NARRATIVE RISK ASSESSMENT – PROTECTED TEMPLATE FINAL v2.0

PROTECTED LEVEL CROSSING RISK ASSESSMENT

1. LEVEL CROSSING OVERVIEW AND ENVIRONMENT

1.1 LEVEL CROSSING OVERVIEW

This is a risk assessment for Queen Adelaide (Peterborough) level crossing.

Crossing details	
Name	Queen Adelaide (Peterborough)
Type	AHB
Crossing status	Public Highway
Overall crossing status	Open
Route name	Ely - Peterborough
Engineers Line Reference	EMP - 72m 12ch
OS grid reference	TL 562 815
Number of lines crossed	2
Line speed (mph)	60mph
Electrification	No
Signal box	Cambridge PSB

Risk assessment details	
Name of assessor	**[Name withheld Reg 13(1)]**
Post	**[Role withheld Reg 13(1)]**
Date completed	13/01/2016
Next due date	13/04/2017
Email address	**[Name withheld Reg 13(1)]**
Phone number	**[Mobile No. withheld Reg 13(1)]**

ALCRM risk score	
Individual risk	D
Collective risk	2
FWI	**0.045099223**

1.2 INFORMATION SOURCES

The table below shows the stakeholder consultation that was undertaken as part of the risk assessment.

Consulted	Attended site
Local resident	No
Local community	No

Stakeholder consultation attendance notes:

Public Highway Crossing – nearby residents have been spoken to by the LCM who has also spoken to potential users at the nearby Village Hall

The reference sources used during the risk assessment included:

- Census, GI Portal, SMIS

1.3 ENVIRONMENT

Up side crossing approach

Down side crossing approach

The level crossing is located on the B1382 Ely Road which is a Public Highway. The road approach speed is estimated to be 31-40mph. There are no stations visible at the level crossing

At Queen Adelaide (Peterborough) the orientation of the road/path from the north is 120°; the orientation of the railway from the north to the up line in the up direction is 220°. Low horizon can result in sun glare; sun glare is a known issue.

[Paragraph withheld under Reg 12(4)(d)]

Site visit general observations:

See Above comments - There are various projects planned in the Ely Area but nothing has an imminent effect on use at this time

2. LEVEL CROSSING USAGE

2.1 RAIL

The train service over Queen Adelaide (Peterborough) level crossing consists of passenger and freight trains. There are 193 trains per day. The highest permissible line speed of trains is 60mph. Trains are timetabled to run for 24 hours per day.

Assessor's train service notes:

A high frequency of trains and a relatively speedy service are already in existence at this crossing

2.2 USER CENSUS DATA

A 24 hour census (over nine days) was carried out from 05/09/2015 to 13th September 2015 by Sotera – the figures below represent the high points from this census and any other previously recorded. The census applies to 100% of the year.

The census information is as follows:

Cars	4382
Vans / small lorries	798
Buses	48
HGVs	86
Pedal / motor cyclists	170
Pedestrians	81
Tractors / farm vehicles	25
Horses / riders	0
Animals on the hoof	0

Available information indicates that the crossing does not have a high proportion of vulnerable users.

Vulnerable user observations:

None evidenced at time of inspection but Crossing has walking routes/paths nearby. Also in previous assessment LCM witnessed a coach dropping a party of elderly people into the village hall for a fete/WI gathering. No evidence to suggest higher than usual usage here – reaffirmed by Sotera September 2015 Risk Assessment

Available information indicates that the crossing does not have a high number of irregular users.

Irregular user observations:

None evidenced at time of inspection - again as per previous assessment, see above comments in relation to vulnerable users. No evidence to suggest higher than usual usage here reaffirmed by Sotera September 2015 Risk Assessment

Assessor's general census notes:

The Sotera 9 Day Assessment from 5th Sept 2015 to 13th September 2015 reaffirmed that this is a busy crossing in terms of road usage

2.3 USER CENSUS RESULTS

ALCRM calculates usage of the crossing to be 5339 road vehicles and 251 pedestrians and cyclists per day.

