs j) Avoidance of channels and gullies k) Need for deterrent kerbing l) Need for lighting 	
Cyclists	
<p>Have the needs of cyclists been considered, especially at junctions and roundabouts?</p> <p>Are cycle lanes or segregated cycle tracks required?</p> <p>Does the signing make clear the intended use of such facilities?</p> <p>Are cycle crossings adequately signed?</p> <p>Do guard rails need to be provided to make cyclists slow down or dismount at junctions / crossings?</p> <p>Has lighting been provided on cycle routes?</p>	
Equestrians	
<p>Should bridleways or shared facilities be provided?</p> <p>Does the signing make clear the intended use of such paths and is sufficient local signing provided to attract users?</p> <p>Have suitable parapets / rails been provided where necessary?</p>	

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Road signs, carriageway markings and lighting

ADS and Local Traffic Signs	
<p>Do destinations shown accord with signing policy? Are signs easy to understand? Are the signs located behind safety fencing and out of the way of pedestrians and cyclists? Is there a need for overhead signs? Where overhead signs are necessary, is there sufficient headroom to enable designated NMU usage? Do signs need reflectorisation where the road is unlit and is the facing material appropriate for the location?</p>	
Variable Message Signs	
<p>Are the legends relevant and easily understood? Are signs located behind safety fencing?</p>	
Lighting	
<p>Has lighting been considered at new junctions and where joining with existing roads? Is there a need for lighting, including lighting of signs and bollards? Are lighting columns located in the best positions, e.g. behind safety fences and not obstructing NMU routes?</p>	
Road Markings	
<p>Are road markings appropriate to location?</p> <ul style="list-style-type: none"> a) Centre lines b) Edge lines c) Hatching d) Studs e) Text / destinations f) Approved and / or conform to the regulations 	

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Poles and Columns	
Are poles and columns protected by safety fencing where appropriate?	

Other observations

Pre-opening Stage Checklist

The Audit Team should consider whether the design has been properly translated into the scheme as constructed and that no inherent road safety defect has been incorporated into the works.

Particular attention should be paid to design changes, which have occurred during construction.

Site visit		
Date:	Day:	Time:
Location:		
Site Conditions:		
Scheme Summary:		

Audit Team Leader:
Audit Team Members:
Observer(s):
Others present:

General	
Departures from Standards	
Are there any adverse road safety implications of any departures granted since Stage 2?	

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Drainage	
Does drainage of roads, cycle routes and footpaths appear adequate? Do drainage features, such as gullies obstruct footpaths, cycle routes or equestrian routes?	
Climatic Conditions	
Are there any extraordinary measures required?	
Landscaping	
Could planting obscure signs or sight lines (including during periods of windy weather)? Does mounding obscure signs or visibility?	
Public Utilities	
Have boxes, pillars, posts and cabinets been located so that they don't obscure visibility?	
Access	
Is the visibility to / from access adequate? Are accesses of adequate length to ensure all vehicles clear the main carriageway?	

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Skid Resistance	
Do any joints in the surfacing appear to have excessive bleeding or low skid resistance? Do surface changes occur at locations where they could adversely affect motorcycle stability?	
Fences and Road Restraint Systems	
Is the restraint system adequate? In the case of wooden post and rail boundary fences, are the rails placed on the non-traffic side of the posts?	
Adjacent Development	
Have environmental barriers been provided and do they create a hazard?	
Bridge Parapets	
Is the projection of any attachment excessive?	
Network Management	
Have appropriate signs and / or markings been installed in respect of Traffic Regulation Orders?	
Visibility	
Are the sight lines clear of obstruction?	

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New / Existing Road Interface	
Is there a need for additional signs and / or road markings?	

Junctions

Visibility	
Are all visibility splays clear of obstructions?	

Road Markings	
Do the carriageway markings clearly define routes and priorities? Have all superseded road markings and studs been removed adequately?	

