

PROTECTED LEVEL CROSSING RISK ASSESSMENT



Anglia Route
Level Crossing Narrative Risk Assessment
Dimmock's Cote AHB
Planned 4th April 2022



1. LEVEL CROSSING OVERVIEW AND ENVIRONMENT

1.1 LEVEL CROSSING OVERVIEW

This is a risk assessment for Dimmock's Cote AHB level crossing.

Crossing Details	
Name	Dimmock's Cote AHB
Type	AHB
Crossing status	Public Highway
Overall crossing status	Open
Route name	Anglia
Engineers Line Reference	BGK – 66m 25ch
OS grid reference	TL526731
Number of lines crossed	2
Line speed (mph)	75MPH
Electrification	OHL
Signal box	Cambridge

Risk Assessment Details	
Name of assessor	Andrew Waling
Post	Level Crossing Manager.
Date completed	04-04-2022
Next due date	04-07-2023
Email address	andrew.waling@networkrail.co.uk
Phone number	07860500842

ALCRM Risk Score	
Risk per traverse risk	E
Collective risk	2
FWI	0.043227849

1.2 INFORMATION SOURCES

Reason for Risk Assessment

Network Rail has a responsibility and legal duty under the Health and Safety at Work Act 1974 for the health, safety and welfare of its employees and for protecting others against risk.

Network Rail also has a legal responsibility under the Management of Health and Safety at Work Regulations 1999. Section 3 focuses on the requirement for suitable and sufficient assessments of risk to health and safety of employees and others in connection with their undertaking.

Network Rail is committed to reducing the risk on the railway and has identified that one of its greatest public risks is at level crossings. This is where the railway has a direct interface with other elements e.g. vehicles and/or pedestrians. Network Rail is working to reduce this risk to as low as is reasonably practicable.

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

Consulted	Attended site
LOMS, MOMS and Cambridge Panel 'A' signaller.	No
Crossing users and local resident.	No
Local Business	No
Police (BTP/Home Office Force)	No
Local Resident	No

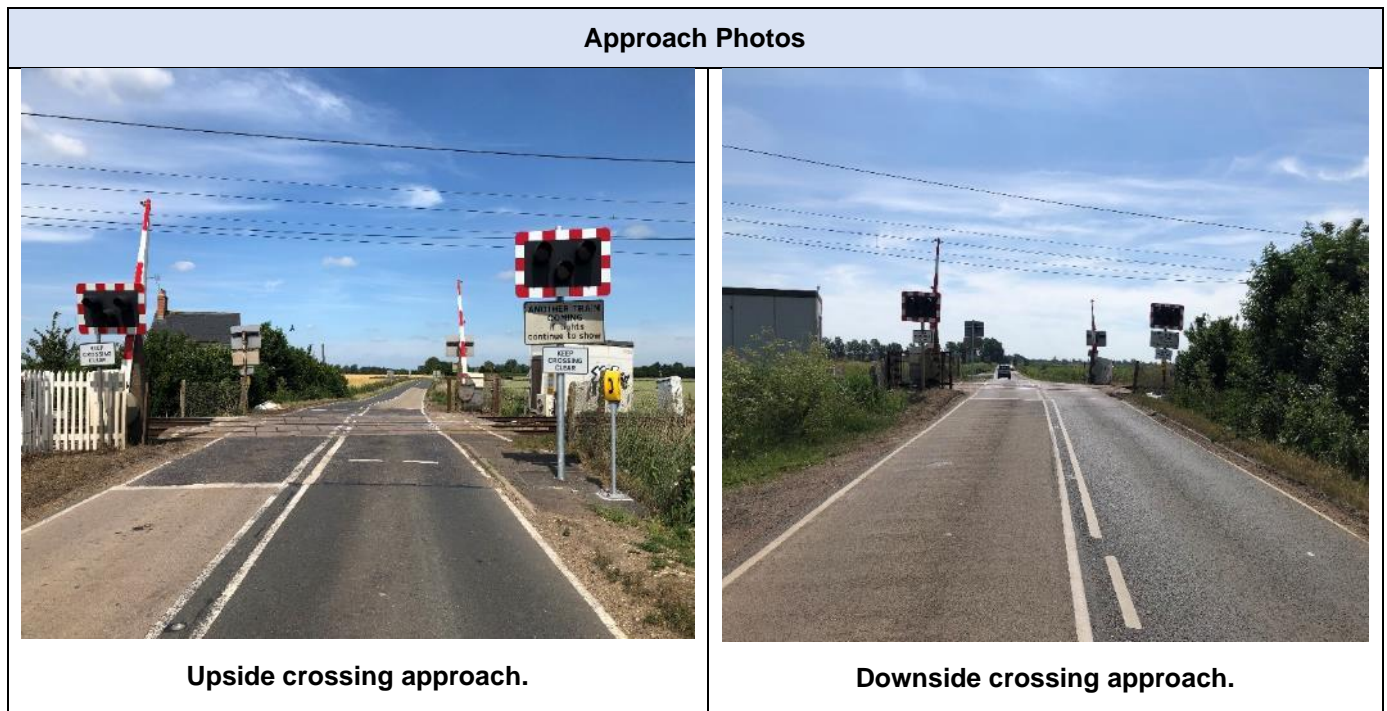
Stakeholder consultation and attendance notes:

None of the above attended the site meeting but all have been contacted since either via email or telephone and their thoughts/recommendations have been noted within this Narrative Risk Assessment.

