

tnPASSIVE LEVEL CROSSING RISK ASSESSMENT

1. LEVEL CROSSING OVERVIEW AND ENVIRONMENT

1.1 LEVEL CROSSING OVERVIEW

This is a planned risk assessment for Teynham West level crossing.

Crossing Details	
Name	Teynham West
Type	FPW
Crossing status	Public Footpath
Overall crossing status	Open
Route name	KENT
Engineers Line Reference	VIR 47m 65ch
OS grid reference	TQ954632
Number of lines crossed	2
Line speed (mph)	90
Electrification	DC
Signal box	FAVERSHAM

Risk Assessment Details	
Name of assessor	Gemma Kent
Post	Level Crossing Manager
Date completed	06-12-2021
Next due date	07-03-2023
Email address	Gemma.Kent@networkrail.co.uk
Phone number	07801902008

ALCRM Risk Score	
Risk per traverse risk	B
Collective risk	2
FWI	0.025583378

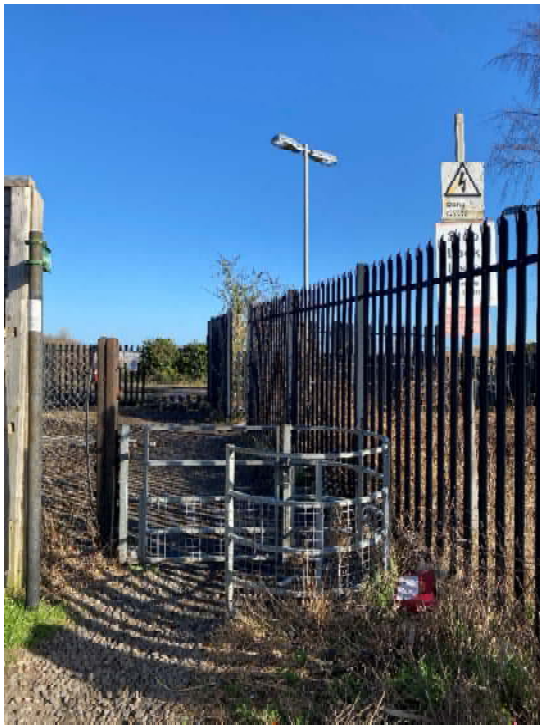
1.2 INFORMATION SOURCES

The reference sources used during the risk assessment included:

- Geo-RINM
- SMIS
- Trust
- KCC rights of way map
- Google Maps
- NESA
- RSK camera census

1.3 ENVIRONMENT

Approach Photos



Up side crossing approach



Down side crossing approach

The environment surrounding Teynham West level crossing consists of Town or village etc on one side of the line. It is a Public Footpath level crossing which is a principal access route for users travelling to a nearby station or ticket machine.

At Teynham West level crossing the orientation of the road/path from the north is 20°; the orientation of the railway from the north to the up line in the up direction is 110°.

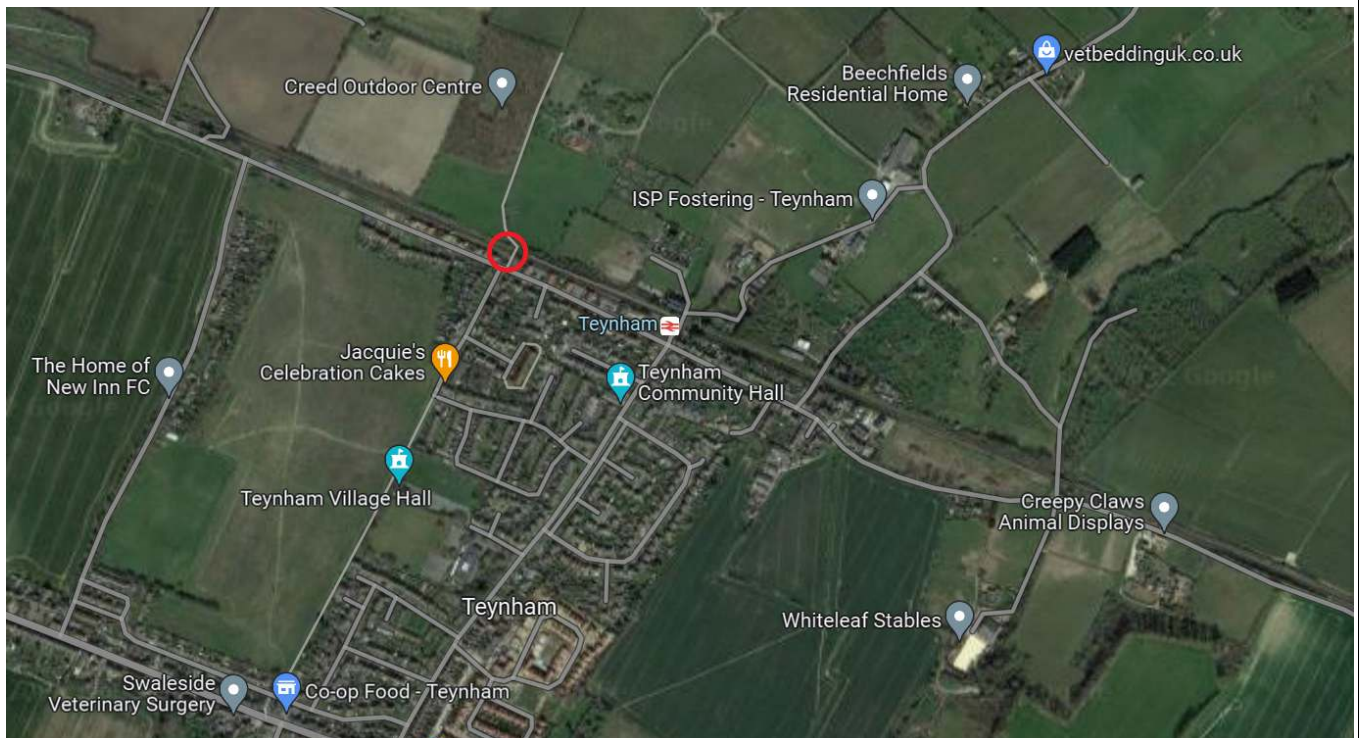
Site visit general observations:

