[redacted]
By email: [redacted]

Network Rail
Freedom of Information
The Quadrant
Elder Gate
Milton Keynes
MK9 1EN

T 01908 782405
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1st June 2018

Dear Mr [redacted]

Information request
Reference number: **FOI2018/00640**

Thank you for your email of 24th May 2018, in which you requested the following information:

> *'There are four level crossings that I am interested in. These are shown in the attached plan. To help orient you as to what this plan shows, the four sites are on the rail line between York and Knaresborough and include the level crossings at Cattal station and Hammerton station along with one site between the two stations and one a short distance to the west of Cattal.*
>
> *For info, we are working as part of a team which is looking at master-planning associated with a potential new residential settlement in the vicinity of Cattal/Hammerton. Our work is being carried out on behalf of Harrogate Borough Council, who I understand have had initial discussions with Network Rail during the early stages of the master-planning process.*
>
> *If you are able to provide any information on these sites, including the findings of the latest assessments, it would be much appreciated.'*

I have processed your request under the terms of the Freedom of Information Act 2000 (FOIA).

I can confirm that we do hold the information you have requested, Please see attached the latest risk assessments for the level crossings labelled:

- Cattal Station MGH-5119-2016-12-14_Redacted

- Cattal Station SPC-8303-2016-12-14_Redacted
- Hammerton Station FPW-8281-2016-08-05_Redacted
- Hammerton Station MGH-5116-2016-08-31_Redacted
- Hammerton Road-MGH-511/-2017-02-07-Redacted
- Hammerton Road-FPW-8301-2014-05-15-Redacted
- Scate Moor-FPG-5121-2016-11-02-Redacted

For your information, Hammerton Road Level Crossing redacted documents contains the information for Parker Lane Level Crossing.

I have withheld the name, phone number and email address of a member of staff from each of these documents under section 40(2) of the FOIA. This exemption allows us to withhold information in circumstances where its disclosure would breach the data protection principles set out at s.35 of the Data Protection Act 2018 and Article 5 of the General Data Protection Regulations. In this instance disclosure would breach the first principle that mandates that data must be processed fairly and lawfully. Here staff members' names, phone numbers and email addresses would clearly make them identifiable and since they would have had no expectation that their personal details would be publicly disclosed through the FOIA, I am satisfied that to do so would be an unfair processing of their personal information.

If you have any enquiries about this response, please contact me in the first instance at FOI@networkrail.co.uk or on 01908 782405. Details of your appeal rights are below.

Please remember to quote the reference number at the top of this letter in all future communications.

Yours sincerely

Claire Duncan
Information Officer

Appeal Rights

If you are unhappy with the way your request has been handled and wish to make a complaint or request a review of our decision, please write to the Head of Freedom of Information at Network Rail, Freedom of Information, The Quadrant, Elder Gate, Milton Keynes, MK9 1EN, or by email at foi@networkrail.co.uk. Your request must be submitted within 40 working days of receipt of this letter.

If you are not content with the outcome of the internal review, you have the right to apply directly to the Information Commissioner for a decision. The Information Commissioner can be contacted at:

Information Commissioner's Office
Wycliffe House
Water Lane
Wilmslow
Cheshire SK9 5AF

NARRATIVE RISK ASSESSMENT – PASSIVE TEMPLATE FINAL v2.0

PASSIVE LEVEL CROSSING RISK ASSESSMENT

1. LEVEL CROSSING OVERVIEW AND ENVIRONMENT

1.1 LEVEL CROSSING OVERVIEW

This is a risk assessment for SCATE MOOR level crossing.

Crossing details	
Name	SCATE MOOR
Type	FPG
Crossing status	Public Bridleway
Overall crossing status	Open
Route name	LNE & EM
Engineers Line Reference	HAY1, 10m, 75ch
OS grid reference	SE436561
Number of lines crossed	1
Line speed (mph)	65
Electrification	No
Signal box	Cattal

Risk assessment details	
Name of assessor	[redacted]
Post	Level Crossing Manager
Date completed	02/11/2016
Next due date	02/02/2019
Email address	[redacted]
Phone number	[redacted]

ALCRM risk score	
Individual risk	C
Collective risk	10
FWI	0.000001095

1.2 INFORMATION SOURCES

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

Consulted	Attended site
Local Authority	No

Stakeholder consultation and attendance notes:

The local authority is consulted on a yearly basis via the regular road rail partnership group meetings.

The reference sources used during the risk assessment included:

- Census, Other (LNE LC Risk tracker used for SMIS & CCIL data on crossing), CCIL.

1.3 ENVIRONMENT

Up side crossing approach

Down side crossing approach

The environment surrounding SCATE MOOR level crossing consists of rural area with fields or other open land in the vicinity.

It is a public bridleway level crossing. A station can be seen from the level crossing.

At SCATE MOOR level crossing the orientation of the road/path from the north is 180°; the orientation of the railway from the north to the up line in the up direction is 280°. Low horizon can result in sun glare; sun glare is not a known issue.

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 was found to be in good repair on the day of the assessment, with all signage present and correct. Bridle gates were also present and in good condition.

2. LEVEL CROSSING USAGE

2.1 RAIL

The train service over SCATE MOOR level crossing consists of passenger trains. There are 36 trains per day. The highest permissible line speed of trains is 65mph. Trains are timetabled to run for 16.5 hours per day.

Assessor's notes:

Northern Trains operate the York to Harrogate service, two trains an hour run over this section of line. There are no freight trains that use the line.

2.2 USER CENSUS DATA

An estimated census has been used. The census was estimated on 02/11/2016 by [redacted]
The census applies to 100% of the year.

The census taken on the day is as follows:

Pedestrians	FEW
Pedal cyclists	0
Horses / riders	FEW
Animals on the hoof	0

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

Vulnerable user observations:

No vulnerable users were identified from the census data gathered

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

Irregular user observations:

No irregular users were identified from the census data gathered, there is also no local attractions or leisure facilities in the area that would attract this type of user.

Information gathered indicates that SCATE MOOR level crossing does not have a high number of users during the night or at dusk.

Site visit night / dusk user observations:

There was no usage during this time identified from data gathered; the crossing is remote and unlit.

Assessor's general census notes:

Census camera was used to survey usage at the crossing over 9 days. No recorded usage so census is estimated to reflect residual usage at few times a year as the crossing is used from feedback received from locals and the gate keeper at Whixley LC near the crossing.

2.3 USER CENSUS RESULTS

ALCRM calculates usage of the crossing to 0 pedestrians and cyclists per day.

3. RISK OF USE

3.1 SIGHTING AND TRAVERSE

At SCATE MOOR level crossing, the decision point and traverse lengths are calculated as:

	Decision point (m)	Traverse length (m)	Measured from
Up side	2	5.5	2m from nearest rail
Down side	2	5.5	2m from nearest rail

Timber decking is provided over the level crossing. The decking is considered to be wide enough for all users of the crossing. It is fitted with a non-slip surface.

The traverse times are calculated as:

	Traverse time (s)
Pedestrians	5

The current census has not identified a high proportion of vulnerable users. Therefore, the pedestrian traverse time has not been increased.

Assessor's traverse time notes:

Traverse time based upon able bodied users and horse riders

Sighting was measured by the following means:

- Range Finder

Sighting, measured in metres, at SCATE MOOR level crossing is recorded as:

All distances are recorded in metres	Minimum sighting distance required	Measured sighting distance	Sighting distance measured to	Is sighting compliant?	If deficient, is sighting distance mitigated?	Notes on deficient sighting time mitigations
Up side looking toward up direction train approach	135	1202	Bridge 12	Yes		Long straight train approach for over 1000 metres
Up side looking toward down direction train approach	135	1066	Cattal Station	Yes		Long straight train approach for over 1000 metres
Down side looking toward up direction train approach	135	1202	Bridge 12	Yes		Long straight train approach for over 1000 metres
Down side looking toward down direction train approach	135	1066	Cattal Station	Yes		Long straight train approach for over 1000 metres

Sighting restrictions are recorded as follows:

	Up Direction	Down Direction
Nothing; vanishing point	YES	YES
Track curvature	NO	NO
Permanent structure (building/wall etc.)	NO	NO
Signage or crossing equipment	NO	NO
Vegetation	NO	NO
Bad weather on the day of visit	NO	NO
Other	NO	NO

There are known obstructions that could make it difficult for users to see approaching trains. There are known issues with foliage, fog or other issues that might impair visibility of the crossing, crossing equipment or approaching trains.

Actions to improve sighting have not been identified.

Assessor's improving sighting and decision point notes

Sighting cannot be improved further.

Assessor's general sighting and traverse notes:

Traverse time was based upon able bodied users and equestrian riders.

3.2 EVALUATION OF MITIGATIONS

3.3 CROSSING APPROACHES

The signs at SCATE MOOR level crossing are located on the direct route a user would take over the level crossing; they are positioned so that they are clearly visible to users taking a direct route over the level crossing. The visibility of the signs is reduced at night or at dusk.

The approaches to the crossing within the boundary fence are considered to be steep, slippery or present a tripping hazard to users.

Assessor's notes:

The approaches to both sides are fairly steep

There are no adjacent sources of light or noise that could affect a users' ability to see or hear approaching trains.

Assessor's general crossing approach notes:

Signs are unlit and there is no nearby source of ambient lighting however they can easily be seen with a personal light source. On the up side the bridge gate is 20 metres from the decision point on the down side the bridle gate is 10 metres from the decision point

3.4 AT THE CROSSING – ANOTHER TRAIN COMING RISK

The likelihood of a second train approaching does not exist at this crossing as it is a single track line.

3.5 INCIDENT HISTORY

A level crossing safety event has not been known to occur at SCATE MOOR level crossing in the last twelve months.

Assessor's incident history notes:

There have been no recorded incidents of deliberate misuse at the crossing.

4. ALCRM CALCULATED RISK

SCATE MOOR ***level crossing ALCRM results***

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

- User misuses

Assessor's key risk drivers notes

User misuses is a key risk at this crossing as it relies on the ability of the members of public to use the crossing correctly. However misuse is not an issue here as the crossing is used correctly.

Safety risk				
Compared to other crossings the safety risk for this crossing is	**Individual risk**		**Collective risk**	
	C		**10**	
	Individual risk (fraction)	**Individual risk (numeric)**		
Car	0	0	0	
Van / small lorries	0	0	0	
HGV	0	0	0	
Bus	0	0	0	
Tractor / farm vehicle	0	0	0	
Cyclist / Motor cyclist	0	0	0	
Pedestrian	1 in 22061	0.000045328	0.000001089	
				Derailment contribution
Passengers			0	0
Staff			0.000000007	0

Total			0.000001095	0
Collision frequencies	**Train / user**	**User equipment**	**Other**	
Vehicle	0	0	0	
Pedestrian	0.000001341	0.000000288	0.00000079	
Collision risk	**Train / user**	**User equipment**	**Other**	
Vehicle	0	0	0	
Pedestrian	0.000001067	0.000000005	0.000000017	

5. OPTION ASSESSMENT AND CONCLUSIONS

5.1 OPTIONS EVALUATED

The options evaluated to mitigate the risks at SCATE MOOR crossing include:

Option	Term[1]	ALCRM risk score	ALCRM FWI	Safety Benefit	Cost	Benefit Cost Ratio	Status	Comments
Closure of crossing by diversion of bridleway	Long Term	M13	0.0	100%	N/A	N/A	COMPLETE	The crossing has been identified for closure as part of the programmed re-signalling and line enhancement; the bridleway route will be diverted via Whixley LC which is approximately 125 metres west of the crossing. This has received the backing of the local authority.
Fitment of miniature warning light (Red/Green) equipment (MSL)	Long Term	D12	2.46E-7	78%	N/A	N/A	COMPLETE	If closure cannot be secure, MSL's type equipment would be beneficial as it would see an increase in safety. However it would not meet cost/benefit on its own, it however can be looked at as part of a package with other UWCT's as part of the impending line re-signalling and enhancement project for the line.