3. RISK OF USE

3.1 CROSSING APPROACHES

The road approach speed is estimated to be 31-40mph. One or more of the approach roads to Queen Adelaide (Peterborough) level crossing have been assessed as being long and straight. There are prominent features on the approach to or on the far side of the level crossing that could distract drivers.

Site visit observations:

Recently re surfaced roadway is in very good condition but may be slick in rainy/icy conditions Laybys Up and Down Sides Up side - Village Hall and sign, MOT centre. Down Side – houses for local residents Overall - The First Queen Adelaide or last Queen Adelaide Crossing depending on your approach (from Ely or Prickwillow) in the sequence of three consecutive AHB level crossings within a few hundred yards of each other. This could cause over familiarity or complacency for regular users. Possibly could cause confusion during poor weather

The road surface, including gradient if present, is unlikely to impact on the ability of a vehicle to stop behind the stop line.

There are no known issues with ice, mud, loose material or flood water. In addition, there are known issues with foliage or fog. These known issues might impair visibility of the crossing or crossing equipment, including signage. They might also affect the ability of a vehicle to stop behind the stop line.

Assessor's notes:

Fog at certain times of year and bad weather may hamper visibility at this crossing

At the estimated road speed, the visibility of level crossing signage and equipment is considered to be sufficient for road users to be able to react in time if the crossing is activated.

3.2 AT THE CROSSING – GROUNDING RISK

The visual evaluation of the vertical profile of the road indicates that it does not create a risk of vehicles grounding on the crossing. Risk of grounding signs have not been provided at the crossing.

Assessor's notes:

Crossing passed vertical profile inspection on 13/05/14

3.3 AT THE CROSSING – BLOCKING BACK

The road layout at or close to the crossing does not result in identified incidents of traffic queuing over the crossing. No incidents of blocking back are recorded and there are identified issues with the road layout, parked cars or other features that could stop traffic. In addition, the road is not a known diversionary route.

Assessor's notes:

Sotera Risk Assessment of September 2015 recorded no blocking back. However the risk of this is increased under predictive usage models in the assessment under the Ely North Junction Upgrade Project especially from 2025 onwards.

3.4 AT THE CROSSING – ANOTHER TRAIN COMING RISK

Trains are occasionally known to pass each other at this crossing.

Assessor's another train coming notes:

This is a relatively infrequent risk albeit a real one on given occasions at this crossing

3.5 INCIDENT HISTORY

A level crossing safety event has not been known to occur at Queen Adelaide (Peterborough) crossing in the last twelve months.

Assessor's incident history notes:

Last recorded Incident - 06/11/2013 17:19:00 Queen Adelaide LC Non-Rail vehicles - 1L11 (EMT 1252 Liverpool Lime Street to Norwich) reported barrier had been struck by a car at Queen Adelaide AHB LC (EMP0)
There were also single incidents in 2007, 2008 and 2010

Red light violations / barrier weaving

The chance of a vehicle user deliberately misusing the crossing is estimated as around average to below average

Measures have been taken to mitigate deliberate misuse and these are below -

Assessor's notes:

Crossing Camera recently installed to prevent possible zig zagging of barriers – camera located on down side of crossing

Also on down side of the crossing is a vehicle activated Speed reminder LED sign located just before the EWC Bridge. The ETN Queen Adelaide crossing also has VAS on the Up side approach to slow cars through the village

3.6 THE CROSSING – STRIKE IN TIMES

Strike in times

	Designed strike in time (Obtainable from RAM)	Does the observed strike in time conform to the designed strike in time?	Is the observed barrier down time excessive?
Up line	29 Seconds	Yes	No
Down line	29 Seconds	Yes	No

Assessor's notes and observations on strike in times:

Observed Recordings – 46 seconds (Up) and 40 seconds (Down) and 96 seconds (Freight)