Teynham West Footpath crossing is located on footpath number ZR681 in Teynham, Kent at the west end of Teynham Station, half a mile from Teynham centre and 4 miles from Sittingbourne. Teynham is a large village situated between Faversham and Sittingbourne and has a population of around 2,900.

On the up (south) side the footpath leads from Lower Road and gives access to platform one of Teynham station before the crossing. The area on the North (Down) side of the crossing is rural and is popular with walkers and dog walkers who use a circular walk coming out on Station Row and over Teynham East CCTV crossing. Platform 2 of Teynham station can also be accessed from north side of the footpath.

The village and housing estates are on the South (Up) side of the crossing, including Teynham Village Hall and Teynham Parochial CE Primary School.

The Creed Outdoor learning centre is situated on the north (down) side of the crossing and from speaking with the founder and with evidence from the camera census, it is known that a high amount of the children and youths attending the centre use the crossing to access daily.



The crossing is adjacent to Teynham Station and both platforms can be accessed from the footpath, because of this the crossing has peak use at both ends of the day. The platforms can also be accessed from the station entrance at the east of the platforms as well as Teynham East CCTV crossing, where there is also a footbridge.

There is ambient light coming from around the platform entrances as well as the platforms and some ambient noise from Lower Road.

There have been approx. 20 new houses built on the south side of the railway, adjacent to Teynham crossing, but this has not been seen to have a big impact on the crossing. There is a local plan to develop the area to the South-west of the crossing around Frogmal Lane. The Planning application is for a mixed use development including up to 300 dwellings, employment area, sports ground, open space, reserve site for health centre and wildlife areas. This is very likely to create increased use over the crossing as this will be the most convenient access to the station for those commuting to or from the proposed development as well as access from the local village of Conyer on the north side of the crossing



2. LEVEL CROSSING USAGE

2.1 RAIL

The train service over Teynham West level crossing consists of Passenger and Freight trains. There are 183 trains per day. The line speed (as shown on the Sectional Appendix) is 90 mph on the up, however it was temporarily reduced to 80 mph as an interim measure intended to counteract significant public safety issues observed at the crossing

A CCTV camera census conducted in 2019 revealed a high number of vulnerable users (which included dog walkers, elderly and encumbered users as well as children) and a high proportion of users misusing the crossing. Against this new information, the crossing was no longer compliant with the prescribed minimum safety standard in terms of sighting distance required to cross safely.

Factoring in the 2019 census data, the required minimum sighting distance for a train approaching at 90mph, when looking for up direction trains is 483m, against only 440m measured.

Consequently a temporary (emergency) speed restriction (TSR) of 80mph was implemented to compensate for the sighting deficiency and to allow more time to see an approaching train and to cross safely or get to a position of safety, whilst a permanent solution was being developed. This is detailed further in section 3.1.

On the down line the line speed is 75 mph. Trains are timetabled to run for 24 hours per day.

Assessor's notes:

The crossing is located on the Victoria to Ramsgate (VIR) line between Sittingbourne and Faversham stations.

Sectional Appendix Extract

Source of information for Line speed= National Electronic Sectional Appendix SO110 Seq 022

LOR	Seq.	Line of Route Description	ELR	Route	Last Updated
SO110	022	Victoria to Ramsgate (via Herne Hill and Chatham)	VIR	Kent / Sussex	19/03/2016
Location	Mileage	Running lines & speed restrictions	Signalling & Remarks		
	M Ch		TCBEast Kent Signalling Centre (EK) RAS DC, Canterbury		
			GSM-R		
Bar Crossing	47 02		Axle counter area		
Frognall TP Hut	47 24				
Frognall Farm Crossing	47 37				
	47 70 *				
TEYNHAM	47 74				
Teynham LC (CCTV)	47 79				
	48 00 *				
	48 20 *				
Teynham Substation	48 36 *				
	48 72				
Stone LC (AHBC)	49 40 *				
	50 27 *				
Luddenham TP Hut	50 39				
	51 20 *				
	51 40 *				

All passenger trains are operated by the Southeastern franchise.