NOTES

Network Rail always evaluates the need for short[1] 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.

[1] Includes interim

CBA gives an indication of overall business benefit. It is used to support, not override, structured expert judgement when deciding which option(s) to progress. CBA might not be needed in all cases, e.g. standard maintenance tasks or low cost solutions (less than £5k).

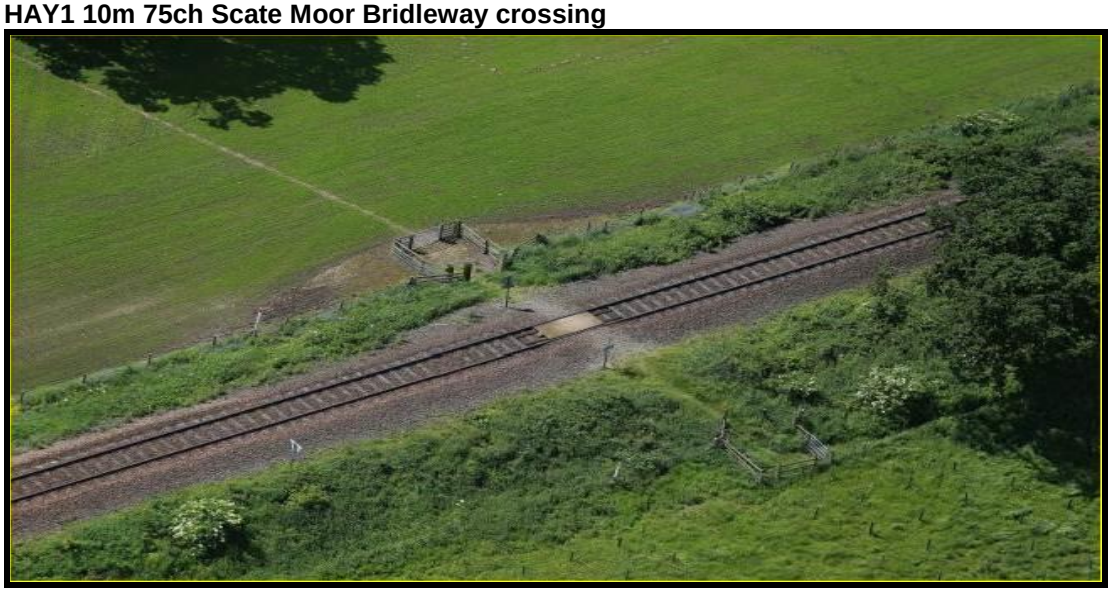
The following CBA criteria are used as a support to decision making:

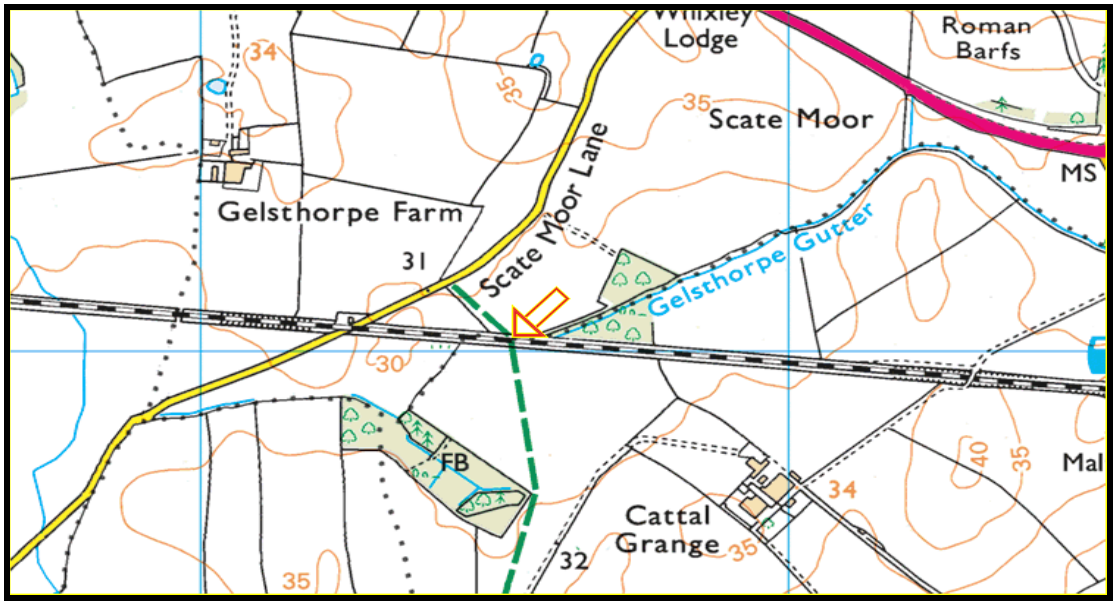
a. benefit to cost ratio is ≥ 1: positive safety and business benefit established;
b. benefit to cost ratio is between 0.99 and 0.5: reasonable safety and business benefit established where costs are not grossly disproportionate against the safety benefit; and
c. benefit to cost ratio is between 0.49 and 0.0: weak safety and business benefit established.

5.2 CONCLUSIONS

Assessor's notes:

HAY1 10m 75ch Scate Moor Bridleway crossing





Crossing Information

The crossing forms part of a bridleway route that starts in the village of Hunsingore and ends just the on the northern side of the crossing at Scate Moor Lane. There is currently no evidence of usage by horse riders at the crossing. The crossing is in good repair and enjoys good levels of sighting during clear weather.

Hazards associated with the crossing

Like all passive crossings the sighting available to view approaching trains can be reduced in periods of fog and bad weather such as heavy rain, snow and low winter sun. There is also an element of trust in the public to use the crossing correctly and not deliberately misuse the crossing.

Current risk controls

There are currently no engineered solutions at the crossing for reduced sighting. Continual public engagement will help to reduce the risk of deliberate misuse.

Long term
The line is due to be re-signalled and capacity enhanced 2026, the crossing has been earmarked for closure as part of this project with the bridleway being diverted over nearby Whixley LC. If this is not achieved the option of looking at further safety mitigations such as MSL type equipment can assessed for the crossing at this stage.

All the options detailed are subject to available funding and final approval from the route asset management team.

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: • 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; - 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: - 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	Controls can include: • 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
Pedestrian and train collision risk	Examples include: • insufficient sighting and / or train warning • ineffective whistle boards; warning inaudible, insufficient warning	Controls can include: • optimising the position of equipment and / or signs • removing redundant and / conflicting signs

	Hazard	Control
	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 • known high level of use during darkness • increased likelihood of user error, 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: - 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	• 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 • 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
	schools, local amenities or other attractions are known to contribute towards user error	
Pedestrian and road vehicle collision risk	Examples include: • 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	Controls can include: • 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	Examples include: • 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	Controls can include: • 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 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

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 HAMMERTON STATION level crossing.

Crossing details	
Name	HAMMERTON STATION
Type	MGH
Crossing status	Public Highway
Overall crossing status	Open
Route name	LNE & EM
Engineers Line Reference	HAY1, 8m, 61ch
OS grid reference	SE470558
Number of lines crossed	2
Line speed (mph)	65
Electrification	None
Signal box	Hammerton

Risk assessment details	
Name of assessor	[redacted]
Post	Level Crossing Manager
Date completed	31/08/2016
Next due date	30/11/2019
Email address	LNELevelcrossings@networkrail.co.uk
Phone number	[redacted]

ALCRM risk score	
Individual risk	H
Collective risk	6
FWI	0.000184554

1.2 INFORMATION SOURCES

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

Consulted	Attended site
signaller	Yes

Stakeholder consultation attendance notes:

The signaller was consulted on the day of the risk assessment (RA). The local highways authority will be consulted over any issues as part of the road rail partnership group

The reference sources used during the risk assessment included:

- Other (LNE LC risk tracker used to analyse CCIL, SMIS & misuse reporting tool date recorded against the crossing), CCIL, SMIS

1.3 ENVIRONMENT

Up side crossing approach

Down side crossing approach

The level crossing is located on Station Road / Crooked Lane, Kirk Hammerton which is a Public Highway. The road approach speed is estimated to be less than or equal to 30mph. The level crossing is at a station

At HAMMERTON STATION the orientation of the road/path from the north is 50°; the orientation of the railway from the north to the up line in the up direction is 100°. Low horizon can result in sun glare; sun glare is not a known issue.

There are planned or apparent developments near the crossing which may lead to a change or increase in use or risk.

Site visit general observations:

Planning permission has been submitted for a small housing development on the site of the Agricorn engineering site approx 23 metres from the crossing on the up side. 15 houses are planned and network Rail are in full consultation over the planning application. The crossing is situated on the apex of a hill and blind bend.

2. LEVEL CROSSING USAGE

2.1 RAIL

The train service over HAMMERTON STATION level crossing consists of passenger trains. There are 36 trains per day. The highest permissible line speed of trains is 65mph. Trains are timetabled to run for 16.5 hours per day.

Assessor's train service notes:

Northern Trains operate the York to Harrogate service, two trains an hour run over this section of line. There are no freight trains that use the line.

2.2 USER CENSUS DATA

A 24 hour census was carried out on 15/01/2014 by Sky High count on us undertaken Jan 2014. The census applies to 100% of the year.

The census taken on the day is as follows:

Cars	424
Vans / small lorries	43
Buses	4
HGVs	16
Pedal / motor cyclists	9
Pedestrians	0

Tractors / farm vehicles	1
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:

There are no vulnerable users that use this part of the crossing as there is a separate pedestrian crossing next to the vehicular gates.

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

Irregular user observations:

No irregular users have been identified using this crossing.

Assessor's general census notes:

9 day census undertaken by Sky High average day usage was calculated from the data.

2.3 USER CENSUS RESULTS

ALCRM calculates usage of the crossing to be 488 road vehicles and 9 pedestrians and cyclists per day.

3. RISK OF USE

3.1 CROSSING APPROACHES

The road approach speed is estimated to be less than or equal to 30mph. None of the approach roads to HAMMERTON STATION level crossing are 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:

Access to garage and station car park on the up side (north side) approach approx 19 metres form crossing.
Access to property on down side (south side) approach approx. 20 metres form the crossing.

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 no known issues with foliage or fog.

Assessor's notes:

The crossing is located on the brow of a hill and the apex of the road bend; this means vehicles approaching from both sides will not see each other until on the crossing. There are level crossing road signs that warn drivers that they are approaching a 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.

3.3 AT THE CROSSING – BLOCKING BACK

Assessor's notes:

There have been no recorded incidents of blocking back on the crossing; the signaller on the day of the assessment also confirms that he has never seen any blocking back. The road over the crossing is a lightly used road.