The reference sources used during the risk assessment included:

- CCIL
- Census Counter
- Geo-RINM
- SMIS
- East Cambs District Council
- Network Rail Town Planning

1.3 ENVIRONMENT



The level crossing is located on A1123. The road approach speed is estimated to be Greater than 50mph.

It is a Public Highway level crossing.

At Dimmock's Cote AHB level crossing 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 200°.

Sun glare

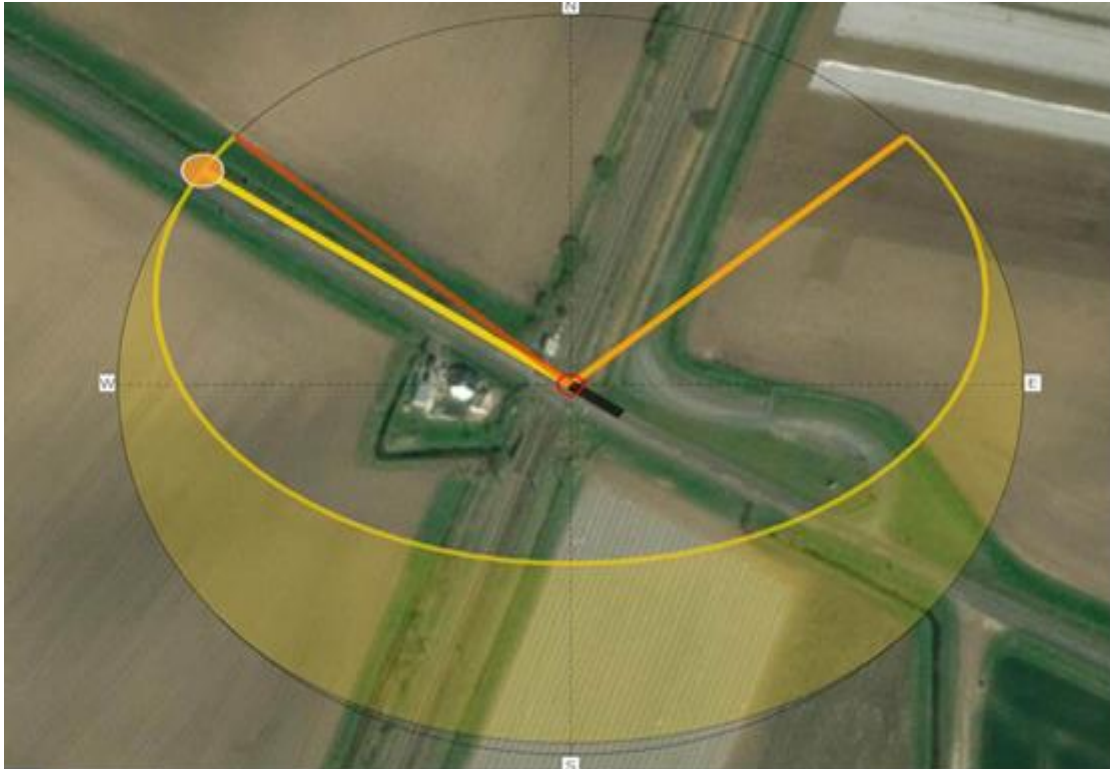
LCG13 assessing sun glare at public road level crossings has been completed and records risk as Tolerable with detailed sun glare risk assessment not needed

Impact of low sun on the crossing

Below is the output from the Sun Calc application, which shows the lines of sunrise and sunset angles at two times of year (longest day June 21st & shortest day December 21st) when low sun would align with the rail approaches and might impact on the sighting.

The thin orange curve is the current sun trajectory, and the yellow area around is the variation of sun trajectories during the year. The closer a point is to the centre, the higher is the sun above the horizon. The yellow line shows the direction of sunrise; the dark orange line the direction of sunset and the mid orange line the direction at a selected time of day (shown by the orange circle above the satellite image).

Longest Day June 21st.