- The first group of 87 trains are all up direction trains capable of travelling 90mph.
- The second group of 88 trains are all down direction trains capable of achieving 80 mph.

- The exception is the third group which are the class 465 and 466 multiple units which have a maximum speed of 75 mph, **there are 8 of these trains in a 24 hour period.**

53 out of 183 trains are booked to stop at the station on an average weekday, this variation of stopping and non stopping trains can cause users of the crossing to misjudge whether the approaching train will be stopping at the station or not and also at what speed the train is approaching the crossing.

Just under half the trains are part of the high speed one (HS1) services operating between St Pancras and Faversham / Thanet area using 6 or 12 coach long class 395 electrical multiple units. The remaining rolling stock are used on the traditional Southeastern routes and are formed of Electrical Multiple Units. They are class 375 (or 377), 465 and 466 units. Trains are formed of various lengths from 2 coaches (40 metres) to 12 coaches (240 metres).

All passenger trains are powered by the third rail at 750dc

There is no booked freight traffic over this crossing.]

2.2 USER CENSUS DATA

A 14 day camera census was carried out by RSK between 10-03-2022 and 23-03-2022. A 14 day average was taken. The census applies to 100% of the year.

The census taken on the day is as follows:

Pedal / motor cyclists	0
Pedestrians	164
Horse riders	0
Animal herders	0

Assessor's general census notes:

A RSK 14 day camera census was commissioned for this risk assessment, this saw an increase in use from the previous census conducted in September 2019 by Sotera where there was an average of 120 users per day.

Available information indicates that the crossing has a high proportion of vulnerable users.

Vulnerable user observations:

There is a high proportion of vulnerable users seen using the crossing. Out of the 2266 users over the 14 day period, 363 users were children, 695 dog walkers, 44 elderly or mobility impaired and 61 were encumbered or pushing a bike or pram

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

Irregular user observations:

There is not a high amount of irregular users. Many of the users seen are regular dog walkers, children attending the outdoor learning centre on the north side of the crossing on a daily basis or regular commuters for the station.

Site visit night / dusk user observations:

There was not a high amount of users seen during the hours of darkness however some use was seen.

2.3 USER CENSUS RESULTS

ALCRM calculates the usage of the crossing to be 164 pedestrians and cyclists per day.

Notes on daily, annual, seasonal usage:

From 10th March 2022 a 14 day continuous camera census was commissioned at Teynham West by RSK. The results can be seen in the table below.

Although an average use of 164 users per day has been used for this census it can be seen that on Saturday 19th 300 people were seen to use the crossing. This is almost double the average use. There were also 220 users on Sunday 20th, suggesting the crossing is used more at the weekends.

As mentioned previously, there is a high number of vulnerable users seen, including a high use by children and youths attending The Creed outdoor learning centre, some elderly, mobility impaired and encumbered users and dog walkers.

Users are categorised as vulnerable when they are likely to take an extended time to traverse due to disability or distraction, e.g. elderly, encumbered or mobility impaired, or are at higher risk due to their perception of risk e.g. children.

Dogs walked on a lead are ostensibly under control; but observed examples show the user will often be distracted, focusing on the dog and not adequately focussing on traversing – and is also an encumbered user; for example, where the dog may itself become distracted, pull or attempt to stray, when approached by other users coming in the opposite direction (especially passing other dog walkers) or by any other event. This in turn causes distraction to the user from properly watching out and listening for approaching trains, etc.

Out of the 2266 users over the 14 day period, 363 users were children, 695 dog walkers, 14 elderly, 30 mobility impaired, 12 encumbered users, 39 were pushing a bike and 10 pushing a pram.

In line with Network Rail guidance under LCG02 Census Good Practice section 5, a 50% traverse increase is applied to the traverse time to enable vulnerable users the required time to traverse the crossing and reach a place of safety before the train arrives at the crossing.

Over the 14 days, 1049 users were travelling northbound and 1234 were travelling southbound over the crossing.