3.4 AT THE CROSSING – ANOTHER TRAIN COMING RISK

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

Assessor's another train coming notes:

Trains are known to pass each other at this crossing. The station is located on a two track section that separates two single line sections. This is where the trains pass each other between Hammerton and Cattal stations. There is no risk to users as the gates remain closed if the trains pass here.

3.5 INCIDENT HISTORY

A level crossing safety event has not been known to occur at HAMMERTON STATION crossing in the last twelve months.

Red light violations / barrier weaving

Assessor's notes:

The crossing has no Red lights or barriers. It is a manned gated crossing.

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	N/A	N/A	N/A
Down line	N/A	N/A	N/A

Assessor's notes and observations on strike in times:

The gates are operated by the crossing keeper. There is no designed strike in times for this crossing.

4. ALCRM CALCULATED RISK

HAMMERTON STATION ***level crossing ALCRM results***

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

- Near station

Assessor's key risk drivers notes

The risk from the station will be a tendency for car drivers to park by the crossing to pick up or drop of people using the train service. The application of double Yellow lines at the crossing would help with enforcement of this and future proof the crossing when it eventually is renewed to a barrier crossing.

Safety risk				
Compared to other crossings the safety risk for this crossing is	**Individual risk**		**Collective risk**	
	H		**6**	
	Individual risk (fraction)	**Individual risk (numeric)**		
Car	1 in 3389830	0.000000295	0.000110257	
Van / small lorries	1 in 274876	0.000003638	0.000011182	
HGV	1 in 310462	0.000003221	0.000001371	
Bus	1 in 776397	0.000001288	0.000000343	
Tractor / farm vehicle	1 in 19403	0.000051537	0.000000086	
Cyclist / Motor cyclist	1 in 420875	0.000002376	0.000015609	
Pedestrian	0	0	0	
				Derailment contribution
Passengers			0.000015569	97.835950332
Staff			0.000030138	5.63506222
Total			0.000184554	9.173623913
Collision frequencies	**Train / user**	**User equipment**	**Other**	
Vehicle	0.000229683	0.016954643	0.000019573	
Pedestrian	0.000012649	0.000118243	0.000156647	
Collision risk	**Train / user**	**User equipment**	**Other**	
Vehicle	0.000123238	0	0	
Pedestrian	0.000010271	0.000001892	0.000003446	

5. OPTION ASSESSMENT AND CONCLUSIONS

5.1 OPTIONS EVALUATED

The options evaluated to mitigate the risks at HAMMERTON STATION crossing include:

Option	Term[1]	ALCRM risk score	ALCRM FWI	Safety Benefit	Cost	Benefit Cost Ratio	Status	Comments
Closure of the crossing.	Long Term	M13	0.0	100%	N/A	N/A	COMPLETE	The closure of the crossing will be assessed by the Harrogate line re-signalling and line enhancement project due to deliver in 2026. The option of a bridge to close two crossings has been potentially identified
Renew to MCB-OD	Long Term	J8	3.3126E-5	82%	N/A	N/A	COMPLETE	If closure does not become possible, a full barrier MCB-OD crossing will be considered by the Harrogate line re-signalling and line enhancement project.
Application of double Yellow lines at the crossing	Long Term	H6	1.84554E-4	No quantative benefit	N/A	N/A	COMPLETE	To prevent the temptation of vehicles parking close to the crossing double Yellow lines will be useful enforcement mitigation. This will prove even more beneficial if they are in place when the crossing is eventually renewed to a full barrier crossing. Consultation with the local highways authority will be

								required for this to go ahead

NOTES
Network Rail always evaluates the need for short[1] 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.
[1] Includes interim

CBA gives an indication of overall business benefit. It is used to support, not override, structured expert judgement when deciding which option(s) to progress. CBA might not be needed in all cases, e.g. standard maintenance tasks or low cost solutions (less than £5k).

The following CBA criteria are used as a support to decision making:

a. benefit to cost ratio is ≥ 1: positive safety and business benefit established;
b. benefit to cost ratio is between 0.99 and 0.5: reasonable safety and business benefit established where costs are not grossly disproportionate against the safety benefit; and
c. benefit to cost ratio is between 0.49 and 0.0: weak safety and business benefit established.

5.2 CONCLUSIONS

Assessor's notes:

HAY1 8m 61ch Hammerton Station crossing details

The crossing is located on a small minor road that gives access to the village of Green Hammerton from the A59. The crossing is in good repair and offers suitable and sufficient protection to road users.

Hazards associated with the crossing

The crossing is located next to a station so there is a risk car drivers will park very close to the crossing to collect or deposit passengers for the train service or possible try to beat the crossing keeper to get to the right side for the train. This is very a minimal risk and there have been no reports of this type of incident.

Risk Control

Signallers have good sighting of approaching vehicles when closing the gates. The application of double yellow lines will also discourage parking next to the crossing if the crossing is renewed to an automatic type.

Long Term Options

With the Harrogate line re-signalling and capacity enhancements due to take place 2026 the crossing will be considered for 2 possible options as detailed in table 5.1. Closure of the crossing and provision of a bridge. This would allow the removal of the crossing and associated risk, maintenance and renewal costs of the asset. Renewal to an MCB-OD full barrier system. This will offer a level of protection which is the same or better as what is already in place. The only perceivable risk is how the crossing is located on the brow of a hill and the apex of a bend and impact on the crossing of a possible two way collision between vehicles. Cars parking next to the crossing to drop off or collect passengers would also increase this risk.

Until then there are no plans to improve or upgrade the crossing as it is currently offering the best protection to users.

All the options detailed will be subject to funding and approval from the route asset manager.

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

NARRATIVE RISK ASSESSMENT – PASSIVE TEMPLATE FINAL v2.0

PASSIVE LEVEL CROSSING RISK ASSESSMENT

1. LEVEL CROSSING OVERVIEW AND ENVIRONMENT

1.1 LEVEL CROSSING OVERVIEW

This is a risk assessment for Hammerton Station level crossing.

Crossing details	
Name	Hammerton Station
Type	FPW
Crossing status	Public Footpath
Overall crossing status	Open
Route name	LNE & EM
Engineers Line Reference	HAY1, 8m, 61ch
OS grid reference	SE470558
Number of lines crossed	2
Line speed (mph)	65
Electrification	None
Signal box	Hammerton

Risk assessment details	
Name of assessor	[redacted]
Post	Level Crossing Manager
Date completed	15/08/2016
Next due date	15/11/2018
Email address	[redacted]@networkrail.co.uk
Phone number	[redacted]

ALCRM risk score	
Individual risk	D
Collective risk	4
FWI	0.001475841

1.2 INFORMATION SOURCES

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

Consulted	Attended site
Hammerton Station signaller	Yes

Stakeholder consultation and attendance notes:

The signaller was consulted on the day of the risk assessment (RA). The local highways authority will be consulted over any issues as part of the road rail partnership group

The reference sources used during the risk assessment included:

- Other (LNE LC risk tracker used to analyse CCIL, SMIS and misuse reporting tool data recorded against the crossing), CCIL, SMIS.

1.3 ENVIRONMENT

Up side crossing approach

Down side crossing approach

The environment surrounding Hammerton Station level crossing consists of town or village etc on both sides of the line.

It is a public footpath level crossing which is located on At Hammerton station. The level crossing is at a station.

At Hammerton Station level crossing the orientation of the road/path from the north is 50°; the orientation of the railway from the north to the up line in the up direction is 100°. Low horizon can result in sun glare; sun glare is a known issue.

There are planned or apparent developments near the crossing which may lead to a change or increase in use or risk.

Site visit general observations:

The pedestrian crossing is a separate crossing from the main vehicular gates but is situated alongside the main crossing. The pedestrian crossing is used by the public to access the station platforms or to cross over to the village. Planning permission has been submitted for a small housing development on the site of the Agricorn engineering site approx 23 metres from the crossing on the up side. 15 houses are planned and network Rail are in full consultation over the planning application.

2. LEVEL CROSSING USAGE

2.1 RAIL

The train service over Hammerton Station level crossing consists of passenger trains. There are 36 trains per day. The highest permissible line speed of trains is 65mph. Trains are timetabled to run for 16.5 hours per day.

Assessor's notes:

Northern Trains operate the York to Harrogate service, two trains an hour run over this section of line. There are no freight trains that use the line.

2.2 USER CENSUS DATA

A 24 hour census was carried out on 15/08/2016 by Sky High Count on us. The census applies to 100% of the year.

The census taken on the day is as follows:

Pedestrians	57
Pedal cyclists	0
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:

No vulnerable users were identified by the census, however as this is also for station access there will be some vulnerable users using the train services but this would be in the minority.

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

Irregular user observations:

No irregular users were identified by the census. The majority of the pedestrians are passengers accessing the station.

Information gathered indicates that Hammerton Station level crossing does not have a high number of users during the night or at dusk.

Site visit night / dusk user observations:

There are users that do use the crossing during the night/dusks time but these are passengers the dark times apply mainly to the winter months. There is station lighting which also illuminates the crossing.

Assessor's general census notes:

An average daily figure was calculated from a 9 day census undertaken by Sky High Count On Us

2.3 USER CENSUS RESULTS

ALCRM calculates usage of the crossing to be 0 road vehicles and 57 pedestrians and cyclists per day.

3. RISK OF USE

3.1 SIGHTING AND TRAVERSE

At Hammerton Station level crossing, the decision point and traverse lengths are calculated as:

	Decision point (m)	Traverse length (m)	Measured from
Up side	2	10.5	2m from the nearest running rail
Down side	2	10.5	2m from the nearest running rail

Concrete decking is provided over the level crossing. The decking is considered to be wide enough for all users of the crossing. It is fitted with a non-slip surface.

The traverse times are calculated as:

	Traverse time (s)
Pedestrians	9

The current census has not identified a high proportion of vulnerable users. Therefore, the pedestrian traverse time has not been increased.

Assessor's traverse time notes:

Traverse time s based upon able bodied users crossing over.

Sighting was measured by the following means:

- Using Range Finder
- Using a marker at a known distance

Sighting, measured in metres, at Hammerton Station level crossing is recorded as:

All distances are recorded in metres	Minimum sighting distance required	Measured sighting distance	Sighting distance measured to	Is sighting compliant?	If deficient, is sighting distance mitigated?	Notes on deficient sighting time mitigations
Up side looking toward up direction train approach	257	715	Hammerton Road LC	Yes		Long straight approach for 1000 metres, main crossing gates
Up side looking toward down direction train approach	257	543	Train approach fully sighted	Yes		Train approaches on a sweeping left hand bend approaching Hammerton Station platform. Train must come to a stop to exchange single line token
Down side looking toward up direction train approach	257	715	Hammerton Road LC	Yes	YES	
Down side looking toward down direction train approach	257	453	Train approach fully sighted	Yes		Train approaches on a sweeping left hand bend approaching Hammerton Station platform. Train must come to a stop to exchange single line token

Sighting restrictions are recorded as follows:

	Up Direction	Down Direction
Nothing; vanishing point	NO	NO
Track curvature	YES	YES
Permanent structure (building/wall etc.)	NO	NO
Signage or crossing equipment	NO	NO
Vegetation	NO	NO
Bad weather on the day of visit	NO	NO

Other	NO	NO

There are known obstructions that could make it difficult for users to see approaching trains. There are known issues with foliage, fog or other issues that might impair visibility of the crossing, crossing equipment or approaching trains.