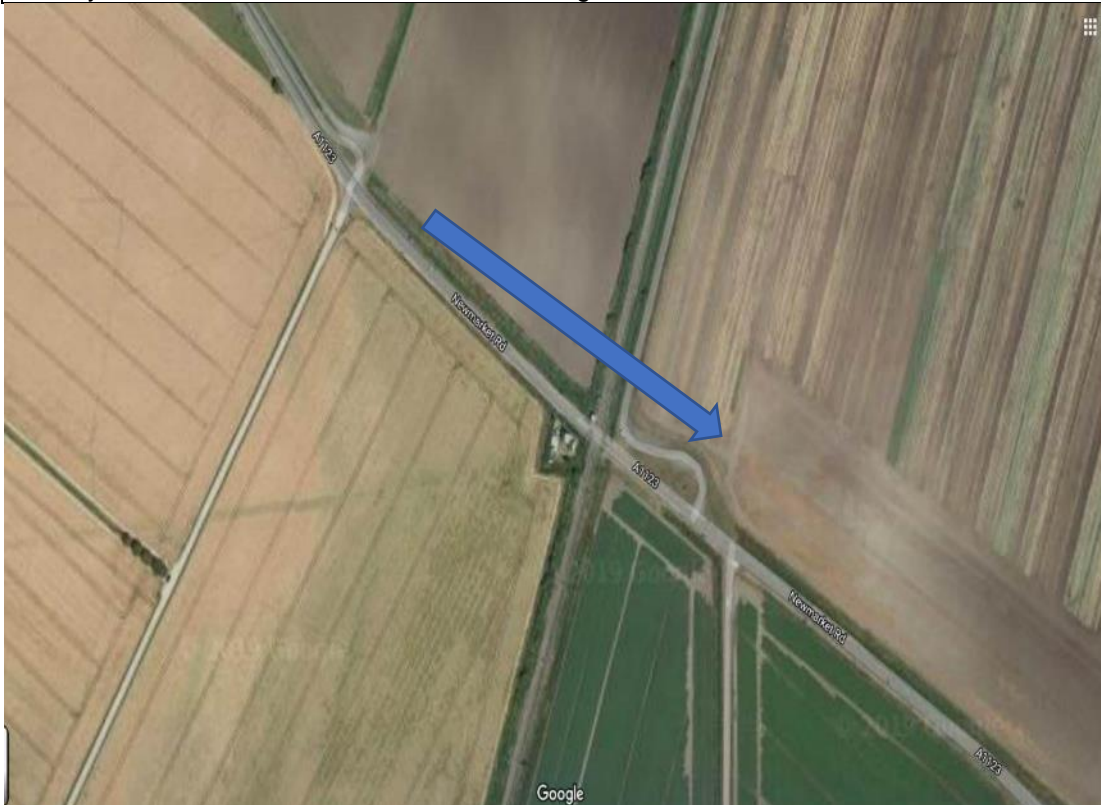
Shortest Day December 21st.



There are no planned or apparent developments near the crossing which may lead to a change or increase in use or risk.

Site Visit General Observations:

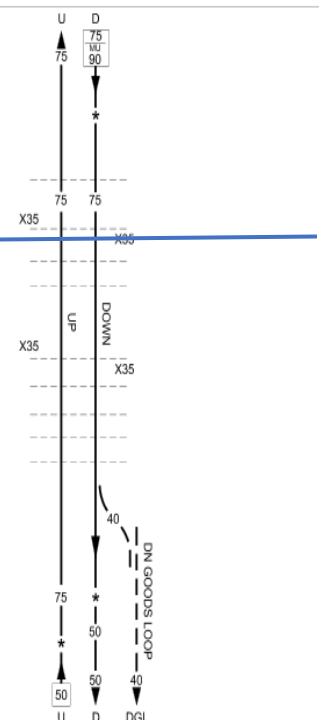

The crossing is located on the main line with trains running from Ely to Cambridge. The line is dual track with trains operating in both directions during normal service operation. The line speed in both directions is 75mph. Dimmock's Cote AHB is located between Ely and Waterbeach Railway Stations. No known new developments within the vicinity of the crossing, this has been checked with East Cambridgeshire County Council and Network Rail Town Planning.



2.1 RAIL

The train service over Dimmock's Cote AHB level crossing consists of Passenger and Freight trains. There are 188 trains per day. The highest permissible line speed of trains is 75 mph. Trains are timetabled to run for 19 hours per day.

Sectional appendix extract.

LOR	Seq.	Line of Route Description	ELR	Route	Last Updated
EA1161	012	Bishops Stortford to Ely North Jn	BGK	Anglia	26/03/2017
Location		Mileage M Ch	Running lines & speed restrictions		Signalling & Remarks
					TCB RA8 Cambridge SB (CA) AC: Romford 
		65 40 *			
Nairns (No.117) LC (UWC)		65 46	T		
Dimmocks Cote LC (AHBC-X)		66 25	X35		
Hopkins Celery LC (FPO)		66 55			
West River Bridge LC (FPS)		67 22			
Ely West River Bridge LC (R/G-X)(UWC)		68 13	X35		
Kirkby LC (UWC)		68 65			
Bedford (No.124) LC (UWC)		69 08	T		
Braham Farm LC (FPS)		69 16			
Bedford (No.125) LC (UWC)		69 20	T		
		69 33			
		69 67 *			Down Goods Loop - PF
		69 70 *			

Assessor's notes:

As stated above trains are timetabled to run for 19 hours per day, but lines are open 24 hours a day and may receive additional freight, passenger or engineering trains which often vary in length, these are non-time tabled trains which do run from time to time and are mainly for engineering, rail head treatment and track recording purposes.

The sectional appendix shows X35 either side of Dimmock's Cote AHB, this is a requirement for trains travelling in the wrong direction can only travel at a maximum of 35MPH over the crossing.







2.2 USER CENSUS DATA

A 24-hour census was carried out on 06-06-2018 by TRACSIS. The census applies to 100% of the year.

The census taken on the day is as follows:

Cars / car-based vans / quad bikes	5,326
Large vans / small lorries / large 4x4s	1,181
Buses / coaches	9
HGVs	634
Tractors / large farm vehicles	41
Pedal / motor cyclists	113
Pedestrians	1
Horse riders	0
Animal herders	0

Assessor's general census notes:

A weekday average used from a 9-day census for a project between 02/06/2018 to 10/06/2018. This crossing sees a high number of vehicles on a daily basis, but the data shows very little pedestrian usage, this is due to the location of the crossing being in a very rural location with no public footpaths on either approach.