4. ALCRM CALCULATED RISK

Queen Adelaide (Peterborough) ***level crossing ALCRM results***

Key risk drivers: ALCRM calculates that the following key risk drivers influence the risk at this crossing:

- Crossing approach
- Frequent trains
- Large number users
- Sun glare
- Reduced visibility

Assessor's key risk drivers notes

A large amount of usage combines with a frequent and numerous train services at this crossing. Sun Glare can be a risk but is partially mitigated by LED Lights

Safety risk				
Compared to other crossings the safety risk for this crossing is	**Individual risk**		**Collective risk**	
	D		**2**	
	Individual risk (fraction)	**Individual risk (numeric)**		
Car	1 in 171115	0.000005844	0.01704804	
Van / small lorries	1 in 24929	0.000040113	0.003104595	
HGV	1 in 8155	0.000122612	0.000110215	
Bus	1 in 45520	0.000021968	0.000061515	
Tractor / farm vehicle	1 in 2370	0.000421785	0.000032039	
Cyclist / Motor cyclist	1 in 9429	0.000106052	0.013161042	
Pedestrian	1 in 9429	0.000106052	0.00627085	
				Derailment contribution
Passengers			0.000456757	95.415139467
Staff			0.00485417	2.033654673
Total			**0.045099223**	1.18523559
Collision frequencies	**Train / user**	**User equipment**	**Other**	
Vehicle	0.050909853	0.721779872	0	
Pedestrian	0.029780407	0	0.004917002	
Collision risk	**Train / user**	**User equipment**	**Other**	
Vehicle	0.020356404	0	0	
Pedestrian	0.019345353	0	0.000086539	

5. OPTION ASSESSMENT AND CONCLUSIONS

5.1 OPTIONS EVALUATED

[Pages 7 and 8 withheld under Reg. 12(4)(d)]

[Pages 7 and 8 withheld under Reg. 12(4)(d)]

5.2 CONCLUSIONS

Assessor's notes:

Asset Inspection of 13th January 2016 identified centre and pedestrian walkway road markings faded and in ellipse (M3 priorities) and missing road studs (M3 priority).

There is a local instruction in place that if any large vehicles (as defined by crossing signage) go through the Queen Adelaide Crossings on the ETN, BGK and EMP, then trains are also cautioned on the other lines as well due to the proximity of the crossings to each other.

Crossing sits in the middle of two railway curves – up and down sides – cant on up side with Strail Decking on the Up Side of Crossing that is in relatively good condition – although it has Poly Safe Cess Panels.

Poly Safe surface on the Down side of the crossing has been improved since the last risk assessment but this crossing really needs renewal to one surface type – preferably Strail. LCM has not optioneered this upgrade as ALCRM assumes one type of decking only

Previous LCM survey - Interviewed the local **[Personal details withheld Reg13(1)]** at the Village Hall during the assessment – several **[Personal details withheld Reg13(1)]** had experienced no real issues with using this crossing. Also interviewed a resident near the crossing – suggested flashing 30mph signs as motorists approach the crossing at speed – these have since been introduced. Also residents mentioned a new By Pass being constructed in the next few years which has recently been approved by the planners/council.

[Remainder of page 9 withheld under Reg. 12(4)(d)]

[Withheld under Reg. 12(4)(d)]

[Remainder of page 10 withheld under Reg. 12(4)(d)]

[Page 11 withheld under Reg 12(4)(d)]

[Paragraphs withheld under Reg 12(4)(d)]