Actions to improve sighting have not been identified.

Assessor's improving sighting and decision point notes

Sighting cannot be improved due to the rail infrastructure, however a station notice board on the up side approach was recently relocated to improve pedestrian visibility of trains approaching in the up direction.

Assessor's general sighting and traverse notes:

The trains often pass at this section of double track. Trains leaving the platform in the down direction can obscure the approach of a train approaching the station in the up direction to users of the crossing and vice versa. The main road gates are also located at the decision point. The up side pedestrians can look down the line behind the gate posts (2.2 metres) as a large sign was recently removed to improve sighting. On the down side sighting is obscured by the gates and vegetation at 2.1 metres but users can see the train approaching in the down direction when the road gates are closed. When the road gates are closed the users will know the trains are approaching and there is signage in place instructing users not to crossing when the main gates are closed. All trains slow to a stop at the station to exchange single line tokens

3.2 EVALUATION OF MITIGATIONS

3.3 CROSSING APPROACHES

The signs at Hammerton Station level crossing are located on the direct route a user would take over the level crossing; they are positioned so that they are clearly visible to users taking a direct route over the level crossing. The visibility of the signs is not reduced at night or at dusk.

The approaches to the crossing within the boundary fence are not considered to be steep, slippery or present a tripping hazard to users.

There are no adjacent sources of light or noise that could affect a users' ability to see or hear approaching trains.

Assessor's general crossing approach notes:

The crossing is used by the public as well as train passengers and runs alongside the main road crossing

3.4 AT THE CROSSING – ANOTHER TRAIN COMING RISK

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

Assessor's another train coming notes:

Trains are known to pass each other at this crossing. The station is located on a two track section that separates two single line sections. This is where the trains pass each other between Hammerton and Cattal stations. There is no risk to users as the gates remain closed if the trains pass here.

3.5 INCIDENT HISTORY

A level crossing safety event has been known to occur at Hammerton Station level crossing in the last twelve months.

Assessor's incident history notes:

One incident of deliberate misuse in June 2016 of a man walking across the crossing in front of an approaching train

4. ALCRM CALCULATED RISK

Hammerton Station ***level crossing ALCRM results***

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

- User misuses
- Large number users
- Near station
- Sun glare

Assessor's key risk drivers notes

The incidents of user deliberate misuse is rare, only one recorded incident in 2 years however the fact the crossing is next to the station increases the chances of a user deliberately misusing the crossing to get across to either platform to catch a train. Sun glare will happen 07:15 – 08:15 in the morning for users looking eastbound for approaching trains and between 17:30 – 18:30 for users looking westbound for approaching trains. This is only in the summer months. The effect of sun glare is been measure as minimal risk to users.

Safety risk				
Compared to other crossings the safety risk for this crossing is	**Individual risk**		**Collective risk**	
	D		**4**	
	Individual risk (fraction)	**Individual risk (numeric)**		
Car	0	0	0	
Van / small lorries	0	0	0	
HGV	0	0	0	
Bus	0	0	0	
Tractor / farm vehicle	0	0	0	
Cyclist / Motor cyclist	0	0	0	
Pedestrian	1 in 28363	0.000035257	0.001467037	
				Derailment contribution
Passengers			0	0
Staff			0.000008803	0
Total			0.001475841	0
Collision frequencies	**Train / user**	**User equipment**	**Other**	
Vehicle	0	0	0	
Pedestrian	0.001796629	0.000499768	0.001368973	
Collision risk	**Train / user**	**User equipment**	**Other**	
Vehicle	0	0	0	
Pedestrian	0.001429686	0.000007836	0.000029515	

5. OPTION ASSESSMENT AND CONCLUSIONS

5.1 OPTIONS EVALUATED

The options evaluated to mitigate the risks at Hammerton Station crossing include:

Option	Term[1]	ALCRM risk score	ALCRM FWI	Safety Benefit	Cost	Benefit Cost Ratio	Status	Comments
Provision of a locking mechanism for the pedestrian gates	Long Term	D4	N/A	N/A	N/A	N/A	COMPLETE	The provision of a locking mechanism for the wicket gates would prevent deliberate misuse of the crossing when the main gates are closed for the approach of trains. Impact on the signallers work load would need to be assessed however to determine the risks and benefits.
Closure	Long Term	M13	0.0	100%	N/A	N/A	COMPLETE	There are two options for closure of the crossing which will be assessed by the Harrogate line re-signalling and line enhancement project due to deliver in 2026. The option of a bridge to close two crossings has been potentially identified. If this does not become achievable the crossing will be renewed with and MCD-OD full barrier crossing, this will also allow closure of the separate foot crossing element.

NOTES
Network Rail always evaluates the need for short[1] 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.
[1] Includes interim

CBA gives an indication of overall business benefit. It is used to support, not override, structured expert judgement when deciding which option(s) to progress. CBA might not be needed in all cases, e.g. standard maintenance tasks or low cost solutions (less than £5k).

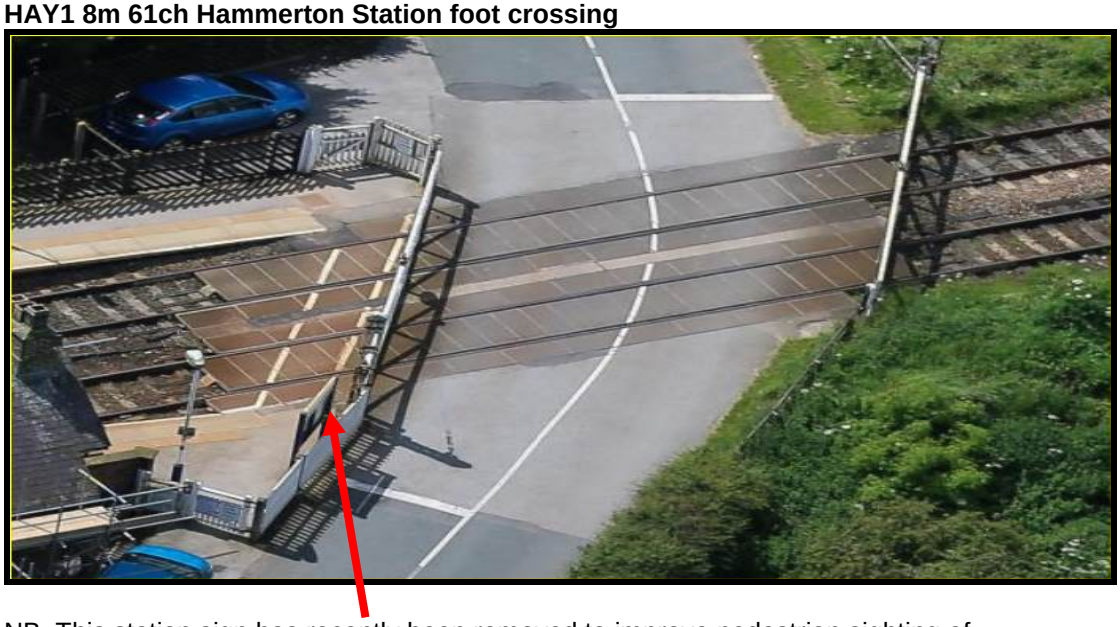
The following CBA criteria are used as a support to decision making:

a. benefit to cost ratio is ≥ 1: positive safety and business benefit established;
b. benefit to cost ratio is between 0.99 and 0.5: reasonable safety and business benefit established where costs are not grossly disproportionate against the safety benefit; and
c. Benefit to cost ratio is between 0.49 and 0.0: weak safety and business benefit established.

5.2 CONCLUSIONS

Assessor's notes:

HAY1 8m 61ch Hammerton Station foot crossing



NB. This station sign has recently been removed to improve pedestrian sighting of approaching trains

The crossing is located on a small minor road that gives access to the village of Green Hammerton from the A59. The crossing is in good repair and sighting is compliant for users.

Hazards associated with the crossing

The crossing is located next to a station so there is a risk that pedestrian users will use the crossing to access the station when trains are approaching to catch the train. In addition there is a risk that alighting passengers may use the crossing when the train is in the station passing in front of it to exit the station. There is a small window of sun glare for an hour in the morning and afternoon in the summer months only

Risk Control

Currently there is signage in place at the crossing to instruct users not cross when the main gates are closed. Sun glare has been measured and the time frame has minimal risk impact on users.

Long Term Options

With the Harrogate line re-signalling and capacity enhancements due to take place 2026 the crossing can be closed with two possible options. Closure of the crossing and provision of a bridge. This would allow the removal of the crossing and associated risk, maintenance and renewal costs of the asset. Renewal to an MCB-OD full barrier system. This will remove the free wicket gates and foot crossing and place the user under the protection of the barriers.

Until then there are no plans to improve or upgrade the crossing as it is but it would benefit in the medium term from some form of locking mechanism of the wicket gates. As this would need the signaller to operate the locking there would need to be a signaller work load assessment to determine the risks and benefits.

All the options detailed will be subject to funding and approval from the route asset manager.

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: • 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; - 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: - 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	Controls can include: • 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
Pedestrian and train collision risk	Examples include: • insufficient sighting and / or train warning • ineffective whistle boards; warning inaudible, insufficient warning	Controls can include: • optimising the position of equipment and / or signs • removing redundant and / conflicting signs

	Hazard	Control
	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 • known high level of use during darkness • increased likelihood of user error, 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: - 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	• 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 • 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
	schools, local amenities or other attractions are known to contribute towards user error	
Pedestrian and road vehicle collision risk	Examples include: • 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	Controls can include: • 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	Examples include: • 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	Controls can include: • 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 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

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 HAMMERTON ROAD level crossing.

Crossing details	
Name	HAMMERTON ROAD
Type	MGH
Crossing status	Public Highway
Overall crossing status	Open
Route name	
Engineers Line Reference	HAY1, 9m, 17ch
OS grid reference	SE463558
Number of lines crossed	2
Line speed (mph)	65
Electrification	No
Signal box	Hammerton

Risk assessment details	
Name of assessor	[redacted]
Post	Level Crossing Manager
Date completed	07/02/2017
Next due date	07/05/2020
Email address	[redacted]@networkrail.co.uk
Phone number	[redacted]

ALCRM risk score	
Individual risk	G
Collective risk	7
FWI	0.000061501

1.2 INFORMATION SOURCES

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

Consulted	Attended site
Crossing keeper	Yes

Stakeholder consultation attendance notes:

The signaller was consulted on the day of the risk assessment (RA). The local highways authority will be consulted over any issues as part of the road rail partnership group.

The reference sources used during the risk assessment included:

- Attendant records, Other (LNE LC risk tracker used to analyse CCIL, SMIS and LC reporting tool data recorded against the crossing.), CCIL, GI Portal, SMIS

1.3 ENVIRONMENT

Up side crossing approach

Down side crossing approach

The level crossing is located on Hammerton Road / Parker Lane, Kirk Hammerton. which is a Public Highway. The road approach speed is estimated to be less than or equal to 30mph. A station can be seen from the level crossing

At HAMMERTON ROAD the orientation of the road/path from the north is 160°; the orientation of the railway from the north to the up line in the up direction is 100°. Low horizon can result in sun glare; sun glare is not a known issue.

