

**TRANSPORT AND WORKS ACT 1992
TRANSPORT AND WORKS (INQUIRIES PROCEDURES)
RULES 2004
NETWORK RAIL (STALYBRIDGE TO DIGGLE
(SADDLEWORTH) ENHANCEMENTS) ORDER**

LEVEL CROSSING SAFETY

PROOF OF EVIDENCE

of

James Doodson

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1. QUALIFICATIONS AND EXPERIENCE

- 1.1.1 I am James Doodson, a Route Level Crossing Manager (RLCM) employed by Network Rail, within the North West Route, which is part of the North West & Central Region. I have been in my current role since September 2023, but by profession have 10 years' experience working within the railway industry. I am a permanent employee working for Network Rail to manage level crossing risk on the North West Route. I joined Network Rail in 2015 covering various roles until I was appointed to the Level Crossing Manager's position for the Manchester area in 2018. My roles and responsibilities during this employment were to manage the level crossing risk for my area, conduct maintenance activities, risk assessments on level crossings alongside other community engagement activities to reduce level crossing risk.
- 1.1.2 My current responsibilities, so far as is relevant to this public inquiry, are to sign off and approve the LCM Assessments on level crossing risk and condition of level crossing assets, and to oversee the inspection and maintenance regime.
- 1.1.3 My proof of evidence will cover the following matters.
- Introduction to both level crossings ("the Crossings");
 - Level crossing risk assessment process and the All-Level Crossing Risk Model (ALCRM)
 - Level crossing risk at the Crossings including incident history.
 - Response to Objections
 - Conclusions

2. THE LEVEL CROSSINGS

2.1 General Provisions

- 2.1.1 There are 2 Level Crossings included withing the Order:
- (a) Moorgate Halt at 13 miles and 26 chains
 - (b) Stockport Road at 11 miles and 35 chains
- 2.1.2 In this section I set out the main features that are common to both of the Crossings. Level crossings present an open interface between the railway and the highway, giving rise to an increased potential for user behaviour to affect train operations. They have differing levels of protection, and are broadly split into two groups:

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- (i) Active crossings: where the road vehicle or pedestrian is warned of the approach of a train through the closure of gates or barriers and/or by warning lights and/or alarms.
- (ii) Passive crossings: where no warning of train approach is given other than by the train driver who may use the train horn. The onus is on the road user or pedestrian to determine whether it is safe to cross the line. Instruction for proper use must be provided at each location, along with other appropriate signage.

2.1.3 Both of the crossings are passive crossings.

2.1.4 Both of the Crossings traverse two operational railway lines running between Manchester Victoria and Leeds which both have a 65mph line speed.

2.1.5 The direction of travel for trains towards Leeds, is known as the 'Up' line and the direction of travel for trains away from Leeds is known as the 'Down' line.

2.1.6 **Train Operations** – The railway lines running over both Level Crossings in the draft order, are operational and in 24-hour use. The train count taken for the latest risk assessments for both of the crossings (Moorgate Halt and Stockport Road) confirmed the current very high frequency of 150 trains daily throughout the seven days, travelling up to a maximum speed of 65 mph. There were also a further 11 freight trains that passed over the Crossing on average daily within the Assessment period. The TRU project, which the Order is sought to facilitate, will increase train service.

2.1.7 **Speed of trains** – the risk assessment carried out for each of the Crossings is based on the maximum permitted line speed over the level crossing. Prior to its closure under a Temporary Traffic Regulation Order (TTRO), there was a temporary speed restriction in place at Moorgate Halt due to deficient sighting for vulnerable users, lowering the permitted speed to 55mph. The TRU project, which the Order is sought to facilitate, will increase the train speed to 80mph at Moorgate Halt and 75mph at Stockport Road.

2.1.8 **Amount of rail use** – a new train count is taken to quantify the current train service over the crossing whenever a risk assessment is carried out. The train count should be based on the actual number of trains that run over the crossing on a representative day i.e. mid-week / non-Sunday service. For the risk assessments I discuss below in relation to the Crossings in the Order, this information was obtained from Real Time Trains website.