Roundabouts	
Can the junction be seen from appropriate distances and is the signing adequate?	

Traffic Signals	
Can the signals be seen from appropriate distances? Can drivers see signals for opposing traffic? For the operation of signals: a) Do phases correspond to the design? b) Do pedestrian phases give adequate crossing time?	

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T, X and Y Junctions	
Are priorities clearly defined? Is signing adequate?	

Non-Motorised User Provision

Adjacent Land	
Has suitable fencing been provided?	

Pedestrians	
Are the following adequate for each type of crossing (bridges, subways, at grade)? a) visibility b) signs; c) surfacing; d) other guardrails; e) drop kerbing or flush surfaces; f) tactile paving.	

Cyclists	
Do the following provide sufficient levels of road safety for cyclists on, or crossing the road? a) visibility; b) signs; c) guardrails; d) drop kerbing or flush surfaces; e) surfacing; f) tactile paving.	

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Equestrians	
Do the following provide sufficient levels of road safety for equestrians? a) visibility b) signs; c) guardrails.	

Road Signs, Carriageway Markings and Lighting

Signs	
Are the visibility, locations and legibility of all signs (during daylight and darkness) adequate? Are signposts protected from vehicle impact? Will signposts impede the safe and convenient passage of pedestrians and cyclists? Have additional warning signs been provided where necessary?	


Variable Message Signs	
Can VMS be read and easily understood at distances appropriate for vehicle speeds? Are they adequately protected from vehicle impact?	

Lighting	
Does the street lighting provide adequate illumination of roadside features, road markings and non-vehicular users to drivers? Is the level of illumination adequate for the road safety of non-motor vehicle users?	

Carriageway Markings	
Are all road markings / studs clear and appropriate for their location? Have all superseded road markings and studs been removed adequately?	

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Other observations

A large, empty rectangular box with a thin black border, intended for recording observations. It occupies the central portion of the page.

Early Operation Stage Checklist

Safety performance monitoring of a new scheme should take place after the first year of operation of a new scheme, and again after three years of operation. It should follow the following process:

- Collect accident data for 12/36 month period from the commencement of operation of the scheme.
- Prepare an accident monitoring report.
- Analyse the accident record in detail to identify:
 - The locations at which personal injury accidents have occurred;
 - Common contributory factors/causes of personal injury accidents.
- Identify any changes in the accident variables and compare with control data.
- Visit the site and record any identified safety issues as per the Pre-opening Stage Checklist.
- Identify the influence of any problems and recommendations identified at previous audit stages, and any Exception Reports.
- Identify any road safety problems indicated by the accident data analysis and site observations.
- Make recommendations for remedial action.

Road Safety Audit Comment Sheet

Page ... of ...

Scheme name: Stage:

Auditor: Date:

Plan No.	Comment	Comment discussed	Comment included	Reason not included

Road Safety Audit Report Template

LOCATION

SCHEME NAME

ROAD SAFETY AUDIT STAGE [audit stage]

Ref:

**LOCATION
SCHEME NAME**

ROAD SAFETY AUDIT STAGE [audit stage]

1. INTRODUCTION

1.1 This report describes a Stage [audit stage] Road Safety Audit carried out [summary of scheme], on behalf of [client]. The audit was carried out on [date] in the offices of [auditing organisation].

1.2 The audit team members were as follows:-

[name of lead auditor], [qualifications];

[title], [name of organisation].

[name of second auditor], [qualifications];

[title], [name of organisation].

1.3 (except for Stage 3)

The audit comprised an examination of the drawings and other information relating to the scheme supplied by the design office (as listed in Appendix A). Information not available at the time of the audit was [information not available (delete if not applicable)]. The site was visited by the Audit Team on [date of site visit]. The weather was [weather conditions]. The traffic conditions were [traffic conditions].

1.3 (alternative format for stage 3)

The audit comprised a daylight examination of the site by the Audit Team on [date and time of daylight site visit]. The weather was [weather conditions]. The traffic conditions were [traffic conditions].