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:

Manned gates are secured by padlocks the gates are not interlocked with any signalling equipment. The gate keepers have block indictors to inform them if a train is in section. The pedestrian free wicket gates are now locked out of use due to sighting and whistle board non-compliance. The pedestrians now cross via the manned gates.

2. LEVEL CROSSING USAGE

2.1 RAIL

The train service over HAMMERTON ROAD level crossing consists of passenger trains. There are 36 trains per day. The highest permissible line speed of trains is 65mph. Trains are timetabled to run for 16.5 hours per day.

Assessor's train service notes:

Northern Trains operate the York to Harrogate service, two trains an hour run over this section of line. There are no freight trains that use the line.

2.2 USER CENSUS DATA

A 24 hour census was carried out on 07/02/2017 by [redacted]. The census applies to 100% of the year.

The census taken on the day is as follows:

Cars	14
Vans / small lorries	6
Buses	0
HGVs	2
Pedal / motor cyclists	11
Pedestrians	25

Tractors / farm vehicles	1
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:

No vulnerable users were identified by the census which was also confirmed by the gate keeper on the day of the assessment.

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

Irregular user observations:

No irregular users were identified by the census which was also confirmed by the gate keeper on the day of the assessment.

Assessor's general census notes:

Data was used from a 9 day camera census undertaken at the crossing January 2015. An average daily figure was used from the data.

2.3 USER CENSUS RESULTS

ALCRM calculates usage of the crossing to be 23 road vehicles and 36 pedestrians and cyclists per day.

3. RISK OF USE

3.1 CROSSING APPROACHES

The road approach speed is estimated to be less than or equal to 30mph. One or more of the approach roads to HAMMERTON ROAD level crossing are assessed as being long and straight. There are no prominent features on the approach to or on the far side of the level crossing that could distract drivers.

Site visit observations:

The crossing is approached by narrow roads with no footpaths on both sides. Cars and vans can pass each other just but larger vehicles would not be able to pass. The normal position of the gates on approach are closed to the road, users must get the crossing keepers attention by way of a bell. In 2015 the pedestrian gates were closed to users and subsequently came under the protection of the crossing keeper, however occasional Joggers are still jumping over the gates over the gates and continuing over the crossing. Currently there is wire meshing attached to the gates to stop these users getting a foothold to climb over but they now vault over which triggered the assessment. A covert camera has now been deployed here to monitor the misuse and the crossing keepers encouraged to report the misuse. Normal position of the gates is closed to the road so strike in time is not applicable for this risk assessment. This is a two track section to provide a passing section for trains to pass off the single line sections. Trains do pass within the crossing environment.

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 can be an issue here at certain times of the year; however this risk is mitigated as the crossing is manned.

At the estimated road speed, the visibility of level crossing signage and equipment is considered to provide road users with surplus time to react 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.

3.3 AT THE CROSSING – BLOCKING BACK

Assessor's notes:

No blocking back occurs at the crossing as the normal position of the gates is closed to the road.

3.4 AT THE CROSSING – ANOTHER TRAIN COMING RISK

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

Assessor's another train coming notes:

Trains do pass each other at this location. The crossing is located on a two track section that separates two single line sections; the trains are timetable to pass each other on this two track section. There is no risk to the users as the gates are closed.

3.5 INCIDENT HISTORY

A level crossing safety event has been known to occur at HAMMERTON ROAD crossing in the last twelve months.

Assessor's incident history notes:

In the last year there have been six reported events. These were pedestrians climbing over the gates.

Red light violations / barrier weaving

Assessor's notes:

There are no road traffic lights at this crossing and no barriers. The gates normal position is closed to the road and user have to use the bell to get the crossing keepers attention to cross.

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	N/A	N/A	N/A
Down line	N/A	N/A	N/A

Assessor's notes and observations on strike in times:

The gates are operated by the crossing keeper. There is no designed strike in times for this crossing.

4. ALCRM CALCULATED RISK

HAMMERTON ROAD ***level crossing ALCRM results***

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

- User deliberate misuses

Assessor's key risk drivers notes

There is no misuse from vehicular users however there are a minority of joggers who have taken to vaulting over the road gates instead of using the bell for the gate keeper to open the gates.

Safety risk				
Compared to other crossings the safety risk for this crossing is	**Individual risk**		**Collective risk**	
	G		**7**	
	Individual risk (fraction)	**Individual risk (numeric)**		
Car	1 in 2375296	0.000000421	0.000003641	
Van / small lorries	1 in 813669	0.000001229	0.00000156	
HGV	1 in 823723	0.000001214	0.000000171	
Bus	0	0	0	
Tractor / farm vehicle	1 in 411692	0.000002429	0.000000086	
Cyclist / Motor cyclist	1 in 484730	0.000002063	0.000016567	
Pedestrian	1 in 484730	0.000002063	0.000037653	
				Derailment contribution
Passengers			0.00000031	87.15058623
Staff			0.000001514	1.988928884
Total			0.000061501	0.488024981
Collision frequencies	**Train / user**	**User equipment**	**Other**	
Vehicle	0.000010825	0.000488294	0.000000922	
Pedestrian	0.000040477	0.000472971	0.000626587	
Collision risk	**Train / user**	**User equipment**	**Other**	
Vehicle	0.000005458	0	0	
Pedestrian	0.000032868	0.000007568	0.000013785	

5. OPTION ASSESSMENT AND CONCLUSIONS

5.1 OPTIONS EVALUATED

The options evaluated to mitigate the risks at HAMMERTON ROAD crossing include:

Option	Term[1]	ALCRM risk score	ALCRM FWI	Safety Benefit	Cost	Benefit Cost Ratio	Status	Comments
Closure of crossing by provision of a road bridge	Long Term	M13	0.0	100%	N/A	N/A	COMPLETE	The closure of the crossing will be assessed by the Harrogate line re-signalling and line enhancement project due to deliver in 2026. The option of a bridge to close two crossings has been potentially identified
Upgrade to MCBOD - Harrogate line project	Long Term	G7	6.01E-05	2%	N/A	N/A	COMPLETE	If closure does not become possible, a full barrier MCB-OD crossing will be considered by the Harrogate line re-signalling and line enhancement project.
Provision of higher road gates	Long Term	G7	6.1501E-5	N/A	N/A	N/A	COMPLETE	This mitigation has been identified to tackle the risk of a minority of joggers who have taken to vaulting over the current gates without requesting to the crossing keeper to cross. The higher gates will make it impossible for this deliberate misuse to continue. There is no immediate safety benefit in

								quantative terms however the risk score will improve by the next risk assessment if this stops the deliberate misuse.

NOTES
Network Rail always evaluates the need for short[1] 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.
[1] Includes interim

CBA gives an indication of overall business benefit. It is used to support, not override, structured expert judgement when deciding which option(s) to progress. CBA might not be needed in all cases, e.g. standard maintenance tasks or low cost solutions (less than £5k).

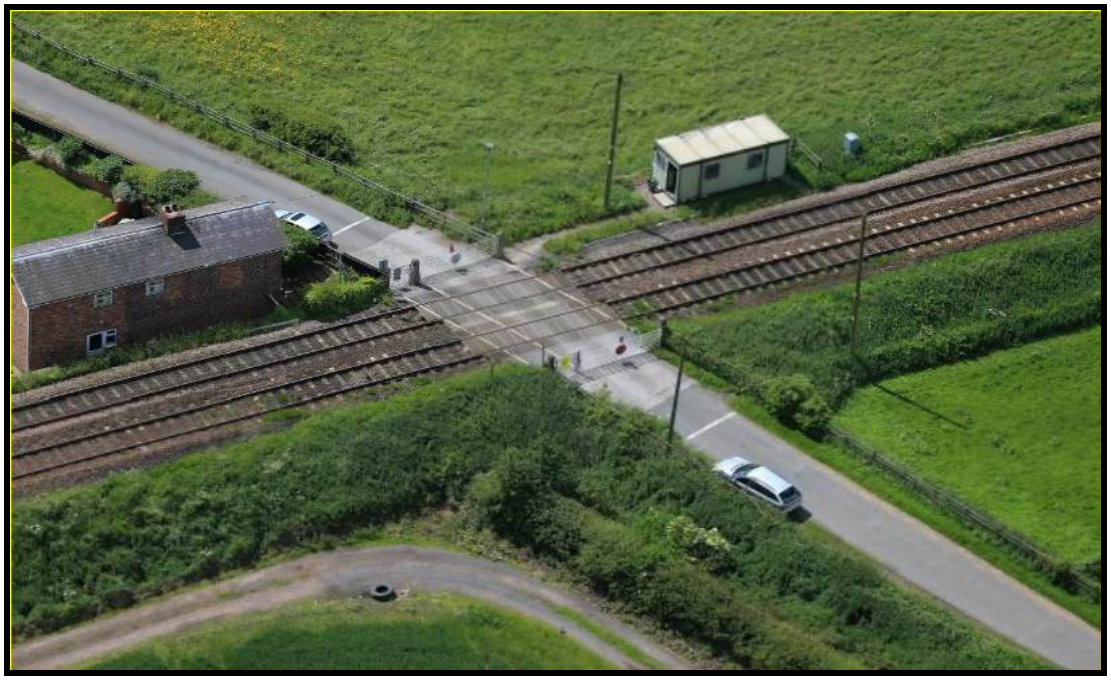
The following CBA criteria are used as a support to decision making:

a. benefit to cost ratio is ≥ 1: positive safety and business benefit established;
b. benefit to cost ratio is between 0.99 and 0.5: reasonable safety and business benefit established where costs are not grossly disproportionate against the safety benefit; and
c. benefit to cost ratio is between 0.49 and 0.0: weak safety and business benefit established.

5.2 CONCLUSIONS

Assessor's notes:

HAY1 9m 17ch Hammerton Road MG



Crossing Details

The crossing is located on a small minor road that gives access to the village of Green Hammerton from the A59 and Kirk Hammerton. The crossing is in very good repair and offers suitable and sufficient protection to road and pedestrian users. The pedestrian wicket gates were locked out of use in 2015 and pedestrians placed under the protection of the manned gates when it was discovered the whistle board that mitigates non-compliant sighting of trains approaching from Cattal station towards Hammerton station (west to east) for pedestrians crossing from the up side (North to south) was not located at its compliant distance to be effective.

Hazards associated with the crossing

The crossing has suffered from pedestrian deliberate misuse since the pedestrian wicket gates were closed to users. This has been from a minority of joggers who vault over the gates to cross.

Risk Control

The installation of higher gates would mitigate this risk as detailed in 5.1. Currently the crossing keepers just warn them if they are observed deliberately misusing the crossing. A camera is in place to monitor any such incidents. It is not anticipated to reopen the pedestrian gates as crossing via the manned gates offers the user the safest form of protection while crossing.

Long Term Options

With the Harrogate line re-signalling and capacity enhancements due to take place 2026 the crossing will be considered for 2 possible options as detailed in table 5.1. Closure of the crossing and provision of a bridge. This would allow the removal of the crossing and associated risk, maintenance and renewal costs of the asset. Renewal to an MCB-OD full barrier system. This will offer a level of protection which is the same or better as what is

already in place.