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

Vulnerable user observations:

Main double track road in rural location and from the data gathered from the 9-day census no vulnerable users were recorded using Dimmock's Cote AHB crossing.

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

Irregular user observations:

No known irregular users but the 'Fish and Duck' mariner is located over the crossing on the upside and is approximately ½ mile Parallel to the track so this may see irregular users but from data gathered this is not deemed to be high.

Site visit night / dusk user observations:

No usage was recorded during the 9-day census so a 1% has been used as a mitigation.

2.3 USER CENSUS RESULTS

ALCRM calculates the usage of the crossing to be 7,191 road vehicles and 114 pedestrians and cyclists per day.

Notes on daily, annual, seasonal usage:

Dimmock's Cote AHB is located in a rural location and is double track with a national speed limit over it, it sees a high number of road vehicles on a daily basis but very little pedestrian usage, this is a standard pattern throughout the year but during the months of July, August and September the crossing is used by more agricultural vehicles due to the harvest.

3. RISK OF USE**3.1 CROSSING APPROACHES**

The road approach speed for vehicles on the upside of the crossing is Greater than 50mph and the approach speed on the downside of the crossing is Greater than 50mph.

Both of the approach roads to Dimmock's Cote AHB level crossing are assessed as being long and straight. There are prominent features on the approach to the level crossing that could distract drivers.

Site visit observations:

The crossing sits on a slight hump and vehicles approach the crossing at more than 50MPH, access turnings to farms and houses are on both the up and down sides, mud on the road can cause splash back onto signs which may make the signs dirty and hard to read.
During the winter months this crossing regularly gritted by the highways department and should the A10 Ely to Cambridge Road be shut then the road that Dimmock's Cote AHB is located on will become the diversion route.

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 known issues with ice, mud, loose material or flood water. In addition, there are known issues with foliage or fog.

Assessor's notes:

Fog can be an issue at certain times of the year but this has been mitigated by the fitment of LED lights in all of the RTL's, also, 3rd party foliage from the residential property on the downside approach could obscure the sighting for the ZO wig wag board making it harder for vehicles to see when the crossing is activated, this has never been an issue as the resident keeps it cut back regularly throughout the year.

At the estimated road speed, the visibility of level crossing signage and equipment on the upside is easily sufficient - a vehicle would have surplus time to react if the crossing is activated

At the estimated road speed, the visibility of level crossing signage and equipment on the downside is easily sufficient - a vehicle would have surplus time to react if the crossing is activated

Assessor's general crossing approach notes:

Both approaches to Dimmock's Cote AHB are of tarmac design and are long, and as already stated above in this Narrative Risk Assessment vehicles approach from both sides at more than 50MPH, also, the tarmac is anti-skid for approximately 80mtrs on both approaches.

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.

Assessor's notes:

Even though the crossing sits on a humped profile this has still passed the SIN109 inspection report with no further work required.
There is no risk of grounding signs on either approach leading up to the crossing and no visible signs of grounding on the crossing panels themselves nor the tarmac.

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. Blocking back risk is Never known to occur.

No incidents of blocking back are recorded.

There are no identified issues with the road layout, parked cars or other features that could stop traffic. In addition, the road is a known diversionary route.

Assessor's notes:

House on downside approach of the level crossing on the left-hand side which could cause blocking back but this has never known to occur but cannot be discounted.
As stated above in this document, if the main A10 Ely to Cambridge Road is shut then this road is a diversion route which will see double the amount of traffic passing over Dimmock's Cote AHB.

3.4 AT THE CROSSING – ANOTHER TRAIN COMING RISK

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

Assessor's another train coming notes:

As stated above, trains are occasionally known to pass each other at this crossing, if the train frequencies increase then the chance of a second train coming will increase.

3.5 INCIDENT HISTORY

A level crossing safety event has been known to occur at Dimmock's Cote AHB level crossing in the last twelve months.

Assessor's incident history notes:

Nov 19, 2021, Dimmock's Cote AHB Anglia From a distance the Driver observed LC lights and barriers working and saw a car accelerate and pass over the crossing before they were down. Vehicle essentially went through a red road light. LC misuse - user error.

HISTORIC: -

Sep 1, 2017 NRV/LC Misuse/TSBS - RV removed barrier at Dimmock's Cote LC, 1T02 07:14 London King's Cross - Kings Lynn struck displaced barrier.
 Dec 22, 2017 LC Near Miss - 1T07, ET, (15:54 Kings Lynn - London King's Cross) reported a near miss with a vehicle after a RTA at Dimmock's Cote AHB

Red light violations / barrier weaving

The chance of a vehicle user deliberately misusing the crossing is estimated as significantly higher than average. Measures have been taken to mitigate deliberate misuse.

Assessor's incorrect use notes:

Led wig wags have been fitted to all the RTLs at this crossing but should the crossing be either closed or upgraded to a full barrier crossing this would mitigate against vehicles misusing the crossing.

3.6 THE CROSSING – STRIKE IN TIMES

Strike in times

	Designed strike in time	Does the observed strike in time conform to the designed strike in time?	Is the observed barrier down time excessive?
Up line	39s	Yes	No
Down line	39s	Yes	No

Assessor's notes and observations on strike in times:

During the data collection for this Narrative Risk Assessment for this level crossing the Level crossing Manager timed the 'strike in times' for Dimmock's Cote AHB and these are as follows: 36 seconds for a train on the upside and 37 seconds for a train on the downside, these times are adequate with this type of crossing.