CONCLUSIONS AND RECOMMENDATIONS

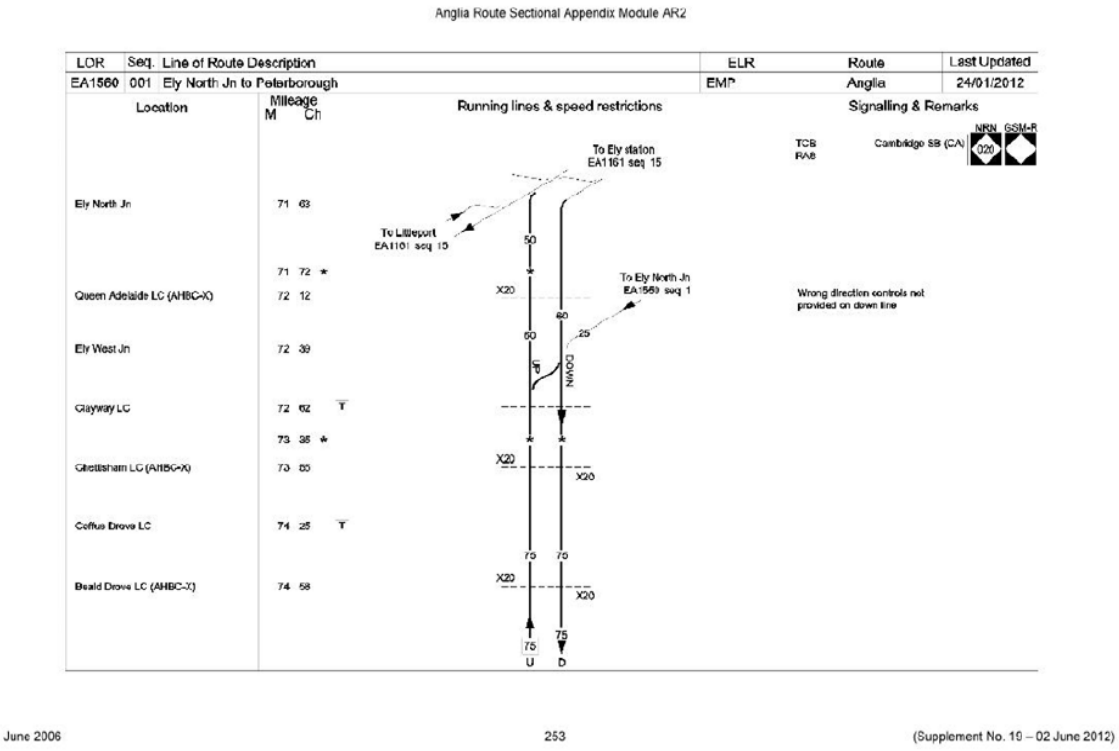
[Paragraphs withheld under Reg 12(4)(d)]

[Page 13 withheld under Reg 12(4)(d)]

[Page 14 withheld under Reg 12(4)(d)]

[Page 15 withheld under Reg 12(4)(d)]

ANNEX A – ADDITIONAL PHOTOGRAPHS



Anglia Route Sectional Appendix Module AR2

LOR	Seq.	Line of Route Description	ELR	Route	Last Updated
EA1560	001	Ely North Jn to Peterborough	EMP	Anglia	24/01/2012