Also present during the daylight examination was/were:

- [name and organisation of other person present]
- [name and organisation of other person present]

The Audit Team visited the site during darkness on [date and time of night site visit]. The weather was [weather conditions]. The traffic conditions were [traffic conditions].

1.4 The terms of reference of the audit are as described in [current standard]. 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 design to any other criteria. A Stage [previous audit stage] Road Safety Audit was carried out by [auditing organisation] in [month and year of previous RSA], (reference number [RSA reference number]).

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1.5 All of the problems described in this report are considered by the audit team to require action in order to improve the safety of the scheme and minimise accident occurrence. The locations of the problems are referenced on the plan in Appendix B.

1.6 [scheme description]

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2. ITEMS RESULTING FROM THIS STAGE 2 AUDIT

(Split into sections below, if necessary, or present problems in order they are encountered, progressing along the length of the scheme)

2.1 GENERAL

2.2 LOCAL ALIGNMENT

2.3 JUNCTIONS

2.4 NON-MOTORISED USERS

2.5 SIGNS AND ROAD MARKINGS

2.6 LIGHTING

2.1 PROBLEM

Location 2.1 – [Describe location]

Summary: [summarise accident problem]

[detailed description of road safety problem, including who is at risk and why]

RECOMMENDATION

[recommended measures to address the problem]

2.2 PROBLEM

Location 2.1 – [Describe location]

Summary: [summarise accident problem]

[detailed description of road safety problem, including who is at risk and why]

RECOMMENDATION

[recommended measures to address the problem]

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3. AUDIT TEAM STATEMENT

I certify that this audit has generally been carried out in accordance with [current standard].

AUDIT TEAM LEADER: (author of report)

[name of lead auditor], [qualifications];

[title], [name of organisation].

signed.....

date.....

AUDIT TEAM MEMBER:

[name of second auditor], [qualifications];

[title], [name of organisation].

[name, full address and contact details of auditing organisation]

APPENDIX A

List of Drawings Examined:

- Drawing No. [drawing number, including revision]
- Drawing No. [drawing number, including revision]

Other Information Provided:

- [other information provided (delete as necessary)]
- [other information provided (delete as necessary)]

APPENDIX B

Plan attached showing the locations of the problems identified as part of this audit (location numbers refer to paragraph numbers in the report).

Exception Report Template

[LOCATION]

[SCHEME NAME]

ROAD SAFETY AUDIT STAGE [Audit Stage]

EXCEPTION REPORT

Ref:

[LOCATION]
[SCHEME NAME]

ROAD SAFETY AUDIT STAGE [Audit Stage]

EXCEPTION REPORT

1. ROAD SAFETY AUDIT EXCEPTION REPORT

- 1.1 This Exception Report refers to a Stage [Audit Stage] Road Safety Audit Report, reference number [Ref. No.] submitted by [Auditing Organisation] and to those recommendations within that report that the Project Sponsor proposes should not be implemented.
- 1.2 A copy of Road Safety Audit Report, reference number [Ref. No.] is reproduced as **Appendix 1** to this report.
- 1.3 [scheme description]

2. ROAD SAFETY AUDIT STAGE [Audit Stage]

2.1 PROBLEM

Location 2.1 – [As per Audit Report]

Summary: [As per Audit Report]

Response:

[reasons for the recommendation not to be implemented]

2.2 PROBLEM

Location 2.1 – [As per Audit Report]

Summary: [As per Audit Report]

Response:

[reasons for the recommendation not to be implemented]

3. Signed:

PROJECT SPONSOR: (*author of report*)

[name], [qualifications];

[title], [name of organisation].

signed.....

date.....

4. Exception Report submitted to:

DIRECTOR, OVERSEEING ORGANISATION:

date.....

5. Copies of Exception Report to:

DESIGN TEAM:

date.....