3.1 Overall Usage at Teynham West Footpath Level Crossing

		Adult	Accompanied Child	Unaccompanied Child	Dog Walker (Dog on a lead)	Dog Walker (Dog off lead)	Elderly	Mobility Impaired	Encumbered User	Cyclist pushing bike	Wheelchair	Pushchair/ Pram	Mobility Scooter	Railway Personnel	Total	Total - Railway Personnel
Thursday	10/03/2022	79	8	25	48	0	0	3	0	0	0	0	0	2	165	163
Friday	11/03/2022	65	1	6	30	0	0	0	1	2	0	0	0	0	105	105
Saturday	12/03/2022	64	8	2	52	1	1	2	0	1	0	1	0	2	134	132
Sunday	13/03/2022	75	12	2	51	2	0	2	0	2	0	0	0	2	146	146
Monday	14/03/2022	64	2	19	53	1	0	3	0	2	0	3	0	2	148	146
Tuesday	15/03/2022	71	8	6	40	0	2	1	2	2	0	1	0	0	133	133
Wednesday	16/03/2022	49	6	14	28	3	1	4	4	4	0	0	0	0	113	113
Thursday	17/03/2022	68	12	52	47	2	0	3	0	1	0	2	0	0	187	187
Friday	18/03/2022	78	7	18	45	0	1	0	1	3	0	0	0	4	157	153
Saturday	19/03/2022	142	53	11	76	2	6	3	1	6	0	0	0	0	300	300
Sunday	20/03/2022	107	37	3	61	0	1	2	0	8	0	1	0	0	220	220
Monday	21/03/2022	67	0	19	47	2	1	3	1	4	0	1	0	0	144	144
Tuesday	22/03/2022	38	5	13	52	1	0	1	1	2	0	1	0	0	182	182
Wednesday	23/03/2022	78	4	12	40	1	1	3	1	2	0	0	0	7	149	142
Total over 14 days		1103	163	200	680	15	14	30	12	39	0	10	0	17	2283	2266
14 day Average		78.79	11.64	14.29	48.57	1.07	1	2.14	0.86	2.79	0	0.71	0	1.21	163.07	161.86
Weekday Average		71.5	5.3	18.2	44	1	0.6	2.1	1.1	2.2	0	0.8	0	1.5	148.3	146.8
Weekend Average		97	27.5	4.5	60	1.25	2	2.25	0.25	4.25	0	0.5	0	0.5	200	199.5

Figure 3-1.1 – Usage Data Recorded During the Fourteen-day Census

3. RISK OF USE

3.1 SIGHTING AND TRAVERSE

At Teynham West level crossing, the decision point and traverse lengths are calculated as:

	Decision point (m)	Traverse length (m)	Measured from
Up side	2	9	On the deck level with upside signal
Down side	2	9	Level with small railway building

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	12

Assessor's traverse time notes:

The traverse is calculated using an accepted standard of 1.189m/s for able bodied users. As mentioned above there is a high amount of vulnerable users at the crossing so 50% has been added to the traverse time to account for these users, this is to enable them the time needed to traverse the crossing and reach a position of safety before a train arrives at the crossing. This is in line with Network Rail guidance under LCG02 Census Good Practice section 5.
An additional 1 second has also been added to account for step ups on the decking both sides of the crossing.

Sighting, measured in metres at a line speed of 80mph for the up line (including the current TSR) and 75mph for the down line, at Teynham West level crossing is recorded as:

Required sighting at full 90mph line speed on the up is shown in red

	Up side looking at trains travelling in the up direction		Up side looking at trains travelling in the down direction		Down side looking at trains travelling in the up direction		Down side looking at trains travelling in the down direction	
	Minimum required sighting distance	Actual sighting distance	Minimum required sighting distance	Actual sighting distance	Minimum required sighting distance	Actual sighting distance	Minimum required sighting distance	Actual sighting distance
Line 1: Line 1	429/483	440	402	861	429/483	463	402	466
	Sighting distance measured to point		Sighting distance measured to point		Sighting distance measured to point		Sighting distance measured to point	
	Teynham station platform		Lineside equipment		Footbridge		Frogna Farm Crossing	
	Minimum required sighting distance	Actual sighting distance	Minimum required sighting distance	Actual sighting distance	Minimum required sighting distance	Actual sighting distance	Minimum required sighting distance	Actual sighting distance
Line 2: Line 2	429/483	464	402	854	429/483	464	402	432
	Sighting distance measured to point		Sighting distance measured to point		Sighting distance measured to point		Sighting distance measured to point	
	Foot bridge		Lineside equipment		Footbridge		fencing	
	Minimum required sighting distance	Actual sighting distance	Minimum required sighting distance	Actual sighting distance	Minimum required sighting distance	Actual sighting distance	Minimum required sighting distance	Actual sighting distance

	If sighting is deficient, is it mitigated?	Notes on deficient sighting
Up side looking at trains travelling in the up direction	Yes, sighting deficiency mitigated	Whistle Board and TSR
Up side looking at trains travelling in the down direction	N/A	N/A
Down side looking at trains travelling in the up direction	N/A	N/A
Down side looking at trains travelling in the down direction		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	Yes
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 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

During the CCTV census in 2019 it was found that the crossing had a **high number of vulnerable users** and the 50% increase for traverse time was applied. At 90mph a minimum sighting distance of 483m is required for users to see an approaching train, as shown in the sighting table this cannot be achieved. When accounting vulnerable users only 440m of sighting is achieved when on the upside looking for up direction trains.