4. ALCRM CALCULATED RISK

Dimmock's Cote AHB level crossing ALCRM results.

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

- Distracted / forced by dog (loss of control), Road traffic accident, Second train coming
- Does not observe lights/barriers, Slips, trips, falls or snagged on crossing
- Unaware of crossing, Blocking back, Late braking, Turns onto the railway
- Railway cause: slow moving / short warning, train unexpected, Stuck or grounded on crossing
- Incorrect use (e.g. non-adherence with level crossing road traffic light signals)
- Sunlight obscures crossing/lights or view up / down track, Poor crossing visibility
- Railway cause: failure to detect approaching train, lights / barriers or obstacle detection equipment fails to operate, signaller or other workforce, train driver

The calculated safety risk for this crossing is:	Risk per Traverse (Letter)	Collective Risk (Number)
	E	2
	Risk per Traverse (FWI)	Collective Risk (FWI)
Cars / car-based vans / quad bikes	0.000000013	0.025397218
Large vans / small lorries / large 4x4s		0.00563164
Buses / Coaches	0.000000003	0.000008961
HGVs		0.000631275
Tractors / large farm vehicles		0.000040824
Pedal / motor cyclists		0.006213343
Pedestrians	0.000000151	0.000054985
Horse Riders		0
Animal Herders		0
Vehicles user in pedestrian mode		0
Train Passengers	0.000000003	0.000239326
Train Staff	0.000000009	0.00059404
Derailment Risk		0.004416235
Weighted Average (Users)	0.000000014	
Total Risk		0.043227849
	Average Consequence	0.592570409
	Collision Frequency	0.072949726

5. OPTION ASSESSMENT AND CONCLUSIONS

5.1 OPTIONS EVALUATED

The options evaluated to mitigate the risks at Dimmock's Cote AHB crossing include:

Option	Term	Risk per Traverse	Collective Risk	FWI	FWI Difference	Cost	Benefit Cost Ratio	Status	Comments
Close via overbridge	Long Term	M	13	0	-.043227849	£10,000,000	0.23	RECOMMENDED Reject.	A bridge would need to cater for use by pedestrians with push chairs etc. and possibly for horses and accommodate maximum height overheads, which would mean that the cost is relatively high. Making it an equestrian bridge would also increase the cost.
Install ANPR cameras	Traffic Change Option	E	2	.039346688	-.003881161	£136,000	0.53	Reject.	Preferred option if MCBOD does not proceed - passes CBA and whilst poor behaviour is not prevalent here would be an effective behaviour modifier
Upgrade to MCB-OD	Long Term	I	4	.002079546	-.041148303	£3,500,000	0.37	Accept.	Natural Upgrade to MCB-OD could be considered here - would need to

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									consider crossing redesign but it is in CP6 plan for March 2022 as at time of writing this.
VAS	Traffic Change Option	E	2	.0420635	-.001164349	£30,000	0.47	Accept.	These are electric signs that are activated when a vehicle approaches the crossing.
Safety campaign	Short Term	E	2	.042839733	-.000388116	£500	N/A	Accept.	This is ongoing by the Level Crossing Manager with the support of the BTP.

NOTES

Network Rail always evaluates the need for short and long-term risk control solutions. An example of level crossing risk management might be a short-term risk control of a temporary speed restriction, with the long-term solution being closure of the level crossing and its replacement with a bridge.

5.2 CONCLUSIONS

Assessor's notes:

Dimmock's Cote is an AHB crossing with two half-width barriers (penguin pedestals) and four RTLs, it has anti-skid tarmac on both road approaches and is monitored from Cambridge signal box.

The crossing is located on the A1123 Newmarket Road southeast of Stretham village near Ely on the Public Highway which has a road speed limit of 60MPH in both directions.

The railway is supplied by 25k overhead line wires which are present at the crossing and deemed 'live' at all times.

The crossing is located between the Ely station and Waterbeach station with direct services into both London Liverpool Street and London Kings Cross stations, the maximum permissible line speed is 75MPH on both roads and the line is open 24 hours a day 365 days a year including bank holidays (UK) only.

The Crossing has a high vehicular usage and a frequent and relatively fast train service which passes over it daily. Pedestrian usage is minimal mainly due to the crossing's location although on occasions the nearby marina facilities may increase this should those using the facilities wish to go for a walk in the surrounding area.

There is a house on the right (downside perspective) next to the crossing; the driveway is 25m from the crossing so could provide an occasional source of blocking back (no evidence from surveys) although it is a left turn after passing over the crossing.

There is also a layby just before the crossing on the left, this crossing falls in the Flood zone territory which means there is a chance that the crossing could flood due to its location, and that it is located by two rivers close by but again this has never been known to happen.

Dimmock's Cote AHB crossing falls within the Ely Area Capacity Enhancement (EACE) as the original plan was to build an overbridge over the crossing and apply for full closure but due to the potential cost and size of project this would have to be a joint venture with the highway's agency.

Dimmock's Cote AHB has now been accepted for an upgrade to an full barrier manually controlled with obstacle detection (MCB-OD) as part of the Cambridge C3R project.