AUDIT TEAM LEADER:

date.....

APPENDIX A

ROAD SAFETY AUDIT STAGE [Audit Stage]

Ref:

Specimen Road Safety Audit Report

BRIDGE ROAD PROPOSED ROUNDABOUT

ROAD SAFETY AUDIT STAGE 2

Ref: 0000

BRIDGE ROAD PROPOSED ROUNDABOUT

ROAD SAFETY AUDIT STAGE 2

1. INTRODUCTION

1.1 This report describes a Stage 2 Road Safety Audit carried out on a proposed roundabout at Bridge Road, Badtown, on behalf of Badshire County Council. The audit was carried out on 13 February 2007 in the offices of TMS Consultancy.

1.2 The audit team members were as follows:-

Harminder Aulak, BSc (Hons), IEng, FIHIE, MCIT, MILT;
Senior Engineer, TMS Consultancy

Martin Belcher, BSc, CEng, MICE;
Director, TMS Consultancy

1.3 The audit comprised an examination of the drawings and other information relating to the scheme supplied by the design office (as listed in **Appendix A**). Information on drainage and landscaping was not available to the audit team.

The site was visited by both members of the Audit Team at 10.00 hours on 10 February 2007. The weather was fine and dry. The traffic conditions were light.

1.4 The terms of reference of the audit are as described in HD 19/03. 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 design to any other criteria. A Stage 1 audit was carried out by TMS Consultancy in October 2005 (TMS Report No. 3222).

1.5 All of the problems described in this report are considered by the audit team to require action in order to improve the safety of the scheme and minimise accident occurrence. The locations of the problems are referenced on the plan in **Appendix B**.

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- 1.6 The scheme consists of a four-arm roundabout at the junction of Bridge Road and the A222 in Badtown. The roundabout replaces an existing priority junction, and is being constructed to improve capacity at this junction.

2. ITEMS RESULTING FROM THIS STAGE 2 AUDIT

2.1 Problem

Location A: north-west bound approach to the roundabout

Summary: risk of overshoot or rear end shunt accidents

As the north-west bound approach to the roundabout curves to the left, the stopping sight distance to the give way line lies across the nearside verge. The hedge along the verge will obstruct the stopping sight distance, which could result in overshoot or shunt type accidents.

Recommendation

It is important that the hedge along the nearside verge is removed over the appropriate distance to ensure the stopping sight distance (SSD) is not obstructed (SSD of 215m is required for a 100kph design speed).

2.2 Problem

Location A: north-west bound approach to the roundabout

Summary: risk of overshoot accidents

The chevron and turn left signs (Diagram 515 and 606) on the north-west bound approach to the roundabout are not in the direct line of sight for approaching drivers. Drivers may not judge the distance to the roundabout correctly resulting in overshoot accidents.

Recommendation

The signs should be moved three or four metres to the right so that they are visible to approaching drivers. Alternatively, extra chevrons could be added to the sign assembly.

2.3 Problem

Location B,C: Bridge Road approaches to the roundabout

Summary: risk of skidding accidents

High approach speeds on Bridge Road could lead to skidding accidents particularly on a wet road.

Recommendation

High-friction surfacing should be provided on both main road approaches.

2.4 Problem

Location A,B,C,D: all approaches to roundabout

Summary: risk of late decision making leading to merging and weaving accidents

The advance direction signs (reference BR.1, 2, 3 and 4) are sited too close to the roundabout at 100m. Drivers approaching at speed may make late decisions and weave across each other on the approach and circulatory area.

Recommendation

The advance direction signs should be positioned further from the roundabout, around 200m from the junction. The signs to Diagram 510 may need to be relocated accordingly.

2.5 Problem

Location B,C: Bridge Road approaches to the roundabout

Summary: risk of side-swipe accidents on exits

The two lanes marked as ahead for drivers on both the Bridge Road approaches could result in side-swipe type accidents as there is only one lane on the exits. The direction arrows are also too close to the give-way lines to provide suitable guidance for drivers.