Before implementing a temporary speed restriction (TSR) Network Rail considered the following immediate short term actions to bring the crossing into compliance:

- Improving sighting – Teynham station is a fully operational station, as such station furniture, commuters on the platforms, trains stopped in the station and any other railway furniture is unable to be moved or removed, therefore it was unachievable to improve the sighting.
- Implementing Miniature stop lights – This is not an immediate short term action and is detailed below in section 5.2.
- Closing the crossing – temporarily closing the crossing may adversely affect full legal closure by generating objections from the local public. Network Rail want to engage with the public and work with the council to achieve legal closure.
- Improving whistle board warning – At 90mph the whistle boards in their current position do not give the required warning time to users at the crossing. to give effective warning of approaching trains, whistle boards should be positioned no further than 400m from the crossing. At the line speed of 90mph, to ensure sufficient warning time, they would need to be moved beyond that maximum distance where their efficiency can no longer be achieved. Consequently, as the most appropriate short-term intervention, whistle boards could not be deployed on their own and to ensure their compliance and efficacy, would need to be combined with a temporary speed restriction (pending deployment of a permanent solution).

As the above immediate actions did not reduce the risk or were unachievable a temporary speed restriction on the up line of 80mph from 90mph was implemented.

Assessor's general traverse notes:

The traverse is calculated at a walking speed of 1.189m/s with 1 second added for the step ups and a 50% increase for vulnerable users.

Assessor's general sighting notes:

53 out of the 183 trains stop at Teynham station, this mix of stopping and non-stopping services makes it harder for a user to judge the speed of an approaching train as they will either be slowing down for the station or accelerating as they are leaving the station. They are also unlikely to know if the approaching train will stop at the station and so the train may be doing full line speed.

Sighting is reduced further when there is a train stood in the platform, obscuring sighting of any approaching trains on the opposite line.

There is a brick railway building on the down side at the London side of the crossing, that if a user were to take a quick glance could obscure sighting, there are whistle boards in place to help mitigate this. Sighting can also be obscured by some of the station and platform furniture, including the platform end gates. Any commuters standing on the platform can also obscure sighting of approaching trains or become a distraction for anyone using the crossing.

3.2 EVALUATION OF MITIGATIONS

Teynham West level crossing is provided with whistle boards.

	Line speed	Whistle board distance (m)	Whistle board warning time (s)	Is the train horn clearly audible at the crossing?	Is the whistle board warning effective?	Comments on audibility and whistle board position
Up line	80	400	11.93	Yes	Yes, effective	See below
Down line	75	395	11.78	Yes	Yes, effective	See below

The percentage of users who use the crossing during the night-time quiet period, between midnight and 06:00, is estimated as 2%.

Assessor's notes on whistle boards:

The upside whistle board is placed on the other side of the station and Teynham East crossing.

If used correctly, the whistle boards are a suitable risk measure for warning users of an approaching train, however during the night time quiet period (00:00-06:00) trains do not blow their horns, therefore there is no warning of approach trains during this time.

Teynham West level crossing is not provided with warning lights.

3.3 CROSSING APPROACHES



The signs at Teynham West 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.

There are known issues with ice, mud, loose material or flood water.

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:

Access to the crossing is via a metal kissing gates on both sides, built into the Network rail boundary, the platform entrances are within the gates on both sides.

The crossing has a good timber deck fitted with anti slip surface.

There are small step ups on the crossing deck, this is however not disincentivising to cycles, prams and wheelchairs, which increases the risk.

Anti-trespass guards are fitted on both sides of the deck.

All signage relating to footpath crossings is fitted, STOP LOOK LISTEN, ELECTRIFICATION, TRESPASS and included here is DO NOT CROSS IN FRONT OR BEHIND TRAINS STANDING IN THE PLATFORMS.

The crossing is also surrounded by palisade fencing which can obscure sighting on the Upside approach if users were to glance for approaching trains.

There is a small amount of ambient light coming from the station and nearby road but not directly at the crossing. A user may require a personal light source.

3.4 AT THE CROSSING – ANOTHER TRAIN COMING RISK

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

Assessor's another train coming notes:

There are 183 trains per day, due to close proximity to the station, with a mix of stopping and non stopping trains or following incidents, disruptions or unscheduled running, trains do pass within 20 seconds of each other.

The risk is to a pedestrian having waited for the first train to pass, then steps out into the path of the second train which they have not been able to see or hear as it has been obscured by the first train.

The risk of this is also increased by any trains stood in the platforms, obscuring sighting of any trains on the opposite line and exacerbated by any users rushing to catch their train at the station.

3.5 INCIDENT HISTORY

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

Assessor's incident history notes:

There have been the following incidents in the last twelve months:

20.11.22 – LC Near Miss – 1P30 (10:53 Ramsgate-Victoria) reported applying the emergency brake at Teynham West crossing due to 4 males crossing in front of the train. Near miss confirmed

15.02.22 - LC Near Miss - 1F37 1220 Ramsgate – St. Pancras reported a near miss at Teynham West footpath crossing

04.04.22 – LC Near Miss 1F53, 1620 Ramsgate – St Pancras International reported a near miss at Teynham West Foot Crossing.

(it should be noted that the above near miss events took place with the temporary line speed of 80mph in place.)

28.04.22 - "Kid" reported sitting against fence within boundary as 1F58 went past at Teynham West footpath crossing.

08.04.21 - 1F51 16.30 Faversham to St Pancras reported a LC misuse with a bike rider at Teynham West - NOT a near miss.