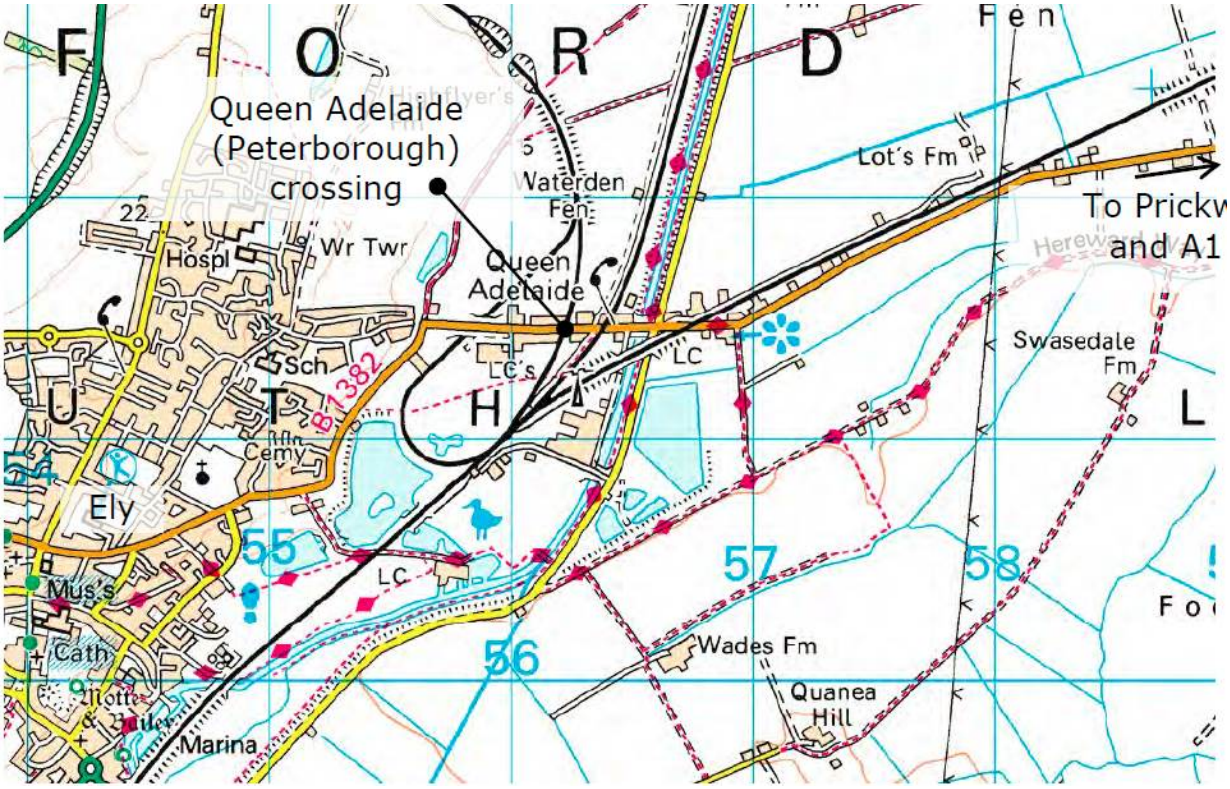
Location | Mileage M Ch | Running lines & speed restrictions | Signalling & Remarks

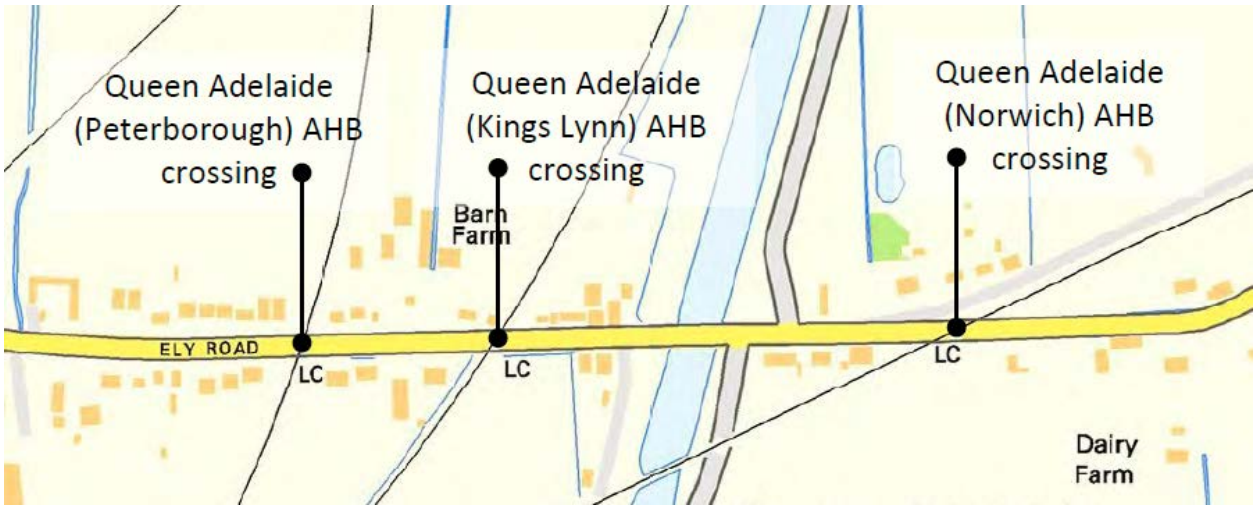
Ely North Jn 71 63
Queen Adelaide LC (AHBC-X) 72 12
Ely West Jn 72 39
Clayway LC 72 62
Ghettisham LC (AHBC-X) 73 35
Coffue Drove LC 74 25
Beald Drove LC (AHBC-X) 74 58