2.1.9 In addition to the train service outlined above, it can also become necessary to run more trains over a crossing due to operational reasons for instance due to

trains being diverted if there are problems on other lines of route. There is also a process twice a year in which the train operating companies can adjust the train timetable and include more services though this is not directly affected by the Order.

2.1.10 Engineering trains and track recording trains are also known to use this line. These are short in train length, not timetabled and run at various, ad hoc times during the day. Various on-track machinery and plant can run over crossings during railway engineering works that are being carried out on the network. Network Rail's maintenance regime along this line regularly sees weekend or mid-weeknight engineering trains pass. These operate during periods where they will not affect the running of passenger trains and will therefore be unexpected to users of a crossing.

2.1.11 Passenger trains over both of the Crossings are operated predominately by TransPennine Express and can vary in length but usually around 90 metres in length. Freight trains also operate over the Crossings and they are usually 300 metres in length.

2.2 LEVEL CROSSING RISK

2.2.1 Level crossings create an interface between roads, bridleways or footpaths and the operational railway. This has the potential to bring members of the public – pedestrians, cyclists, horse-riders, or vehicle drivers – into conflict with train movements. As a result, level crossing risk is one of the biggest safety risks on the railway infrastructure.

2.2.2 As part of Network Rail's strategy 'Enhancing Level Crossing Safety 2019-2029' (**NR77**) and the Guidance published by our Regulator, ORR, "Principles for managing level crossing safety" dated 15 June 2021 (**NR78**), Network Rail's strategy for managing level crossing risk includes:

- (i) Risk management; limiting/reducing the number of active open level crossings, continuing on-going risk reduction, risk-based prioritising of efforts, carrying out inspection and maintenance activities, on-going risk assessment regime (using tools such as the industry recognised ALCRM, support for public education and awareness of level crossing safety;
- (ii) Research and development; commitment to request and participate in research to reduce level crossing risk, also to investigate and introduce new technology;

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- (iii) Co-operation with stakeholders; support the British Transport Police (BTP) and the ORR (Office of Rail and Road) to enforce adherence to level crossing and road traffic legislation, forming partnerships with other organisations such as local authorities and highway authorities.
- (iv) Learning and taking action; Network Rail will learn from others, from accidents/incidents/recommendations and take action as considered necessary.

2.2.3 Some key elements of Network Rail's policy on level crossings are reflected in the Office of Rail and Road (ORR) publication 'Principles for managing level crossing safety' dated 15th June 2021, including:

- (i) ORR emphasises that risk should be reduced through the design of a level crossing or through an alternative way of crossing the railway where this is reasonably practicable. For an existing level crossing the risk assessment should always consider whether closure is a reasonably practicable option;
- (ii) To ensure that the level of protection at a crossing remains adequate and appropriate, the controls should be reviewed to ensure that they are working as intended and risk assessments should be kept up to date so that any changes at the crossing are assessed and managed.

2.2.4 It is proposed that the TransPennine Route Upgrade Project will lead to the increased train capacity, increased line speed and electrification of the line at this location. Where an increase train capacity is proposed, Network Rail's Regulator, the ORR requires Network Rail to review the implications of the risk at existing level crossings along the route and to make any required upgrades/interventions to ensure that the risk of the level crossing is not materially increased. Any impact on safety will depend on the type of level crossing involved. Existing protection may no longer be adequate.

2.3 LEVEL CROSSING: RISK ASSESSMENT

2.3.1 As set out in this Proof of Evidence the risk assessment of level crossings involves both a quantitative and qualitative assessment of risk.