Options to be considered: -

Closure by overbridge/Under-pass: - This would be the obvious preferred option but in all likelihood is probably unlikely unless the local Council and Highways Authority decide upon a major highways improvement scheme here or it is considered as part of an extension of the latest Ely development project.

In any event this would in all likelihood require a major highway redesign and probable land/residence purchases and possibly multiple bridging arrangements. It is unlikely that a diversionary route could be achieved in a singular capacity with just a Railway Bridge which probably makes this option untenable despite potentially a fairly positive CBA. It could still be worthwhile investigating whether the council and HA have any long-term plans for a major road bridge scheme here given the potential positive CBA for closure for the crossing as an AHB.

An Underpass would be the more expensive option due to the need to solve possible flooding issues; an over-bridge might be more feasible, however there is a house close to the crossing with driveway access 25m from the crossing therefore property purchase may be required. This is likely to increase the cost, although bridges on Optioneering meeting held on the 18/12/19 this was considered as part of the Cambridge re signalling project due to take place in CP6. At the last optioneering meeting held on the 10/03/21 this option was rejected due to cost being disproportionate to safety benefit. **At the optioneering meeting held on the 6th July 2022 this option was rejected due to the cost being disproportionate to safety benefit.**

Upgrade to MCB-OD: - This option passes a CBA and is in the Route Signalling CP6 plan for March 2022 as at time of this Assessment. Possible issue with barrier down times and education will be required here to make users aware of the crossing type change. Optioneering meeting held on the 18/12/19 this was agreed and is due to be completed in CP6. At the last optioneering meeting held on the 10/03/21 this option was accepted and passed to the

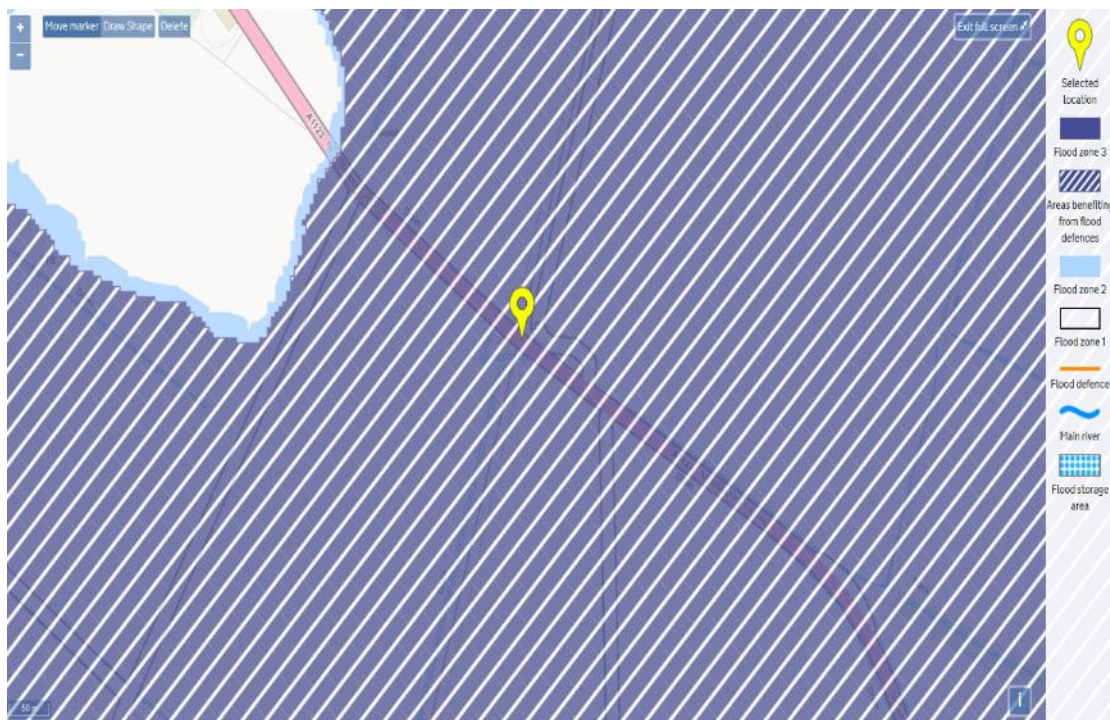


S&T Ram team. This should hopefully be delivered by December 2023. **At the optioneering meeting held on the 6th July 2022 this option was accepted as it is now part of the Cambridge C3R Project.**