Until then there are no plans to improve or upgrade the crossing as it is currently offering the best protection to users with the exception of installation of the higher gates.

All the options detailed will be subject to funding and approval from the route asset manager.

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

NARRATIVE RISK ASSESSMENT – PASSIVE TEMPLATE FINAL v2.0

PASSIVE LEVEL CROSSING RISK ASSESSMENT

1. LEVEL CROSSING OVERVIEW AND ENVIRONMENT

1.1 LEVEL CROSSING OVERVIEW

This is a risk assessment for HAMMERTON ROAD level crossing.

Crossing details	
Name	HAMMERTON ROAD
Type	FPW
Crossing status	Public Highway
Overall crossing status	Open
Route name	LNE & EM
Engineers Line Reference	HAY1, 9m, 17ch
OS grid reference	SE463558
Number of lines crossed	2
Line speed (mph)	65
Electrification	No
Signal box	Hammerton

Risk assessment details	
Name of assessor	[redacted]
Post	Level Crossing Manager
Date completed	15/05/2014
Next due date	NULL
Email address	[redacted]@networkrail.co.uk
Phone number	[redacted]

ALCRM risk score	
Individual risk	M
Collective risk	13
FWI	0

1.2 INFORMATION SOURCES

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

Consulted	Attended site
signaller/gate keeper	Yes

Stakeholder consultation and attendance notes:

The crossing keeper provided feedback on the day of the assessment.

The reference sources used during the risk assessment included:

- CCIL.

1.3 ENVIRONMENT

Up side crossing approach

Down side crossing approach

It is a public highway level crossing which is located on Hammerton Road / Parker Lane, Kirk Hammerton. A station can be seen from the level crossing.

At HAMMERTON ROAD level crossing the orientation of the road/path from the north is 160°; the orientation of the railway from the north to the up line in the up direction is 100°. Low horizon can result in sun glare; sun glare is a known issue.

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 pedestrian passive crossing is now locked out of use. The public must now use the main vehicular gates operated by the gate keeper. The risk of pedestrians is now covered in the risk assessment that covers the manned gates.

2. LEVEL CROSSING USAGE

2.1 RAIL

The train service over HAMMERTON ROAD level crossing consists of passenger trains. There are 36 trains per day. The highest permissible line speed of trains is 65mph. Trains are timetabled to run for 16.5 hours per day.

Assessor's notes:

Northern Trains operate the York to Harrogate service, two trains an hour run over this section of line. There are no freight trains that use the line.

2.2 USER CENSUS DATA

An estimated census has been used. The census was estimated on 15/05/2014 by [redacted] [redacted]
The census applies to 100% of the year.

The census taken on the day is as follows:

Cars	0
Vans / small lorries	0
Buses	0
HGVs	0
Pedal / motor cyclists	0
Pedestrians	0

Tractors / farm vehicles	0
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:

The pedestrian passive crossing is now locked out of use

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

Irregular user observations:

The pedestrian passive crossing is now locked out of use

Information gathered indicates that HAMMERTON ROAD level crossing does not have a high number of users during the night or at dusk.

Site visit night / dusk user observations:

The pedestrian passive crossing is now locked out of use

Assessor's general census notes:

The pedestrian passive crossing is now locked out of use

2.3 USER CENSUS RESULTS

ALCRM calculates usage of the crossing to be 0 road vehicles and 0 pedestrians and cyclists per day.

3. RISK OF USE

3.1 SIGHTING AND TRAVERSE

At HAMMERTON ROAD level crossing, the decision point and traverse lengths are calculated as:

	Decision point (m)	Traverse length (m)	Measured from
Up side	2	9.5	2m from nearest rail
Down side	2	9.5	2m from nearest rail

Concrete decking is provided over the level crossing. The decking is considered to be wide enough for all users of the crossing. It is fitted with a non-slip surface.
The pedestrian crossing is now locked out of use
The traverse times are calculated as:

	Traverse time (s)
Pedestrians	9
Vehicles	0

The current census has not identified a high proportion of vulnerable users. Therefore, the pedestrian traverse time has not been increased.

Assessor's traverse time notes:

Traverse time based upon able bodied users.

Sighting was measured by the following means:

- Using Range Finder

Sighting, measured in metres, at HAMMERTON ROAD level crossing is recorded as:

All distances are recorded in metres	Minimum sighting distance required	Measured sighting distance	Sighting distance measured to	Is sighting compliant?	If deficient, is sighting distance mitigated?	Notes on deficient sighting time mitigations
Up side looking toward up direction train approach	233	204	Vegetation	No	Yes	Whistle board provided. However the whistle board is not located at the compliant distance to offer adequate warning.
Up side looking toward down direction train approach	233	690	Hammerton Station gates	Yes	N/A	N/A
Down side looking toward up direction train approach	233	526	Bridge	Yes	N/A	N/A
Down side looking toward down direction train approach	233	690	Hammerton Station gates	Yes	N/A	N/A

Sighting restrictions are recorded as follows:

	Up Direction	Down Direction
Nothing; vanishing point	NO	NO
Track curvature	YES	YES
Permanent structure (building/wall etc.)	NO	NO
Signage or crossing equipment	NO	NO
Vegetation	NO	NO
Bad weather on the day of visit	NO	NO
Other	NO	NO

There are no known obstructions that could make it difficult for users to see approaching trains. There are no known issues with foliage, fog or other issues that might impair visibility of the crossing, crossing equipment or approaching trains.

Actions to improve sighting have not been identified.

Assessor's improving sighting and decision point notes

Sighting cannot be improved further. Pedestrians' sighting of trains from west to east (up direction trains) on the northern side (upside) of the crossing is deficient. In addition the whistle board which is the mitigation for the deficient sighting is not located at the compliant position and does not offer adequate warning.

3.2 EVALUATION OF MITIGATIONS

HAMMERTON ROAD level crossing is provided with whistle boards.

	Line Speed	Distance to whistle board*	Whistle board warning provided (s)	Is the whistle board warning < or > traverse ? (s)	Whistle board compliance with 400m maximum (m)	Is the train horn clearly audible at the crossing?	Comments on audibility and whistle board position
Up line	65	225	7.06	-1.94	N/A	Yes	The whistle board is not located at the compliant distance to offer adequate warning.
Down line	65	225	7.06	-1.94	N/A	Yes	

The percentage of users who use the crossing during the night time quiet period, between 2300 and 0700, is estimated as 1%.

Assessor's notes on whistle board suitability as a risk control

The whistle board on the up side is not located at the compliant distance to offer adequate warning

3.3 CROSSING APPROACHES

The signs at HAMMERTON ROAD level crossing are located on the direct route a user would take over the level crossing; they are positioned so that they are clearly visible to users taking a direct route over the level crossing. The visibility of the signs is reduced at night or at dusk.

Assessor's notes:

There are now no pedestrian signs at the crossing The pedestrian passive crossing is now closed.

There are no adjacent sources of light or noise that could affect a users' ability to see or hear approaching trains.

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:

Trains do pass each other at this location. The crossing is located on a two track section that separates two single line sections; the trains are timetable to pass each other on this two track section. There is no risk to the users as the gates are closed.

3.5 INCIDENT HISTORY

A level crossing safety event has not been known to occur at HAMMERTON ROAD level crossing in the last twelve months.

Assessor's incident history notes:

N/A

4. ALCRM CALCULATED RISK

HAMMERTON ROAD ***level crossing ALCRM results***

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

- User misuses
- Low sighting
- Sun glare

Assessor's key risk drivers notes

The pedestrian passive crossing is now closed.

Safety risk				
Compared to other crossings the safety risk for this crossing is	**Individual risk**		**Collective risk**	
	M		**13**	
	Individual risk (fraction)	**Individual risk (numeric)**		
Car	0	0	0	
Van / small lorries	0	0	0	
HGV	0	0	0	
Bus	0	0	0	
Tractor / farm vehicle	0	0	0	
Cyclist / Motor cyclist	0	0	0	
Pedestrian	0	0	0	
				Derailment contribution
Passengers			0	0
Staff			0	0
Total			0	0
Collision frequencies	**Train / user**	**User equipment**	**Other**	
Vehicle	0	0	0	
Pedestrian	0	0	0	
Collision risk	**Train / user**	**User equipment**	**Other**	
Vehicle	0	0	0	
Pedestrian	0	0	0	

5. OPTION ASSESSMENT AND CONCLUSIONS

5.1 OPTIONS EVALUATED

The options evaluated to mitigate the risks at HAMMERTON ROAD crossing include:

Option	Term[1]	ALCRM risk score	ALCRM FWI	Safety Benefit	Cost	Benefit Cost Ratio	Status	Comments
No options available for the crossing	Long Term	M13	0.0	100%	N/A	N/A	N/A	This pedestrian passive crossing is now closed

NOTES

Network Rail always evaluates the need for short[1] 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.

[1] Includes interim

CBA gives an indication of overall business benefit. It is used to support, not override, structured expert judgement when deciding which option(s) to progress. CBA might not be needed in all cases, e.g. standard maintenance tasks or low cost solutions (less than £5k).

The following CBA criteria are used as a support to decision making:

a. benefit to cost ratio is ≥ 1: positive safety and business benefit established;
b. benefit to cost ratio is between 0.99 and 0.5: reasonable safety and business benefit established where costs are not grossly disproportionate against the safety benefit; and
c. benefit to cost ratio is between 0.49 and 0.0: weak safety and business benefit established.

5.2 CONCLUSIONS

Assessor's notes:

HAY1 9m 17ch Hammerton road pedestrian crossing

This crossing was a pedestrian free wicket passively sighted crossing. It was located alongside the main vehicular crossing gates which are manned by a crossing keeper.

The crossing is now closed and pedestrians must now use the main manned gates. This has removed the risk of pedestrians using the crossing passively as they now come under the protection of the crossing keeper.

The reasoning for the closure was that pedestrians sighting of trains approaching from west to east (up direction trains) on the northern side (upside) of the crossing is deficient. Also the whistle board which is the mitigation for the deficient sighting is not located at the compliant position and does not offer adequate warning.

In addition the opportunity was taken in to Network Rails commitment in reducing risk at passive crossings to bring pedestrians under the safe control of a protected manned crossing.

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: • 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; - 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: - 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	Controls can include: • 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
Pedestrian and train collision risk	Examples include: • insufficient sighting and / or train warning • ineffective whistle boards; warning inaudible, insufficient warning	Controls can include: • optimising the position of equipment and / or signs • removing redundant and / conflicting signs

	Hazard	Control
	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 • known high level of use during darkness • increased likelihood of user error, 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: - 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	• 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 • 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
	schools, local amenities or other attractions are known to contribute towards user error	
Pedestrian and road vehicle collision risk	Examples include: • 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	Controls can include: • 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	Examples include: • 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	Controls can include: • 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 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

PASSIVE LEVEL CROSSING RISK ASSESSMENT

1. LEVEL CROSSING OVERVIEW AND ENVIRONMENT

1.1 LEVEL CROSSING OVERVIEW

This is a risk assessment for CATTAL STATION level crossing.