To Ely station EA1161 seq 15
To Littleport EA1101 seq 15
To Ely North Jn EA1560 seq 1
X20
50
60
80
25
UP
DOWN
75
U
D
TCB RA8
Cambridge SB (CA)
NRN 020
GSM-R
Wrong direction controls not provided on down line

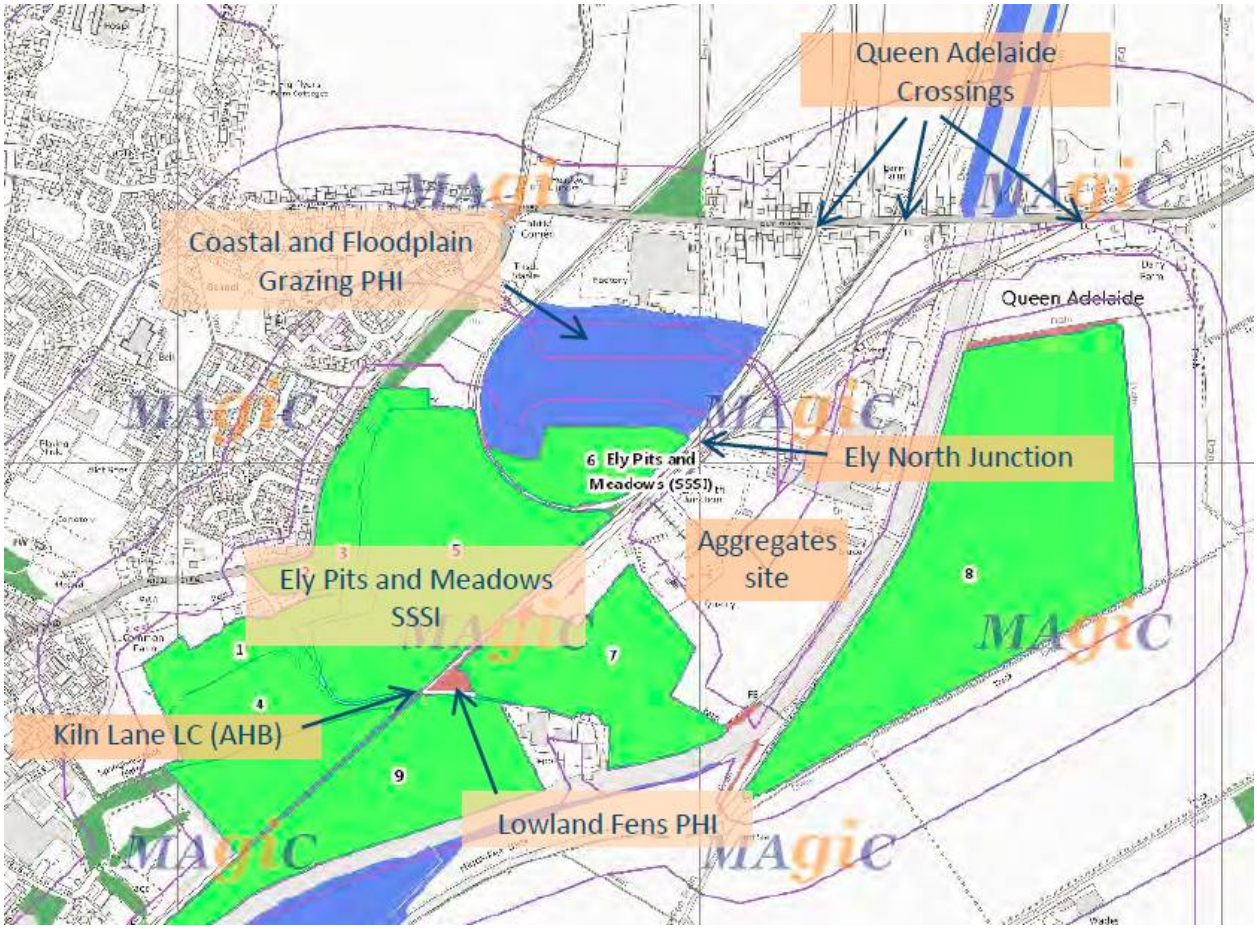
June 2006 253 (Supplement No. 10 – 02 June 2012)