2.3.2 The risk assessment process firstly involves assessing the crossing and inputting sets of data into the Risk tool - All Level Crossing Risk Management (**ALCRM**) used by Network Rail. This data leads to the quantitative data within the risk assessment in the form of an ALCRM score and Fatalities and Weighted Injuries Index (**FWI**) score. This is recorded in the Narrative Risk Assessment (**NRA**) for the crossing produced by the Level Crossing Manager, together with

commentary and observations from the RLCM, applying his or her expert judgment, highlighting key safety factors relevant to the crossing.

- 2.3.3 A qualitative risk assessment (or “structured expert judgment”) is applied by the risk assessor (**the LCM**) throughout the risk assessment process. Information to support structured judgement is derived through the collation of evidence during the site visit, by applying local knowledge, using smart intelligent sources such as the internet and mapping services, through stakeholder engagement and analysis of previous assessments and accident/incident data.
- 2.3.4 Network Rail uses both the quantitative ALCRM and the NRA, which articulates the qualitative, expert judgment of the LCM, to ensure a full and balanced approach is adopted in the risk management of the particular level crossing.
- 2.3.5 ALCRM reports two measures of risk: collective risk and risk per traverse. For each crossing the ALCRM score is made up of a letter (Risk per Traverse) and a number (Collective Risk) and also a Fatalities and Weighted Injuries (FWI) figure which informs the Collective Risk number.
- 2.3.6 Collective risk is a measure of the total harm, or safety loss and is expressed in terms of FWI per year, where FWI is a measure that accounts for fatalities and injuries. Collective risk is reported in a simplified numeric form and ranked from ‘1 to 13’ where ‘1’ represents the highest risk and ‘13’ representing nil risk. This is independent of crossing type, so crossings that are relatively busy with lower degrees of protection will receive the highest rankings and conversely lightly used crossings that have high levels of protection will receive rankings towards the lower end.
- 2.3.7 As part of the NRA and following the assessment of the risk at the level crossings, LCMs are required to consider options for removing, mitigating, or further mitigating the risk at the crossing and evaluating available options to manage safety and/or the requirement to pursue closure. When reviewing options to improve safety at level crossings, Network Rail’s LCMs seek to follow the principles from the Hierarchy of Risk Controls.
- 2.3.8 The main purpose of ALCRM is to provide a consistent method for assessing safety risks to crossing users, train passengers and train staff at level crossings on Network Rail controlled infrastructure. The risk model was developed as the result of a collaborative partnership involving the Rail Safety & Standards Board (**RSSB**), Network Rail and others.
- 2.3.9 The model has been reviewed by the RSSB with respect to pedestrian risk and was found to be robust.

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2.3.10 The calculated levels of risk are used as one part of Network Rail's overall risk management process, informing Network Rail of the relative risks of different level crossings and guiding business decisions on crossing upgrades and closures. ALCRM is a working tool which is updated periodically to incorporate findings from latest research, the changing risk profile, and other needs of the business. The key inputs into the Risk Assessment are:

(a) **Crossing type** – this input takes into account the safety provision from the level crossing equipment at the location. Both of the Crossings in the Order are of the type known as 'passive', meaning that level crossing users are not provided with a warning of approaching trains. Users are therefore responsible for their own safety and have to make their own judgement whether it is safe to cross or not.

(b) **Train Sighting** – Approaching trains may not be seen until it is too late (due to restrictive sighting) and quieter, more modern electric rolling stock and continuous welded rail means there is a much-reduced audible warning of approaching trains than there may have been in the past and they may not be heard.

(c) **Warning time** – For footpath crossings, the decision point (the last point of safety before stepping onto the railway, and where the user makes the decision whether it is safe to cross) is a minimum 2 metres from the first running rail. The next point of safety after a pedestrian starts to cross is 2 metres past the furthest running rail. Network Rail calculates the traverse time based on a person traveling at 1.189 metres per second. A 50% safety margin is added to the traverse time when vulnerable use is identified.