Previous to this there have been the following incidents:

23.08.20 – Children playing on the crossing.

29.08.20 – Near Miss with a man on a push bike.

20.04.18 – Near miss with a MOP

20.03.18 – Near miss with a person

07.11.17 – Female with dog walked in front of train

25.10.17 – Male pushing a pram walked in front of train

30.08.17- Youths misusing the crossing

25.06.17- Emergency brake applied for children playing chicken

25.06.17- Youths playing chicken

17.06.17- Two youths ran across in front of train

13.04.17-Person crossed in front of train

05.04.17 – A boy and a girl were dodging trains

During the 9 day camera census unwanted behaviours and misuse events were captured that had not been reported as they were not seen by train drivers or railway staff, this included:

- Accompanied children loitering and sitting on the tracks
- Cyclists riding over the crossing
- Children running across the tracks
- Children walking over the trespass guards
- An adult and child pushing a trolley over the crossing
- Unaccompanied children playing football on the crossing

Some can be seen in the images below:



Figure 3-3.2 – Unaccompanied Children Playing with a Football on the Tracks



Figure 3-3.3 – Cyclists Riding Across the Level Crossing



Figure 3-3.5 – Accompanied Child Sits on the Railway

Teynham West level crossing ALCRM results.

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

- Distracted / forced by dog (loss of control)
- Tries to cross in front of train
- Second train coming
- Does not stop look listen
- Slips, trips, falls or snagged on crossing
- Unaware of crossing
- Railway cause: insufficient sighting

The calculated safety risk for this crossing is:	Risk per Traverse (Letter)	Collective Risk (Number)
		B
	Risk per Traverse (FWI)	Collective Risk (FWI)
Cars / car-based vans / quad bikes	0	0
Large vans / small lorries / large 4x4s		0
Buses / Coaches		0
HGVs		0
Tractors / large farm vehicles		0
Pedal / motor cyclists	0.000000425	0
Pedestrians		0.025421046
Horse Riders		0
Animal Herders		0
Vehicles user in pedestrian mode		0
Train Passengers		0
Train Staff	0.000000002	0.000162331
Derailment Risk		0
Weighted Average (Users)	0.000000388	
Total Risk		0.025583378
	Average Consequence	0.788
	Collision Frequency	0.032466215

5. OPTION ASSESSMENT AND CONCLUSIONS

5.1 OPTIONS EVALUATED

The options evaluated to mitigate the risks at Teynham West crossing include:

Option	Term	Risk per Traverse	Collective Risk	FWI	FWI Difference	Cost	Benefit Cost Ratio	Status	Comments
Closure via diversion	Long Term	M	13	0	-0.025583378	50,000	21.88	COMPLETE	See section 5.2
Closure via stepped footbridge	Long Term	M	13	0	-0.025583378	1,100,000	0.99	COMPLETE	See section 5.2
Closure via ramped footbridge	Long Term	M	13	0	-0.025583378	2,200,000	0.50	COMPLETE	See section 5.2
Installation of OMSL	Long Term	C	2	0.011610315	-0.013973063	150,000	2.00	COMPLETE	See section 5.2
Installation of Integrated MSL	Long Term	C	2	0.011610315	-0.013973063	800,000	0.40	COMPLETE	See section 5.2
Yellow deck and demarcation	Short Term	B	2	0.025074957	-0.000508421	5,000	0.32	COMPLETE	See section 5.2
Remove step ups	Short Term	B	2	0.025583378	0	5,000	0.00	COMPLETE	See section 5.2

NOTES

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

5.2 CONCLUSIONS

Assessor's notes:

Teynham West Footpath crossing is located on footpath number ZR681 in Teynham, Kent at the west end of Teynham Station, half a mile from Teynham centre and 4 miles from Sittingbourne. Teynham is a large village situated between Faversham and Sittingbourne and has a population of around 2,900. On the up (south) side the footpath leads from Lower Road and gives access to platform one of Teynham station before the crossing. The area on the North (Down) side of the crossing is rural and is popular with walkers and dog walkers who use a circular walk coming out on Station Row and over Teynham East CCTV crossing. Platform 2 of Teynham station can also be accessed from north side of the footpath. The village and housing estates are on the South (Up) side of the crossing, including Teynham Village Hall and Teynham Parochial CE Primary School.

The crossing is adjacent to Teynham Station and both platforms can be accessed from the footpath, because of this the crossing has peak use at both ends of the day. The platforms can also be accessed from the station entrance at the east of the platforms as well as Teynham East CCTV crossing, where there is also a footbridge.

There have been houses built on the south side of Teynham Station, but this has not been seen to have a big impact on the crossing. There is a local plan to develop areas on the South side of the crossing around Froggnal Lane, this is likely to create increased use over the crossing as this will be the most convenient use for the station.



Current Risk

Teynham West is ranked 2nd out of 361 for Level crossing risk in Kent and 2nd out of 169 for footpath crossing risk in Kent.

The risk score changed significantly from one assessment to another from a C3 to a B2.