Sectional Appendix Extract and O/S Map Below





Crossing Locations



Map of environmentally significant sites

ANNEX B – HAZARD IDENTIFICATION AND RISK CONTROLS

The table below is intended for use by risk assessors when identifying hazards and risk control solutions. It is not an exhaustive list or presented in a hierarchical order.

	Hazard	Control
Road vehicle and train collision risk	Examples at the crossing include: • fast and / or long and straight roads; inability to stop • proximity of junctions; distraction, blocking back • sweeping road approaches, parked cars hinder identification of level crossing ahead • level crossing equipment and road traffic light signals are not conspicuous or optimally positioned; orientation / sun glare, insufficient light output, misalignment of the carriageway over the crossing • there is a risk of grounding and / or the severity of the gradient might adversely affect a vehicle's ability to negotiate the crossing • insufficient or excessive strike in times increase the likelihood of driver error / violations • high chance of a second train coming • crossing type is unsuitable for location, train service, line speed and / or user groups Additional examples include: • Signaller unsighted to road vehicle; bleaching of CCTV image, blind spots • barriers or gates not fully interlocked with signalling system and / or no approach locking (opportunity for human error - raise barriers / open gates with train approaching)	Controls can include: • vehicle activated signs, advance warning signs; countdown markers, risk of grounding signs, provision of emergency telephones • liaising with highways authority regarding traffic restrictions; speed limits, restricting direction of traffic • engaging with signalling engineers to optimise strike in times • enhanced 'another train coming' signs • road traffic light signal and boom lighting LED upgrade, extended hoods, repaint backboards, reflectorised markings • upgrading of asset to a higher form of protection • improving camera equipment / Signaller's view of crossing, e.g. install colour monitor • signalling interlocking upgrade and / or barrier inhibition
Pedestrian and train collision risk	Examples include: • high chance of a second train coming • increased likelihood of user error, e.g. crossing is at station • free wicket gates are known to result in user error or encourage misadventure • crossing type is unsuitable for location, train service, line speed and user groups	Controls can include: • spoken 'another train coming' audible warning • providing red standing man sign • maximise sighting lines of approaching trains • enhanced 'another train coming' signage • providing tactile paving and / or pedestrian stop lines • interlocking (or locking where Crossing Attendant provided) of wicket

	Hazard	Control
	• schools, local amenities or other attractions are known to contribute towards user error Additional examples include: • Signaller unsighted to user; bleaching of CCTV image, blind spots • barriers or gates not fully interlocked with signalling system and / or no approach locking (opportunity for human error - raise barriers / open gates with train approaching)	gates • upgrading of asset to a higher form of protection • improving camera equipment / Signaller's view of crossing, e.g. reposition on-site camera equipment • signalling interlocking upgrade and / or barrier inhibition
Pedestrian and road vehicle collision risk	Examples include: • road / footpath inadequately separated; footpath not clearly defined, narrow carriageway restricts width of footpath, footpath width unsuitable for all user groups, e.g. heavily used, high volume of encumbered users • condition of footpath surface increases the likelihood of users diverting from the designated footpath or slipping / tripping into the carriageway	Controls can include: • clearly define the footpath; renew markings, install tactile paving and / or widen where possible • improving footpath crossing surface so it is devoid of potholes, excessive flangeway gaps and is evenly laid • removing redundant footpath markings that do not align with public footpaths • road speed controls, vehicle activated signs, advance warning signs
Personal injury	Examples include: • barrier mechanism unguarded / inadequately protected • foreseeable likelihood of pedestrians standing beneath barrier during lowering sequence • skewed crossing with large flangeway gaps results in cyclist, mobility scooter, pushchair or wheelchair user being unseated	Controls can include: • fully guarding barrier mechanisms • improving fence lines • marking pedestrian stop lines, introducing tactile paving • reducing flangeway gaps and straightening where possible