Crossing details	
Name	CATTAL STATION
Type	SPC
Crossing status	Public Footpath
Overall crossing status	Open
Route name	LNE & EM
Engineers Line Reference	HAY1, 10m, 22ch
OS grid reference	SE446559
Number of lines crossed	2
Line speed (mph)	65
Electrification	None
Signal box	Cattal

Risk assessment details	
Name of assessor	[redacted]
Post	Level Crossing Manager
Date completed	14/11/2017
Next due date	14/02/2020
Email address	[redacted]@networkrail.co.uk
Phone number	[redacted]

ALCRM risk score	
Individual risk	C
Collective risk	4
FWI	0.003985177

1.2 INFORMATION SOURCES

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

Consulted	Attended site
Cattal signaller	Yes

Stakeholder consultation and attendance notes:

The reference sources used during the risk assessment included:

- Other (LNE LC Risk tracker used to analyse CCIL, SMIS and Misuse reporting tool data for the crossing), CCIL, SMIS.

1.3 ENVIRONMENT

Up side crossing approach

Down side crossing approach

The environment surrounding CATTAL STATION level crossing consists of Null

It is a public footpath level crossing which is located on At Cattal station. The level crossing is at a station.

At CATTAL STATION level crossing the orientation of the road/path from the north is 0°; the orientation of the railway from the north to the up line in the up direction is 80°. Low horizon can result in sun glare; sun glare is a known issue.

There are planned or apparent developments near the crossing which may lead to a change or increase in use or risk.

Site visit general observations:

On the up side the barrow crossing is accessed via the station platform on the down side the crossing is accessed via the platform and a road side wicket gate. The crossing was found to be in good condition on the day of the assessment with all required signs present and correct.

2. LEVEL CROSSING USAGE

2.1 RAIL

The train service over CATTAL STATION level crossing consists of passenger trains. There are 36 trains per day. The highest permissible line speed of trains is 65mph. Trains are timetabled to run for 16.5 hours per day.

Assessor's notes:

Northern Trains operate the York to Harrogate service, two trains an hour run over this section of line. There are no freight trains that use the line.

2.2 USER CENSUS DATA

An estimated 24 hour census has been used. The census was estimated on 14/11/2017 by Level Crossing Manager. The census applies to 100% of the year.

The census taken on the day is as follows:

Pedestrians	92
Pedal cyclists	0
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:

No vulnerable users were identified from feedback provided by the signaller.

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

Irregular user observations:

There were no irregular users identified from feedback provided by the signaller.

Information gathered indicates that CATTAL STATION level crossing has a high number of users during the night or at dusk.

Site visit night / dusk user observations:

During winter months there will be extended hours of night/dusk usage by passengers using the station

Assessor's general census notes:

As the usage of this crossing is predominately by passengers data from the ORR's passenger figures have been used for the current year and averaged for daily use and adjusted to take into consideration that only passengers bound for Harrogate and passengers arriving at Cattal from York will use the crossing due to the station layout for access egress.

2.3 USER CENSUS RESULTS

ALCRM calculates usage of the crossing to be 0 road vehicles and 92 pedestrians and cyclists per day.

3. RISK OF USE

3.1 SIGHTING AND TRAVERSE

At CATTAL STATION level crossing, the decision point and traverse lengths are calculated as:

	Decision point (m)	Traverse length (m)	Measured from
Up side	2	9	2m from nearest running rail
Down side	2	9	2m from nearest running rail

Concrete decking is provided over the level crossing. The decking is considered to be wide enough for all users of the crossing. It is fitted with a non-slip surface.

The traverse times are calculated as:

	Traverse time (s)
Pedestrians	8

The current census has not identified a high proportion of vulnerable users. Therefore, the pedestrian traverse time has not been increased.

Assessor's traverse time notes:

Although traverse time is based on the highest line speed of 65 mph all trains must stop at Cattal Station to exchange tokens for the single line with the signaller so train approach is considerably slower than the line speed.

Sighting was measured by the following means:

- Using known references
- Sighting, measured in metres, at CATTAL STATION level crossing is recorded as:

All distances are recorded in metres	Minimum sighting distance required	Measured sighting distance	Sighting distance measured to	Is sighting compliant?	If deficient, is sighting distance mitigated?	Notes on deficient sighting time mitigations
Up side looking toward up direction train approach	68	312	Bridge 11	Yes	n/a	Train approach is long and straight
Up side looking toward down direction train approach	220	1145	Bridge 8	Yes	n/a	Train approach is long and straight for 1145 when line drops down gradient and vanishes out of sight
Down side looking toward up direction train approach	68	312	Bridge 11	Yes	n/a	Train approach is long and straight
Down side looking toward down direction train approach	220	1145	Bridge 8	Yes	n/a	Train approach is long and straight for 1145 when line drops down gradient and vanishes out of sight

Sighting restrictions are recorded as follows:

	Up Direction	Down Direction
Nothing; vanishing point	NO	YES
Track curvature	NO	NO
Permanent structure (building/wall etc.)	YES	NO
Signage or crossing equipment	YES	NO
Vegetation	NO	NO
Bad weather on the day of visit	NO	NO
Other	NO	NO

There are known obstructions that could make it difficult for users to see approaching trains. There are no known issues with foliage, fog or other issues that might impair visibility of the crossing, crossing equipment or approaching trains.

Actions to improve sighting have not been identified.

Assessor's improving sighting and decision point notes

Sighting cannot be improved anymore for up direction trains due to signalling equipment around the crossing.

Assessor's general sighting and traverse notes:

For up approach trains vision is restricted at the 2m decision point on both sides due to the

gate posts of the main vehicle crossing obstructing. You can however see behind these or one step forward of these. For the up side the top of the platform ramp near to the decision point where users will access the crossing offers in excess of 1000 metres sighting. On the up side the foot crossing can only be accessed via the station platform, on the down side a blocking gate stops passengers from using the crossing until the train has departed and cleared the crossing which is locked by the signaller; however there is a kissing gate provides access to the crossing directly from the main road.

Main vehicle gate hanging post directly in way at 2 metre decision point however approaching trains can be seen from bridge 11 from behind the hanging post. At the top of the platform just before the decision point approach trains can be seen beyond bridge 11 to the crossing on the down side is via a kissing gate direct from the highway.

All trains must stop at Cattal station to exchange the token for the single line. Trains are moving over the crossing at no more than 20 mph in both directions. Approach to the passenger crossing on the up side is via the platform, there is no gate. Access form until the train has departed and the crossing is clear.

3.2 EVALUATION OF MITIGATIONS

3.3 CROSSING APPROACHES

The signs at CATTAL STATION level crossing are located on the direct route a user would take over the level crossing; they are positioned so that they are clearly visible to users taking a direct route over the level crossing. The visibility of the signs is not reduced at night or at dusk.

The approaches to the crossing within the boundary fence are not considered to be steep, slippery or present a tripping hazard to users.

Assessor's notes:

The crossing provides access between both platforms. The up side access is directly from the station platform. The down side access is directly from the platform and a wicket gate by the road side.

There are no adjacent sources of light or noise that could affect a users' ability to see or hear approaching trains.

Assessor's general crossing approach notes:

For up approach trains vision is restricted at the 2m decision point on both sides due to the gate posts of the main vehicle crossing obstructing. You can however see behind these or one step forward of these. For the up side the top of the platform ramp near to the decision point where users will access the crossing offers in excess of 1,000 metres. On the up side the foot crossing can only be accessed via the station platform, on the down side a blocking gate stops passengers from using the crossing until the train has departed and cleared the crossing which is locked by the signaller, however a kissing gate provides access to the crossing directly from the main road.

3.4 AT THE CROSSING – ANOTHER TRAIN COMING RISK

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

Assessor's another train coming notes:

The trains often pass at this section of double track. Trains leaving the platform in the down direction can obscure the approach of a train approaching the station in the up direction to users of the crossing and vice versa.

3.5 INCIDENT HISTORY

A level crossing safety event has not been known to occur at CATTAL STATION level crossing in the last twelve months.

Assessor's incident history notes:

Only one incident has been recorded in the last twelve months on 14/10/17; a teenage female crossing over the line when the main vehicular gates were closed for an approaching train.

4. ALCRM CALCULATED RISK

CATTAL STATION ***level crossing ALCRM results***

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

- User misuses
- Large number users
- Near station
- Sun glare

Assessor's key risk drivers notes

The incidents of user deliberate misuse at this crossing is rare, only one or two recorded incident a year however the fact the crossing is next to the station increases the chances of a user deliberately misusing the crossing to get across to either platform to catch a train. Sun glare will happen 08:15 – 09:00 in the morning for users looking eastbound for approaching trains and between 18:00 – 19:30 for users looking westbound for approaching trains. This is only in the summer months. The effect of sun glare is been measure as minimal risk to users.

Safety risk				
Compared to other crossings the safety risk for this crossing is	**Individual risk**		**Collective risk**	
	C		**4**	
	Individual risk (fraction)	**Individual risk (numeric)**		
Car	0	0	0	
Van / small lorries	0	0	0	
HGV	0	0	0	
Bus	0	0	0	
Tractor / farm vehicle	0	0	0	
Cyclist / Motor cyclist	0	0	0	
Pedestrian	1 in 16943	0.00005902	0.003963756	
				Derailment contribution
Passengers			0	0
Staff			0.000021422	0
Total			0.003985177	0
Collision frequencies	**Train / user**	**User equipment**	**Other**	
Vehicle	0	0	0	
Pedestrian	0.004371793	0	0.02248877	
Collision risk	**Train / user**	**User equipment**	**Other**	
Vehicle	0	0	0	
Pedestrian	0.003478898	0	0.000484858	

5. OPTION ASSESSMENT AND CONCLUSIONS

5.1 OPTIONS EVALUATED

The options evaluated to mitigate the risks at CATTAL STATION crossing include:

Option	Term[1]	ALCRM risk score	ALCRM FWI	Safety Benefit	Cost	Benefit Cost Ratio	Status	Comments
Closure	Long Term	M13	0.0	100%	N/A	N/A	COMPLETE	The main road crossing adjacent to the barrow crossing is intended to be upgraded to a full barrier crossing as part of the Harrogate line re-signalling and line enhancement project due to deliver in 2026. This will enable the closure of the barrow crossing bringing pedestrian users under the protection of the new barrier crossing.
Installation of fencing on up side of station to make passenger walk up the platform before walking down to the crossing. Will help users sight trains better.	Long Term	C4	2.74E-03	4%	N/A	N/A	COMPLETE	The coral fencing can be installed by the signal box to prevent users walking round a blind corner straight to the decision point. This will cause the user to walk a little further down the platform before turning towards the crossing, in turn this will give the user better sighting of oncoming trains a more time to make the decision

NOTES
Network Rail always evaluates the need for short[1] 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.
[1] Includes interim

CBA gives an indication of overall business benefit. It is used to support, not override, structured expert judgement when deciding which option(s) to progress. CBA might not be needed in all cases, e.g. standard maintenance tasks or low cost solutions (less than £5k).

The following CBA criteria are used as a support to decision making:

a. benefit to cost ratio is ≥ 1: positive safety and business benefit established;
b. benefit to cost ratio is between 0.99 and 0.5: reasonable safety and business benefit established where costs are not grossly disproportionate against the safety benefit; and
c. benefit to cost ratio is between 0.49 and 0.0: weak safety and business benefit established.

5.2 CONCLUSIONS

Assessor's notes:

HAY1 10m 22ch Cattal Station foot crossing

Crossing details
The crossing is located on a small minor road that gives access to the villages of Hunsingore, Walshford and Tockwith coming north from the A59. The crossing is in good repair and sighting is compliant for users.