(d) **Amount of rail use** – a new train count is taken to quantify the current train service over the crossing. The train count should be based on the actual number of trains that run over the crossing on a representative day i.e. mid-week / non-Sunday service. This information can be sought from several sources such as Real Time Trains website, or TRUST (Train running under system TOPS). The risk assessment looks at all the different types of trains that run over the crossing, including lengths, different speeds of trains and different Train operating Companies(**TOCs**)/Freight Operating Companies (**FOCs**).

(e) **Speed of trains** – the risk assessment is based on the maximum permitted line speed over the level crossing as shown in the Sectional Appendix.

(f) **Amount of use by the public** – each risk assessment requires a 'census survey' to quantify how busy the crossing is in terms of use by the public. Methods of carrying out a census can range from a 30 minute 'quick' census

carried out on site by the Level Crossing Manager through to a more detailed 9-day census using CCTV cameras deployed on site.

- 2.3.11 To get a better understanding of how a level crossing is used and by whom, the census survey results are broken down into user groups. For footpath crossings the user groups are; “adults”, “accompanied children”, “unaccompanied children”, “elderly”, “rail personnel”, “mobility impaired”, “encumbered”, “wheelchairs”, “pushchairs/prams”, “mobility scooters”, “cyclists” and “dog walkers”.
- 2.3.12 The categorisation of users is based on the application of judgement from the person undertaking the census survey using the CCTV footage and images.
- 2.3.13 “Vulnerable” users (as well as “encumbered” users) are considered to be users who cannot traverse the level crossing within the normal warning time, which is why warning time is increased by 50% for “vulnerable” (and “encumbered”) users. This is supported by guidance within LCG (Level Crossing Guidance) 02 Level Crossing Guidance Document - Census Good Practice Guide (CGPG), core document NR106.
- 2.3.14 The guidance defines “vulnerable” users as people who, when compared with typical users:
- Are likely to take an extended time to traverse due to disability or distraction; and/or
 - Might be at greater risk of harm due to their perception of risk.
- 2.3.15 With regards to the vulnerability of users at level crossings, this risk assessment is exclusively for Network Rail as the expert assessor.
- 2.3.16 The CGPG underscores that the decision on the vulnerability of crossings users, is based on the Level Crossing Managers structured expert judgement and knowledge. The level crossing team are the competent persons responsible for the safe management and risk assessment of level crossings, and this is where the final decision lies.
- 2.3.17 The reasonable practicability of the application of the CGPG reinforces the flexibility in its applications to risk assessments and is to be applied in an evolutionary way, accommodating new and developing trends in human behaviour for example the use of mobile phones and headphones.
- 2.3.18 The categories within the CGPG are inclusive but not exhaustive and the circumstances at which vulnerability is exemplified, is equally not exhaustive. With regard to the “elderly”, the “disabled”, “accompanied” and “unaccompanied

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children”, it is open to the Level Crossing Manager to apply the 50% safeguard, based on their structured expert judgement.

- 2.3.19 The willingness of people to wait for trains or adhere to instructions, alarms or crossing equipment, can be influenced by such things as: distractions, time pressures, over familiarity with a crossing or timetable. Research also indicates and incidents show that human fallibility and susceptibility to distraction needs to be considered alongside deliberate misuse events and accidental human error, when considering the level of risk posed by the Crossing.
- 2.3.20 In terms of health and safety management, it is preferable, if possible, to ‘design out’ safety risks including risks associated with human behaviour.
- 2.3.21 The closure of both Level Crossings would therefore be entirely consistent with this approach.