ANNEX C – ALCRM RISK SCORE EXPLANATION

ALCRM provides an estimate of both the individual and collective risks at a level crossing.

The individual and collective risk is expressed in Fatalities and Weighted Injuries (FWI). The following values help to explain this:

- **1** = 1 fatality per year or 10 major injuries or 200 minor RIDDOR events or 1000 minor non-RIDDOR events
- **0.1** = 20 minor RIDDOR events or 100 minor non-RIDDOR events
- **0.005** = 5 minor non-RIDDOR events

INDIVIDUAL RISK

This is the annualised probability of fatality to a 'regular user'. *NOTE: A regular user is taken as a person making a daily return trip over the crossing; assumed 500 traverses per year.*

Individual risk:

- Applies only to crossing users. It is not used for train staff and passengers
- Does not increase with the number of users.
- Is presented as a simplified ranking:
  - Allocates individual risk into rankings A to M
    (A is highest, L is lowest, and M is 'zero risk' e.g. temporary closed, dormant or crossings on mothballed lines)
  - Allows comparison of individual risk to average users across any crossings on the network

Individual Risk Ranking	Upper Value (Probability)	Lower Value (Probability)	Upper Value (FWI)	Lower Value (FW)
A	1 in 1	Greater than 1 in 1,000	1	0.001000000
B	1 in 1,000	1 in 5,000	0.001000000	0.000200000
C	1 in 5,000	1 in 25,000	0.000200000	0.000040000
D	1 in 25,000	1 in 125,000	0.000040000	0.000008000
E	1 in 125,000	1 in 250,000	0.000008000	0.000004000
F	1 in 250,000	1 in 500,000	0.000004000	0.000002000
G	1 in 500,000	1 in 1,000,000	0.000002000	0.000001000
H	1 in 1,000,000	1 in 2,000,000	0.000001000	0.000000500
I	1 in 2,000,000	1 in 4,000,000	0.000000500	0.000000250
J	1 in 4,000,000	1 in 10,000,000	0.000000250	0.000000100
K	1 in 10,000,000	1 in 20,000,000	0.000000100	0.000000050
L	Less than 1 in 20,000,000	Greater than 0	0.000000050	Greater than 0
M	0	0	0	0

COLLECTIVE RISK

This is the total risk for the crossing and includes the risk to users (pedestrian and vehicle), train staff and passengers.

Collective risk:

- Is presented as a simplified ranking:
  - Allocates collective risk into rankings 1 to 13
    (1 is highest, 12 is lowest, and 13 is 'zero risk' e.g. temporary closed, dormant or crossings on mothballed lines)
  - Can easily compare collective risk between any two crossings on the network

Collective Risk Ranking	Upper Value (FWI)	Lower Value (FW)
1	Theoretically infinite	Greater than 5.00E-02
2	0.050000000	0.010000000
3	0.010000000	0.005000000
4	0.005000000	0.001000000
5	0.001000000	0.000500000
6	0.000500000	0.000100000
7	0.000100000	0.000050000
8	0.000050000	0.000010000
9	0.000010000	0.000005000
10	0.000005000	0.000001000
11	0.000001000	0.000000500
12	0.0000005	0
13	0.00E+00	0.00E+00