The European Road Safety Auditor Training Syllabus – Appendix C Recommendation

There will be little benefit in providing lane arrows for this scheme, as generally, they are only required if there are three or more lanes on an entry to a roundabout. However, if they are to be provided, there should be one lane marked as ahead on the Bridge Road approaches, and the arrows should be positioned at least 15m back from the give-way lines.

2.6 Problem

Location D: south-east bound approach to roundabout

Summary: risk of loss of control accidents

As noted in the Stage 1 Audit Report, south-east bound drivers may look along the old line of the road and not see the roundabout. This could lead to loss-of-control accidents where lamp columns 18 and 19 are located. There is a risk of serious occupant injury if a vehicle strikes a lighting column.

Recommendation

Marker posts should be provided to highlight the new kerblines on the south-east bound approach. The columns should be set back at least 2m from the kerb edge.

2.7 Problem

Location E: pedestrian crossings

Summary: wheelchair users may be in conflict with traffic

The proposed upstand at the dropped kerbs is stated as being 10mm. However, wheelchair users find it difficult to negotiate upstands greater than 6mm, and may become stranded within the carriageway.

Recommendation

The upstands at the dropped kerbs should be no more than 6mm.

2.8 Problem

Location F: lighting columns on footways

Summary: pedestrians may step into the road in conflict with traffic. Errant vehicles may strike lamp columns leading to occupant injury.

The European Road Safety Auditor Training Syllabus – Appendix C

It appears that some of the lamp columns may obstruct the footways, forcing pedestrians to step into the carriageway. Some of the lamp columns are positioned close to the edge of carriageway where they could be a hazard to errant vehicles.

Recommendation

Lamp columns should be positioned at the back of footways.

2.9 **Problem**

Location: general

Summary: cyclists may be in collisions with motor vehicles

Casualty statistics for similar junctions in Badshire show that cyclists are vulnerable when negotiating roundabouts. Around 40% of collisions at roundabouts of this type involve cyclists, and the severity of injury to cyclists is higher than the norm.

Recommendation

The footway on the south-west side should be widened to accommodate cyclists. Extending this path to the north-west side of the roundabout would enable cyclists to avoid the roundabout and would give pedestrians a route with fewer road crossings.

3. AUDIT TEAM STATEMENT

I certify that the terms of reference of the audit are as described in HD 19/03.

AUDIT TEAM LEADER:

Harminder Aulak, BSc (Hons), IEng, FIHIE, MCIT, MILT;
Senior Engineer, TMS Consultancy

signed.....

date.....

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APPENDIX A

List of Drawings Examined:

- ◆ Drawing number 600/R01/01
- ◆ Drawing number 600/R02/04
- ◆ Drawing number 600/R06/06
- ◆ Drawing number 600/R07/07
- ◆ Drawing number 600/R11/08
- ◆ Drawing number 600/R12/09
- ◆ Drawing number 600/R13/10
- ◆ Drawing number 600/R13/11

Other Information Provided:

- Signs schedule

Specimen Designer's Response

1. Introduction

This Report provides the designer's response to the Stage 3 Road Safety Audit carried out by TMS Consultancy for the Section 38 and Section 278 works associated with the New Aldi Store, Salutation Square, Haverfordwest.

This Report is structured to show the problems and recommendations of the Audit followed by the Designer's Response using the same nomenclature as in the Stage 3 Road Safety Audit.

2. Designer's Response

2.1 Problem

Location – North end of new service road, footway leading to Scotchwell Walk.

Summary: Absence of tactile paving at flush kerb may lead to injuries to sight impaired pedestrians.

A flush kerb has been provided at the north end of the new footway to facilitate access between the footway and Scotchwell car park. There is no tactile paving to indicate the kerb edge to sight impaired pedestrians and there is a risk that they may walk into the carriageway inadvertently.