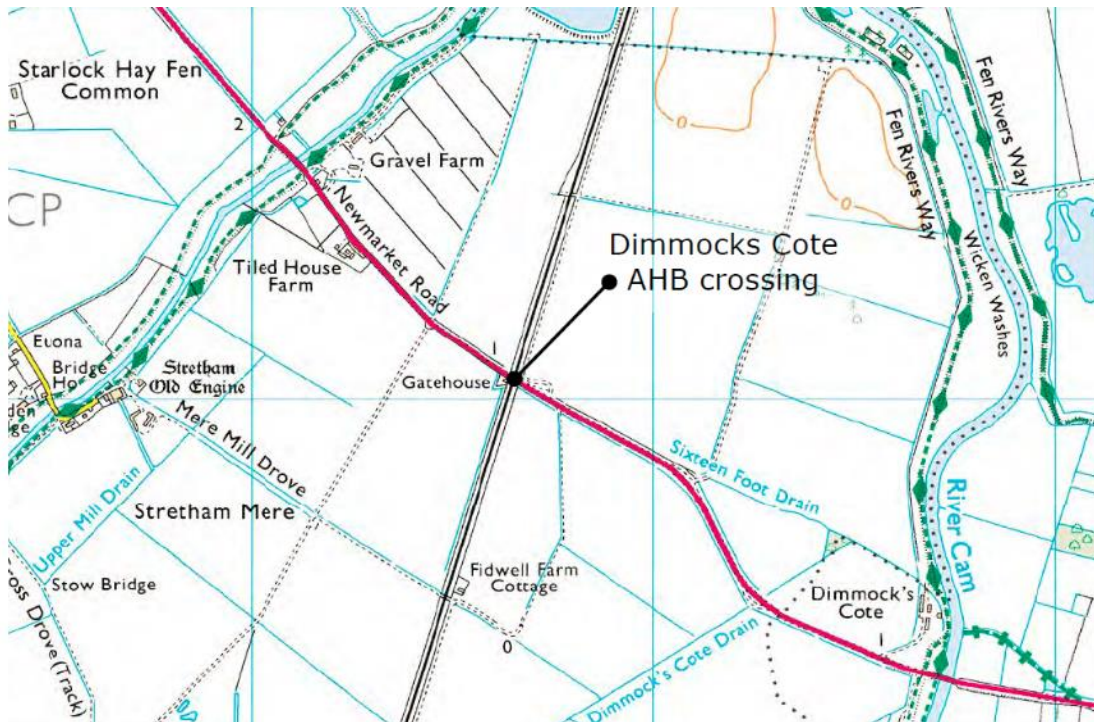
Install ANPR cameras: - Preferred option if MCB/OD does not proceed or is delayed – passes CBA and whilst poor behaviour is not prevalent here would be an effective solution to encourage good continuous behaviour by road users. Optioneering meeting held on the 18/12/19 this was accepted and is in the S&T RAM work bank. At the last optioneering meeting held on the 10/03/21 this option was put on hold pending the upgrade to an MCB-OD. **At the optioneering meeting held on the 6th July 2022 this option was rejected as the crossing is due to be upgraded to a MCB-OD crossing.**

VAS: - These are electric signs that are activated when a vehicle approaches the Level Crossing giving the river a visible warning of the level crossing ahead. At the last optioneering meeting held on the 10/03/21 this option was accepted and passed to the sponsor. **At the optioneering meeting held on the 6th July 2022 this option was accepted and passed to the sponsor to deliver.**

Safety campaign: - This will be undertaken by the LCM on his visits to the crossing and will probably be accompanied by the BTP if required. This is ongoing with the LCM with the support of the BTP.

ANNEX A – ADDITIONAL PHOTOGRAPHS**Additional Photographs****Flood zone map.****Cambridge panel 'A'**

OS map.



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	<p>Examples at the crossing include:</p> <ul style="list-style-type: none"> insufficient sighting and / or train warning for all vehicle types; known to be exacerbated by the driving position, e.g. tractor level crossing equipment and signage is not conspicuous or optimally positioned instructions for safe use might be misunderstood e.g. signage clutter detracts from key messages, conflicting information given high volume of unfamiliar users, e.g. irregular visitors, migrant workers known user complacency leading to high levels of indiscipline, e.g. failure to use telephone, gates left open type of vehicle unsuitable for crossing; <ul style="list-style-type: none"> large, low, slow making access or egress difficult and / or vehicle is too heavy for crossing surface risk of grounding and / or the severity of the gradient adversely affects ability to traverse poor decking panel alignment / position on skewed crossing where telephones are provided, users experience a long waiting time due to: 	<p>Controls can include:</p> <ul style="list-style-type: none"> optimising the position of equipment and / or signs removing redundant and / conflicting signs engaging with signalling engineers to optimise strike in times upgrading of asset to a higher form of protection downgrading of crossing by removing vehicle access rights optimising sighting lines and / or providing enhanced user-based warning system, e.g. MSL re-profiling of crossing surface engaging with stakeholders / authorised users to reinforce safe crossing protocol, legal responsibilities and promote collaborative working widening access gates and / or improving the crossing surface construction material realigning or installing additional decking panels to accommodate all vehicle types implementing train speed restriction or providing crossing attendant

	Hazard	Control
	<ul style="list-style-type: none"> - long signal section (Signaller unaware of exact train location) - high train frequency • insufficient or excessive strike in times at MSL crossings • high chance of a second train coming • high line speed and / or high frequency of trains • unsuitable crossing type for location, train service, line speed and vehicle types 	
Pedestrian and train collision risk	<p>Examples include:</p> <ul style="list-style-type: none"> • insufficient sighting and / or train warning • ineffective whistle boards; warning inaudible, insufficient warning time provided, known high usage between 23:00 and 07:00 • high chance of a second train coming • high line speed and / or high frequency of trains • level crossing equipment and signage is not conspicuous or optimally positioned • location and position of level crossing gates mean that users have their backs to approaching trains when they access the level crossing, i.e. users are initially unsighted to trains approaching from their side of the crossing • instructions for safe use might be misunderstood e.g. signage clutter detracts from key messages, conflicting information given • surface condition or lack of decking contribute to slip trip risk 	<p>Controls can include:</p> <ul style="list-style-type: none"> • optimising the position of equipment and / or signs • removing redundant and / conflicting signs • upgrading of asset to a higher form of protection • optimising sighting lines, e.g. de-vegetation programme, repositioning of equipment or removal of redundant railway assets • implementing train speed restriction or providing crossing attendant • providing enhanced user-based warning system, e.g. MSL • engaging with stakeholders / authorised users to reinforce safe crossing protocol, legal responsibilities and promote collaborative working • installing guide fencing and / or handrails to encourage users to look for approaching trains, read signage or cross at the designed decision point