Risk Reduction

Closure via diversion

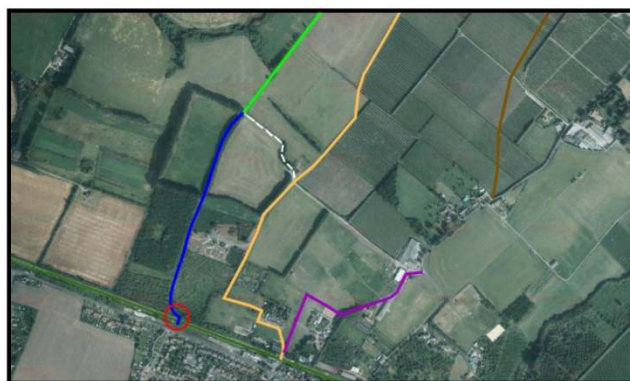
Closure can be achieved by diversion over the railway at Teynham East level crossing, where both platforms for the station can also be accessed. Teynham East CCTV crossing is a fully protected full barrier crossing, with road traffic lights and audible alarms, there is also an adjacent footbridge that can be used when the barriers are down. This type of system offers the highest form of protection and mitigation available to level crossings for users. Some walkers and dog walkers already use a circular walk from the foot crossing that passes in front of the sewage works, to Station row and back over Teynham East crossing. A number of divert options have been explored which can be seen in the maps below.

Network Rails preferred option would be option 3, to create a new path along the back of platform 2 (North side) to meet Station Row and Teynham East crossing as this option will create a new footpath which will be more appropriate and accessible than the other footpaths available.

Option 1



Option 2



Option 3



Closure via footbridge

Closure could also be achieved via a stepped or ramped footbridge, however this would be a high cost option in comparison to the divert available and would be subject to planning permission and land constraints. A bridge would also overlook the rail side neighbours which has to be considered. A ramped structure is very large and is also likely to need land purchase.

Overlay Miniature Stop Lights - £150,000

OMSL's display a red and green light at the crossing as well as an audible alarm, informing users when a train is approaching. OMSL are not suitable for non-complex locations e.g. plain line railway where there are no stations, signals or junctions. Teynham West is adjacent to Teynham station, with integrated signalling infrastructure in situ and immediately approximate to the crossing, this means that OMSLs are not a suitable at this location.

Integrated Miniature Stop Lights- £800,000

Integrated MSLs also display a red and green light at the crossing as well as an audible alarm. Due to the complexity of the area and Teynham station, this system would need to be integrated into the signalling system which is of higher costs. Integrated MSLs would however not reduce the risk to an acceptable level, especially taking into account the behaviours seen at the crossing, in fact it could exacerbate some such as playing 'chicken' with the red light or vandalism, as well as the relatively high cost of installation.

Demarcation - £5,000

For the short term, Demarcation, yellow decking and cats eyes on the decking may provide an aid for users crossing in dark hours. However, there were previously Cats Eyes on the decking and these were broken off, they may attract unwanted attention again by users stopping to get them off. This is not a long term option as shown in the table above it has a very minimal risk reduction does not mitigate against the risk seen at this crossing.

Remove step ups - £5,000

In the short time removing step ups will reduce the traverse time by 1 second, this would not negate the need for the speed restriction as sighting would still be insufficient but would reduce the changes of a tripping hazard. This is not a long-term solution as it does not reduce the risk to an acceptable level and does not mitigate against the risks at the crossing

Reducing the line speed further

Network Rail is under obligation to run an efficient network, which means that it must manage the infrastructure to ensure that it operates at, or as near as, capacity as achievable. This in turn translates into a clear obligation to allow uninterrupted passage of trains at (or as near as achievable) line speed to accommodate the very tight timetable.

Consequently, Network Rail only introduces speed restrictions in exceptional circumstances, in emergencies and on strictly temporary basis where no other option is readily available. Introduction of speed restrictions is accordingly subject to a strict process, involving close liaison with train operators and regulator and carries a sanction to Network Rail – the liability to compensate the train operator for the resulting delay minutes, from the public purse. As this section of railway is already very busy and operates to a tight time schedule for passengers, even the current speed restriction means Network Rail are already liable for significant compensation. To reduce the line speed would exacerbate this, already adverse state of matters, further.

Added to this, the current restriction is a strictly temporary measure pending deployment of a permanent solution. It is not an appropriate risk mitigation measure in its own right not only because it is completely at odds with Network Rail's regulatory and contractual obligations, further, it does (nor is it capable of) not reduce the risk to an ALARP level. To compound this further, it does not mitigate against the behaviours seen at this crossing as mentioned above in section 3.5 and therefore does not reduce the risk to an acceptable level.

Recommendation

Taking into consideration all of the above options available for Teynham West crossing, as well as the risks associated with the crossing- high use by vulnerable users, misuse and unwanted behaviours, the close proximity to the station and a high number of trains, it is recommended that Network Rail look to take forward closure via a diversion over Teynham East CCTV crossing.