Hazards associated with the crossing
The crossing is located next to a station so there is a risk that pedestrian users will use the crossing to access the station when trains are approaching to catch the train. In addition there is a risk that alighting passengers may use the crossing when the train is in the station passing in front of it to exit the station. There is a small window of sun glare for an hour in the morning and afternoon in the summer months only and has minimal effect on users.

Risk Control
Currently the down side platform has a lockable gate the signaller operates to prevent passengers from using the crossing while the train is in the station. At the roadside access gate on the down side and the platform access on the up side there are signs in place instructing pedestrians not to use the crossing while the main road gates are closed.

Long Term Options
With the Harrogate line re-signalling and capacity enhancements due to take place 2026 the crossing can be closed. This would allow the removal of the crossing and associated risk, maintenance and renewal costs of the asset. Renewal to an MCB-OD full barrier system. This will remove the free wicket gates and foot crossing and place the user under the protection of the barriers.

Until then there are no plans to improve or upgrade the crossing as it is, but it would benefit in the medium term from some form the coral fencing on the up as detailed in 5.1.This proposal is jointly under review with Northern Rail.

All the options detailed will be subject to funding and approval from the route asset manager.

ANNEX A – ADDITIONAL PHOTOGRAPHS

ADDITIONAL APPROACH DOWN SIDE FROM PLATFORM

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: • 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; - 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: - 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	Controls can include: • 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
Pedestrian and train collision risk	Examples include: • insufficient sighting and / or train warning • ineffective whistle boards; warning inaudible, insufficient warning	Controls can include: • optimising the position of equipment and / or signs • removing redundant and / conflicting signs

	Hazard	Control
	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 • known high level of use during darkness • increased likelihood of user error, 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: - 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	• 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 • 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
	schools, local amenities or other attractions are known to contribute towards user error	
Pedestrian and road vehicle collision risk	Examples include: • 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	Controls can include: • 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	Examples include: • 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	Controls can include: • 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 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

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 CATTAL STATION level crossing.

Crossing details	
Name	CATTAL STATION
Type	MGH
Crossing status	Public Highway
Overall crossing status	Open
Route name	LNE & EM
Engineers Line Reference	HAY1, 10m, 22ch
OS grid reference	SE446559
Number of lines crossed	2
Line speed (mph)	65
Electrification	No
Signal box	Cattal

Risk assessment details	
Name of assessor	[redacted]
Post	Level Crossing Manager
Date completed	14/12/2016
Next due date	14/03/2020
Email address	[redacted]@networkrail.co.uk
Phone number	[redacted]

ALCRM risk score	
Individual risk	H
Collective risk	6
FWI	0.000330185

1.2 INFORMATION SOURCES

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

Consulted	Attended site
Cattal Station Signaller	Yes

Stakeholder consultation attendance notes:

The signaller on the day of the assessment was on hand to provide feedback. The local highways authority will also be engaged over any issues as part of the regular road rail partnership group meetings.

The reference sources used during the risk assessment included:

- Attendant records, Other (LNE LC incident database checked for any CCIL, SMIS and misuse reporting tool data recorded against the crossing), CCIL, GI Portal, SMIS

1.3 ENVIRONMENT

Up side crossing approach

Down side crossing approach

The level crossing is located on Road linking A59 road with Cattal village. This is a Public Highway. The road approach speed is estimated to be 31-40mph. The level crossing is at a station

At CATTAL STATION the orientation of the road/path from the north is 0°; the orientation of the railway from the north to the up line in the up direction is 80°. Low horizon can result in sun glare; sun glare is not a known issue.

There are 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 was found to be in good repair with all associated signage and road markings required as per the legal order all present and correct. Planning has recently been submitted to develop the site of the builder's yard and the land next to the crossing on the south side (down side) into residential units.

2. LEVEL CROSSING USAGE

2.1 RAIL

The train service over CATTAL STATION level crossing consists of passenger trains. There are 36 trains per day. The highest permissible line speed of trains is 65mph. Trains are timetabled to run for 16.5 hours per day.

Assessor's train service notes:

Northern Trains operate the York to Harrogate service, two trains an hour run over this section of line. There are no freight trains that use the line.

2.2 USER CENSUS DATA

A quick census was conducted on 13/12/2016 by [redacted] at 12:13 for 60 minutes. The census applies to 100% of the year.

The census taken on the day is as follows:

Cars	32
Vans / small lorries	16
Buses	1
HGVs	7
Pedal / motor cyclists	2
Pedestrians	0
Tractors / farm vehicles	6

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:

There are no vulnerable users that use this part of the crossing as there is a separate pedestrian crossing next to the vehicular gates. Also none identified on the quick census or from information provided by the signaller

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

Irregular user observations:

None identified on the quick census or from information provided by the signaller

Assessor's general census notes:

A quick census was taken as there is no current valid 9 day census for the crossing.

2.3 USER CENSUS RESULTS

ALCRM calculates usage of the crossing to be 837 road vehicles and 27 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 CATTAL STATION level crossing are 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:

There is a public house located at the station entrance north of the crossing and a builder's yard located by the crossing on the south side of the crossing. Lorry's frequently reverse into this yard.

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.

At the estimated road speed, the visibility of level crossing signage and equipment is considered to provide road users with surplus time to react 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.

3.3 AT THE CROSSING – BLOCKING BACK

Assessor's notes:

There have been no recorded incidents of blocking back on the crossing; the signaller on the day of the assessment also confirms that he has never seen any blocking back as the gates are manual and the signaller allows cars close by to pass over first before closing.

3.4 AT THE CROSSING – ANOTHER TRAIN COMING RISK

The likelihood of a second train approaching does not exist at this crossing

Assessor's another train coming notes:

Trains are known to pass each other at this crossing. The station is located on a two track section that separates two single line sections. This is where the trains pass each other between Hammerton and Cattal stations. There is no risk to users as the gates remain closed if the trains pass here

3.5 INCIDENT HISTORY

A level crossing safety event has not been known to occur at CATTAL STATION crossing in the last twelve months.

Red light violations / barrier weaving

Assessor's notes:

The crossing has no Red lights or barriers. It is a manned gated crossing.

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	N/A	N/A	N/A
Down line	N/A	N/A	N/A

Assessor's notes and observations on strike in times:

The gates are operated by the crossing keeper. There is no designed strike in times for this crossing.

4. ALCRM CALCULATED RISK

CATTAL STATION ***level crossing ALCRM results***

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

- Near station

Assessor's key risk drivers notes

The risk from the station will be a tendency for car drivers to park by the crossing to pick up or drop of people using the train service. The application of double Yellow lines at the crossing would help with enforcement of this and future proof the crossing if it is eventually renewed to a barrier crossing.

Safety risk				
Compared to other crossings the safety risk for this crossing is	**Individual risk**		**Collective risk**	
	H		**6**	
	Individual risk (fraction)	**Individual risk (numeric)**		
Car	1 in 2012072	0.000000497	0.000112337	
Van / small lorries	1 in 805152	0.000001242	0.000056169	
HGV	1 in 1069518	0.000000935	0.000008095	
Bus	1 in 1526717	0.000000655	0.000001156	
Tractor / farm vehicle	1 in 916590	0.000001091	0.000006938	
Cyclist / Motor cyclist	1 in 420875	0.000002376	0.000046828	
Pedestrian	0	0	0	
				Derailment contribution
Passengers			0.00004889	95.0924986
Staff			0.000049771	10.414872117
Total			0.000330185	15.650224505
Collision frequencies	**Train / user**	**User equipment**	**Other**	
Vehicle	0.000393944	0.016515899	0.00003357	
Pedestrian	0.000037948	0.000354728	0.00046994	
Collision risk	**Train / user**	**User equipment**	**Other**	
Vehicle	0.000184696	0	0	
Pedestrian	0.000030813	0.000005676	0.000010339	

5. OPTION ASSESSMENT AND CONCLUSIONS

5.1 OPTIONS EVALUATED

The options evaluated to mitigate the risks at CATTAL STATION crossing include:

Option	Term[1]	ALCRM risk score	ALCRM FWI	Safety Benefit	Cost	Benefit Cost Ratio	Status	Comments
Safe as is reasonably practicable	Long Term	H6	3.30185E-4	N/A	N/A	N/A	COMPLETE	As the crossing currently stands it is offering the best method of protection to users that are currently available until its eventual renewal. This is because the crossing is manually operated by the signaller and the crossing is interlocked with the signals
Renewal of crossing to MCB-OD	Long Term	J7	8.1364E-5	75%	N/A	N/A	COMPLETE	As closure is not possible, a full barrier MCB-OD crossing will be considered by the Harrogate line re-signalling and line enhancement project.
Closure of the crossing	Long Term	M13	0.0	100%	N/A	N/A	COMPLETE	Although it is Network Rails safety mandate to close crossing where achievable closure of this crossing would not be achievable. This is due to it being a public highway that gives access to local villages in the area and used as a diversionary route. A bridge or tunnel would not be possible due to the local

								environmental restrictions.

NOTES
Network Rail always evaluates the need for short[1] 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.
[1] Includes interim

CBA gives an indication of overall business benefit. It is used to support, not override, structured expert judgement when deciding which option(s) to progress. CBA might not be needed in all cases, e.g. standard maintenance tasks or low cost solutions (less than £5k).

The following CBA criteria are used as a support to decision making:

a. benefit to cost ratio is ≥ 1: positive safety and business benefit established;
b. benefit to cost ratio is between 0.99 and 0.5: reasonable safety and business benefit established where costs are not grossly disproportionate against the safety benefit; and
c. benefit to cost ratio is between 0.49 and 0.0: weak safety and business benefit established.

5.2 CONCLUSIONS

Assessor's notes:

HAY1 10m 22ch Cattal Station MGH

Crossing details

The crossing is located on a small minor road that gives access to the villages of Hunsingore, Walshford and Tockwith coming north from the A59. The crossing is in good repair, suitable and sufficient for users.

Hazards associated with the crossing

The crossing is located next to a station so there is a risk car drivers will park very close to the crossing to collect or deposit passengers for the train service or possible try to beat the crossing keeper to get to the right side for the train. This is very a minimal risk and there have been no reports of this type of incident. As there is also a public house located next to the crossing there is a perceivable risk of potential drink drivers using the crossing when the line is open.

Risk Control

Signallers have good sighting of approaching vehicles when closing the gates. The application of double yellow lines will also discourage parking next to the crossing if the crossing is renewed to an automatic type. To mitigate any risk of drink drivers from the adjacent pub using the crossing regular positive engagement with the landlord will be a benefit. This will be more pertinent if the crossing is renewed to MCB-OD

Long Term Options

With the Harrogate line re-signalling and capacity enhancements due to take place 2026 the crossing will be considered for renewal to an MCB-OD full barrier system. This will offer a level of protection which is the same or better as what is already in place. The only perceivable risk is cars parking next to the crossing to drop off or collect passengers would also increase this risk.

Until then there are no plans to improve or upgrade the crossing as it is currently offering the

best protection to users.

All the options detailed will be subject to available funding and final approval from the route asset management team

ANNEX A – ADDITIONAL PHOTOGRAPHS

Description:

Description:

Description:

Description:

Description:

Description:

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