	Hazard	Control
	<ul style="list-style-type: none"> known high level of use during darkness increased likelihood of misuse, e.g. crossing is at station free wicket gates might result in user error high volume of unfamiliar users, e.g. irregular visitors / ramblers, equestrians complacency leading to high levels of indiscipline, e.g. users are known to rely on knowledge of timetable high level of use by vulnerable people where telephones are provided i.e. bridleways, users experience a long waiting time due to: <ul style="list-style-type: none"> long signal section (Signaller unaware of exact train location) high train frequency insufficient or excessive strike in times at MSL crossings unsuitable crossing type for location, train service, line speed and user groups high usage by cyclists degree of skew over crossing increases traverse time and users' exposure to trains crossing layout encourages users not to cross at the designed decision point; egress route unclear especially during darkness <p>schools, local amenities or other attractions are known to contribute towards user error</p>	<ul style="list-style-type: none"> re-design of crossing approach so that users arrive at the crossing as close to a 90° angle as possible installing lighting sources engaging with signalling engineers to optimise strike in times providing decking or improving crossing surface, e.g. holdfast, strail, non-slip surface providing cyclist dismount signs and / or chicanes straightening of crossing deck

	Hazard	Control
Pedestrian and road vehicle collision risk	<p>Examples include:</p> <ul style="list-style-type: none"> • a single gate is provided for pedestrian and vehicle users where there is a high likelihood that both user groups will traverse at the same time • the position of pedestrian gate forces / encourages pedestrian users to traverse diagonally across the roadway • road / footpath inadequately separated; footpath not clearly defined • condition of footpath surface increases the likelihood of users slipping / tripping into the path of vehicles 	<p>Controls can include:</p> <ul style="list-style-type: none"> • providing separate pedestrian gates • clearly defining the footpath; renew markings • positioning pedestrian gates on the same side of the crossing • improving footpath crossing surface so it is devoid of potholes, excessive flangeway gaps and is evenly laid • improving crossing surface, e.g. holdfast, strail, non-slip surface
Personal injury	<p>Examples include:</p> <ul style="list-style-type: none"> • skewed crossing with large flangeway gaps results in cyclist, mobility scooter, pushchair or wheelchair user being unseated • condition of footpath surface increases the likelihood of users slipping / tripping • degraded gate mechanism or level crossing equipment • barrier mechanism unguarded / inadequately protected 	<p>Controls can include:</p> <ul style="list-style-type: none"> • improving fence lines • reducing flangeway gaps and straightening where possible • providing decking or improving crossing surface, e.g. holdfast, strail, non-slip surface • straighten / realign gate posts • fully guarding barrier mechanisms

ANNEX C – ALCRM RISK SCORE EXPLANATION

ALCRM calculates the level of risk to individual users (per traverse) and the combined risks for all users, train staff and passengers at level crossings. It provides a consistent and robust quantitative methodology that is supplemented by the local knowledge and professional judgement of risk assessors.

Risk is expressed in fatalities and weighted injuries (FWI). The following values help to explain what this means:

- 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

RISK PER TRAVERSE

This is the level of calculated risk to an individual crossing user. It applies to a single traverse of the level crossing or each time the crossing is used by an individual.

Risk per traverse:

- Can be calculated for crossing users, train staff and passengers. Ranking is based on the risk to users only.
- Does not increase with the number of users.
- Is presented as a simplified ranking 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 risks to individuals on a per traverse basis to be assessed even if usage and Collective Risk is low.
- Can help in the prioritisation of risk mitigation and investment in safety.

Risk Per Traverse Ranking	Probability		FWI/traverse	
	Upper	Lower	Upper	Lower
A	1 in 1	1 in 500000	1	0.000002
B	1 in 500000	1 in 2500000	0.000002	0.0000004
C	1 in 2500000	1 in 12500000	0.0000004	0.00000008
D	1 in 12500000	1 in 62500000	0.00000008	0.000000016
E	1 in 62500000	1 in 125000000	0.000000016	0.000000008
F	1 in 125000000	1 in 250000000	0.000000008	0.000000004
G	1 in 250000000	1 in 500000000	0.000000004	0.000000002
H	1 in 500000000	1 in 1000000000	0.000000002	0.000000001
I	1 in 1000000000	1 in 2000000000	0.000000001	0.0000000005
J	1 in 2000000000	1 in 5000000000	0.0000000005	0.0000000002
K	1 in 5000000000	1 in 10000000000	0.0000000002	0.0000000001
L	1 in 10000000000	Greater than 0	0.0000000001	Greater than 0
M	0	0	0	0

COLLECTIVE RISK

This is the total calculated 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 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 help in the prioritisation of risk mitigation and investment in safety.

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