Recommendation

Buff coloured dimpled paving should be provided to a depth of 400mm across the width of the flush kerb.

Designer's Response

Recommendation accepted - 400mm depth and buff coloured tactile paving will be constructed.

2.2 Problem

Location – North end of new service road.

Summary: Unfinished footway will be a trip hazard to pedestrians.

The footway around the base of the two diagram 816 signposts is unfinished. The uneven surface will be a trip hazard to pedestrians.

Recommendation

The gaps in the footway should be infilled.

Designer's Response

Recommendation accepted - Footway is being reinstated as part of the agreed snagging works.

2.3 Problem

Location – Vehicle crossovers from the new service road to Green's Motors.

Summary: Unmarked dropped kerbs may be hazardous to sight impaired pedestrians.

The vehicle accesses to the car showroom and to the 4x4 display area have dropped kerbs of less than 25mm upstand. Sight impaired pedestrians may walk into the carriageway inadvertently.

Recommendation

The kerb upstand at the vehicle accesses should be increased to at least 25mm to provide a detectable kerb edge for sight impaired cane users.

Designer's Response

Recommendation accepted – 25mm upstand will be constructed.

2.4 Problem

Location – Mill Road stepped access to Green’s Motors.

Summary: Unmarked steps may be hazardous to sight impaired pedestrians.

There is no tactile warning of a flight of concrete steps leading from the footway down to the car showroom forecourt. A sight impaired pedestrian might be seriously injured falling down the steps.

Recommendation

Corduroy paving should be provided on the footway at the top of the steps to a depth of 400mm across the width of the steps.

Designer’s Response

Recommendation accepted - 400mm depth of corduroy paving will be provided across the back of the footway for the entire width of the steps.

2.5 Problem

Location – Mill Road.

Summary: Unfinished pedestrian guardrail may be hazardous to sight impaired pedestrians.

Two sections of tubular guardrail at either end of the car showroom building are unfinished, leaving a trip hazard and an unprotected drop into the showroom’s forecourt areas.

Recommendation

Pedestrian guardrail construction should be completed.

Designer’s Response

Recommendation accepted – guardrail is to be finished as part of the snagging.

2.6 Problem

Location – Mill Road

Summary: Drainage overflow may be hazardous to pedestrians.

Large capacity rainwater downpipes from the roof of the car showroom building terminate above smaller drainage gullies at the footway edge. During heavy rainfall, water may overflow across the footway, creating a hazard to pedestrians, especially if the water freezes.

Recommendation

Drainage arrangements should be checked to ensure that they are adequate.

Designer's Response

No evidence to date has shown a problem with the discharge of the RWP's into the gullies beneath. Situation to be monitored through the maintenance period by Pembrokeshire.

2.7 Problem

Location – South side of pelican crossing in Mill Road.

Summary: Inadequate tactile paving may be hazardous to sight impaired pedestrians.

The area of tactile paving on the south side of the crossing is not large enough to ensure that a sight impaired pedestrian will encounter it. The pedestrian might miss the controlled crossing and attempt to cross the road at an inappropriate location or step over the tactile paving and walk into the carriageway inadvertently.

Recommendation

The tactile paving should be provided to a minimum depth of 800mm across the width of the dropped kerb and the tail should extend to the back of the footway at a width of 1200mm. The service cover should be incorporated into the tactile paving with an infilled cover to match.

Designer's Response

Recommendation accepted – minimum depth to be increased to 800mm and tail extend to back of footway and increased in width to 1200mm incorporating a recessed cover.

2.8 Problem

Location – Cartlett Road at the old crossing location.

Summary: Residual road markings may confuse pedestrians and motorists.

The stop line and crossing delineation studs from the old pelican crossing remain in the carriageway. Motorists and pedestrians may be confused as to the location of the existing crossing. Pedestrians may attempt to cross at an unsafe location. Drivers may not stop at the appropriate stop line.