ANNEX A – ADDITIONAL PHOTOGRAPHS

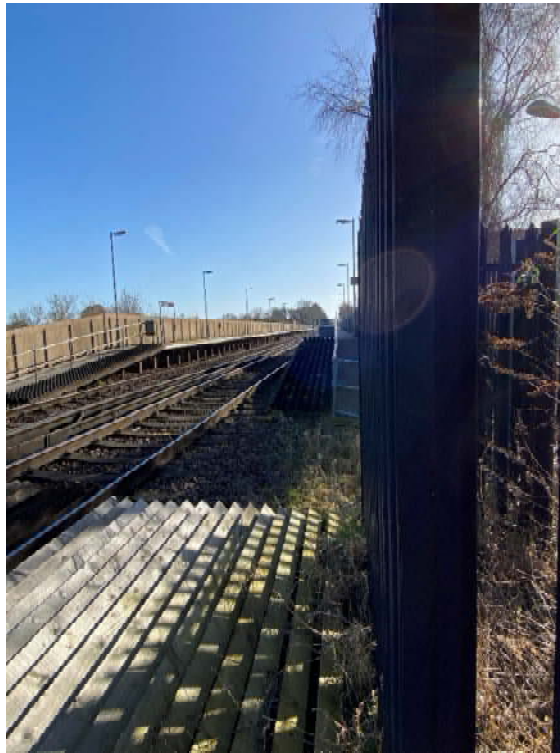
Additional Photographs



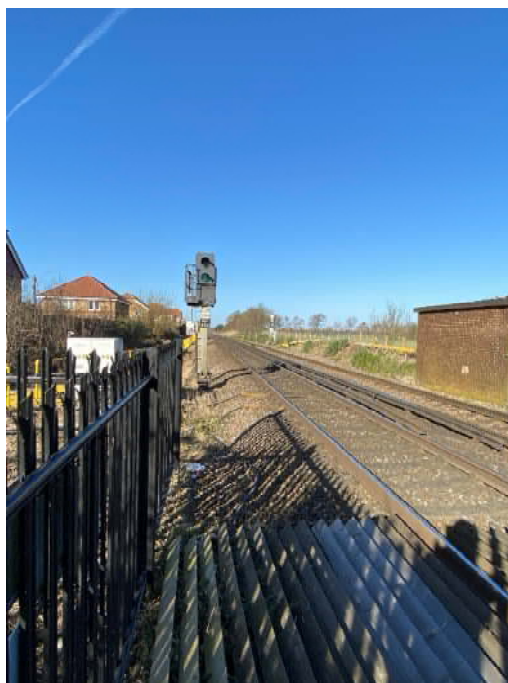
Up side approach to crossing and platform within gate



Up side across crossing



Up side up direction train approach



Up side down direction train approach



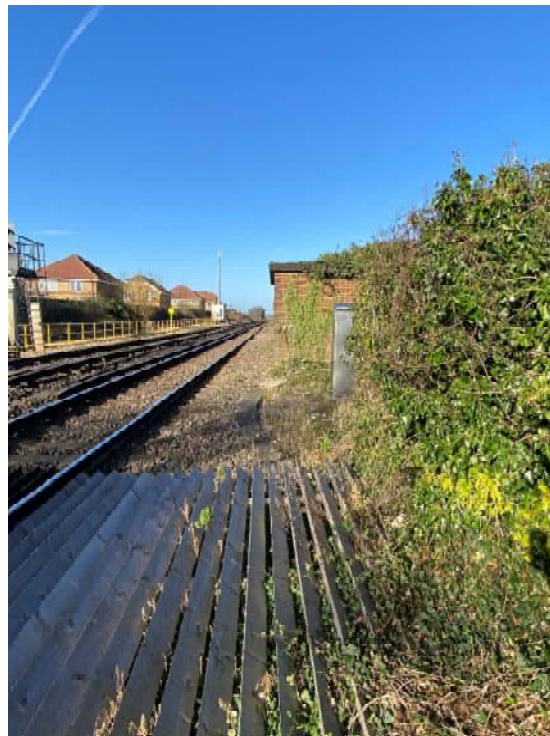
Down side approach from platform entrance



Down side across crossing



Down side up direction train approach



Down side down direction train approach

ANNEX B – HAZARD IDENTIFICATION AND RISK CONTROLS

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

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

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

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

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

ANNEX C – ALCRM RISK SCORE EXPLANATION

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

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

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

RISK PER TRAVERSE

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

Risk per traverse:

- Can be calculated for crossing users, train staff and passengers. Ranking is based on the risk to users only.
- Does not increase with the number of users.
- Is presented as a simplified ranking A to M. A is highest, L is lowest, and M is 'zero risk' e.g. temporary closed, dormant or crossings on mothballed lines.
- Allows risks to individuals on a per traverse basis to be assessed even if usage and Collective Risk is low.
- Can help in the prioritisation of risk mitigation and investment in safety.

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

COLLECTIVE RISK

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

Collective risk:

- Is presented as a simplified ranking 1 to 13. 1 is highest, 12 is lowest, and 13 is 'zero risk' e.g. temporary closed, dormant or crossings on mothballed lines.
- Can help in the prioritisation of risk mitigation and investment in safety.

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