2.4 Optioneering, cost business Analysis and Gross disproportionality Optioneering

- 2.4.1 Introducing additional train services with longer, quieter trains raise the risk at all level crossings along the route. ORR requires that where there is a change in railway operations so as to raise the risk then Network Rail must undertake a new assessment and consider all options that will mitigate the risk so far as is reasonably practical. This necessitates that the risk is reduced to at least the same level of risk prior to any railway enhancements being implemented.
- 2.4.2 Suitable alternative options for each site are usually considered and tested before the recommended option is identified within the NRA.
- 2.4.3 Each single option is subjected to robust Cost Benefit Analysis that also incorporates a calculated Gross Disproportionality Factor, thereby providing a structured and a consistent framework in determining whether the cost of implementing a control measure is grossly disproportionate against the reduction in risk. The Department for Transport considers the optioneering process when also taking into consideration Gross Disproportionality, to be the fairest in determining what options should be progressed, bearing in mind that the cost is weighted in favour of expenditure under gross disproportionality. As DfT confirms, the cost of implementing risk measures must not exceed the benefit that those measures might achieve.
- 2.4.4 The closure of a level crossing, through stopping-up, will unarguably secure the effective mitigation capable of satisfactorily controlling risk, so far as is reasonably practicable. However, risk control solutions should be appropriate for managing the hazards and risks identified. Generally, they must deliver the

greatest degree of public safety for the level of expenditure. Not all solutions are appropriate for all locations and risk may increase if an inappropriate risk control is chosen. Therefore, a site-specific assessment of suitability is part of the selection process.

- 2.4.5 The recommended options are then considered against the wider elements, including overall cost availability (against the full requirement of infrastructure works for the project), consideration of Network Rail's Public Sector Duty and the balance of the benefit to the public against loss and inconvenience to landowners and occupiers.

2.5 Cost Benefit Analysis (CBA) and Gross Disproportionality Factor (GDF)

- 2.5.1 To support the understanding of whether the risk at the level crossing is managed so far as is reasonably practicable (SFAIRP), the CBA is undertaken to provide a Benefit Cost Ratio (BCR); the principle being, if the cost of implementing a control measure is grossly disproportionate to the reduction in the risk that might be achieved, then it is reasonable not to implement that control measure.
- 2.5.2 Additionally, a Gross Disproportionality Factor (**GDF**) is applied to the BCR using one of the following factors:
- Medium = $BCR \times 1.5$
 - High = $BCR \times 2.5$
 - Exceptional = $BCR \times 6$
- 2.5.3 The criteria for defining the correct multiplier is determined by expert judgement by the LCM and subsequent RLCM, considering the level crossing against the following criteria using a question bank:
- Culpability – weighting deliberate misuse against genuine mistakes.
 - Vulnerability – to reflect a greater responsibility towards those less able to protect themselves.
 - Societal aversion – addressing the absence of public appetite for credible mass casualty train accidents.
 - Uncertainty – for the degrees of confidence in our knowledge of the pattern of apply, which encompasses elements such as who/how/with/what consequences.

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- 2.5.4 The highest level indicated across all questions determines the appropriate GDF level to use. Moorgate Halt and Stockport level crossings have been deemed as high rated crossings, so a 2.5 factor is applied.
- 2.5.5 The resultant GDF score informs and supports decision making based on the following criteria:
- (a) Benefit to cost ratio is ≥ 1 : positive safety and business benefit established (GREEN).
 - (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 (AMBER).
 - (c) Benefit to cost ratio is between 0.49 and 0.0: weak safety and business benefit established (RED).
- 2.5.6 The CBA and GDF guidance for level crossings provided to the level crossing teams is:
- GREEN: There would be a legal requirement to deliver the applicable intervention to achieve SFAIRP.
 - AMBER: A record of the business decision / justification on the applicable intervention (or not where the decision is to not deliver any risk mitigation activity) is required.
 - RED: No action would be proposed.
- 2.5.7 As such, cost benefit analysis has been completed for all relevant options across both crossings and gross disproportionality factor applied.

2.6 RISK ASSESSMENT: THE TRU PROJECT

- 2.6.1 In the following sections of my Proof, I have provided the ALCRM and FWI score for both crossings from their most recent risk assessments. As Moorgate Halt is currently temporarily closed, I have provided the ALCRM and FWI scores from the last risk assessment before it was closed.
- 2.6.2 New risk assessments are required to be carried out for each level crossing on a risk-based basis. The higher risk score then the more frequent the crossing will get risk assessed. The current timescales for such are set at 1 ¼ years for high-risk crossings, 2 ¼ years and 3 ¼ years for lower risk crossings. I have identified below where a crossing is currently going through its new risk assessment.