Recommendation

The old crossing markings should be removed.

Designer's Response

Recommendation accepted – studs and markings will be removed as part of the snagging.

2.9 Problem

Location – Access to car showroom forecourt from Cartlett Road.

Summary: Absence of tactile paving may be hazardous to sight impaired pedestrians.

A flush kerb has been provided at the end of the new footway, where it crosses the forecourt access, but no tactile paving has been provided to indicate the kerb edge to sight impaired pedestrians, who may step inadvertently into the path of moving traffic.

Recommendation

Buff coloured tactile paving should be provided to a depth of 1200mm across the width of the dropped kerb at both sides of the access.

Designer's Response

These works are outside of the 278 works for this scheme.

2.10 Problem

Location – North side of pelican crossing in Mill Road.

Summary: Ponding of rainwater may be hazardous to pedestrians.

There is evidence of water ponding at the carriageway edge adjacent to the crossing point on the north side of Mill Road. This could be a hazard to pedestrians, particularly in freezing conditions.

Recommendation

Drainage arrangements should be checked to ensure that they are adequate.

Designer's Response

Kerb Line to be amended at crossing point as part of snagging.

2.11 Problem

Location – Pelican crossing of Cartlett Road.

Summary: Uneven surface may be a trip hazard.

The road surface within the confines of the crossing is uneven and might be a trip hazard for pedestrians, especially those who are sight or mobility impaired.

Recommendation

The road surface at the crossing should be repaired.

Designer's Response

The road surface/trench is to be reinstated as part of the snagging.

2.12 Problem

Location – Pedestrian refuge in centre of Cartlett Road.

Summary: Absence of pedestrian guardrail may be hazardous to pedestrians.

The pedestrian guardrail provided does not extend through the whole stagger. Sight impaired pedestrians will not be guided to the correct crossing point and other pedestrians, particularly children might attempt to cross at inappropriate locations.

Recommendation

Pedestrian guardrail should be provided on the west side of the staggered refuge.

Designer's Response

Pedestrian guardrail is to be provided to enclose the centre pedestrian island as part of the snagging.

2.13 Problem

Location – Splitter island in Cartlett Road.

Summary: Unmarked kerb extension may be hazardous.

The kerb nosing that extends northwards into Cartlett Road from the splitter island is unmarked. It is likely to be struck by weaving vehicles, causing loss of control accidents.

Recommendation

A plain-faced bollard should be provided on the kerb nosing.

Designer's Response

This is an existing removable island and is not part of the Section 278 works.

2.14 Problem

Location – A40 junction with the new service road.

Summary: Vehicles exiting the service road may conflict with eastbound A40 traffic.

There is evidence that some vehicles leaving the Aldi car park are turning left in contravention of the one-way system and exiting the service road onto the eastbound carriageway of the A40. The kerb alignment at the junction, the speed of traffic on the dual-carriageway and the possibility of exiting vehicles turning right onto the A40 against the flow of traffic, all increase the likelihood of a serious accident.

Recommendation

Further measures should be provided to reinforce the new one-way traffic management system. It is possible that temporary additional measures may suffice, until local drivers become accustomed to the new system.

Designer's Response

Recommendation is accepted. It is considered that a design solution is required. We propose to provide design solutions which should be tabled at a meeting between the Designer, Pembrokeshire County Council and South Wales Trunk Road Agency to enable the best solution to be adopted.

2.15 Lighting Issues

- (a) The diagram 616 (No Entry) sign on the west side of the service road opposite the car park entrance was unlit.
- (b) Both bollards on the splitter island at the Mill Road pedestrian crossing were unlit.

The European Road Safety Auditor Training Syllabus – Appendix C

- (c) The diagram 506.1 (Junction Ahead) sign on the A40 prior to the service road was unlit.
- (d) Lamp column No. 11 on the west side of the service road was unlit.

Designer's Response

Lighting issue noted. The Contractor is to ensure that these units are lit.