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2.6.3 In preparing my evidence for this Inquiry, I have also considered what the ALCRM scores for each Crossing would likely to be, if the TRU project upgrades which are set out in the Order have taken place. I have done this by increasing the line speed and using the proposed increased train frequency. All other inputs have been kept the same as used in the risk assessment which resulted in the ALCRM scores in the sections below. Though, it does not take into account the change in sighting distances at each level crossing that the overhead line installation will impact.

2.6.4 This has produced the following results:

Crossing	Current ALCRM Score	Predicted ALCRM Score	Risk Increase (FWI) (%)
Moorgate Halt	B3	B3	35%
Stockport Road	C5	C5	60%

3. MOORGATE HALT LEVEL CROSSING

3.1 Moorgate Halt – Location

3.1.1 Moorgate Halt is a footpath level crossing located in the village of Uppermill on the railway line between Greenfield station and Marsden (Yorks). The surrounding area is a mixture of rural land and urban land.

3.1.2 Figure 3 below provides an aerial view of the Crossing:



Figure 3 street map of Moorgate Halt

3.2 Moorgate Halt - RAIL OPERATIONS

- 3.2.1 Normal passenger services run along this between the hours of 0600 and midnight with approximately 150 services per day operated by Transpennine Express. Freight services also traverse this line with approximately 21 services running through the full 24 hours. The number and frequency of services can fluctuate depending on operational requirements, engineering works or during times of disruption. At this location the crossing spans two lines with a maximum line speed of 65 mph.
- 3.2.2 Passenger trains range in length with most around 90m in length, with freight trains approximately 300m in length.

3.3 Moorgate Halt – PHYSICAL FEATURES OF THE CROSSING

- 3.3.1 Moorgate Halt Crossing is a 'passive' crossing, meaning that level crossing users are not provided with an active warning of approaching trains.
- 3.3.2 The line curves on approach to Mossley station which affects the sighting of an approaching train. As such, a temporary speed reduction was implemented in order to achieve the appropriate warning time for vulnerable users at this crossing. The installation of OHLE and stanchions will further reduce the already limited sighting at this Crossing.

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- 3.3.3 There are no sources of lighting present so a user would require their own personal light source. LED solar deck lights are installed to demarcate the footpath during the hours of darkness.

3.4 Moorgate Halt – LEVEL CROSSING RISK

- 3.4.1 As noted above, the Crossing is currently closed. The most recent NRA for the Crossing is dated 21/08/2024.
- 3.4.2 The ALCRM score for the Crossing was B3 (0.006539395 FWI). At present, there are 457 level crossings on the North West Route. Out of this figure Moorgate Halt crossing would be ranked number 23. However, if you compare this level crossing to other crossings of a similar type it would be ranked 5 out of 75.
- 3.4.3 Factors informing this risk score include:
- (a) High frequency of train movements: high train frequency increases risk;
 - (b) Relatively high line speed: At 65mph on both lines.
 - (c) Relatively high level of public use; the Crossing has an average of 40 pedestrians and 2 cyclists per day. The risk of accident at a level crossing increases significantly with a higher level of use.
 - (d) Type of public use; the crossing has a higher than usual number of vulnerable users which has increased the warning time by 50%.
 - (e) Another train coming; as the line is very heavily used and there is a mix of longer passenger trains, long freight trains and shorter passenger trains there is a significant risk that a level crossing user's view of an approaching train could be obscured by a second train that has just passed over the crossing.
 - (f) Deliberate misuse and accidental human error; significant history thereof, including near misses and incidents with youths and children.
- 3.4.4 It is proposed that the Transpennine Route Upgrade Project will lead to the electrification, subsequent increased train frequency and increased line speed at this location. As such, Network Rail is required to review the implications of the risk at existing level crossings affected by this project and to make any required upgrades/interventions to ensure that the risk of the level crossing is not increased.

3.5 Moorgate Halt – RISK ASSESSMENT

- 3.5.1 The current sighting at the crossing was achievable due to a temporary speed restriction implemented on the down line at 55mph. The project is proposing to increase the line speed to 80mph. If this were to happen, the sighting would be deficient in all directions with no appropriate warning of a train approach.
- 3.5.2 Quieter, more modern electric rolling stock and continuous welded rail, means trains are significantly quieter than they used to be, so there is a much-reduced audible warning of approaching trains than what a user may expect when standing at a crossing.
- 3.5.3 As part of the TRU scheme, the project is installing new signals along this line. The introduction of the new signals creates a new risk whereby a train will straddle the crossing if the signal is showing a red aspect.

3.6 Moorgate Halt – PREVIOUS INCIDENTS

- 3.6.1 In recent years user vigilance for their own safety and adherence to safe protocols has been considerably reduced by the vast increased use of mobile communications and other personal devices.
- 3.6.2 The likelihood of users being distracted by mobile communications has increased and, additionally, the likelihood of people wearing earphones or headphones has also considerably increased which reduces the effectiveness of audible warnings.
- 3.6.3 Moreover, mobile phones have camera and video functions which has greatly increased the temptation for some people to take photographs or video footage in dangerous locations, such as level crossings. The use of headphones/earphones has been identified as a concern within a number of risk assessments and has been noted by the RAIB in their reporting as being a contributing factor in fatalities at other pedestrian crossings similar to the Crossing.
- 3.6.4 The incident history at this crossing is extensive with 23 reported incidents in the past 5 years at the time the risk assessment was written, 13 of which were near misses with pedestrians.
- 3.6.5 Additionally, many of the misuse involves children playing chicken or loitering around the railway, with multiple reports of objects being placed on the track.

3.7 Moorgate Halt – OPTIONEERING

- 3.7.1 The table below shows the CBA and GDF on the options considered.

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Option	Original ALCRM risk score	New ALCRM risk score	New ALCRM FWI	Safety benefit %	Indicative Costs	Cost Benefit Ratio
Closure by Diversion of Public Right of Way	B3	M13	0.000	100 %	£239,000 -	3.7872 -
Closure by Pedestrian Over Bridge	B3	M13	0.000	100 %	£288,000 £3,790,000 -	3.1428 0.2388 -
Closure by Pedestrian Underpass	B3	M13	0.000	100 %	£4,559,200 Unknown	0.1985 Discounted
Installation of Miniature Stop Lights (MSL)	B3	C4	0.001355844	84.64 %	£1,200,000	0.2156
Installation of VAMOS (OMSL)	B3	C4	0.001355844	84.64 %	£350,000	Discounted
Installation of FLEX (IOMSL)	B3	C4	0.001355844	84.64 %	£950,000	0.2901

Option	CBR	GDF value (CBR 2.5)	Outcome
Closure by Diversion of Public Right of Way	3.7872 - 3.1428	9.4679 - 7.8571	GREEN
Closure by Pedestrian Over Bridge	0.2388 - 0.1985	0.5971 - 0.4963	AMBER - RED
Installation of Miniature Stop Lights (MSL)	0.2156	0.5389	AMBER
Installation of FLEX (IOMSL)	0.2901	0.7252	AMBER

3.8 Moorgate Halt – CONCLUSIONS

- 3.8.1 An option considered for this location was the installation of a pedestrian over bridge, which would eliminate the risk at the crossing by allowing users to traverse from one side of the railway to the other without having to use the level crossing. This option came in at a considerable cost of £3.7m to £4.5m and performs poorly on the cost benefit analysis at both ends of the scale. The option has a moderate case after applying GDF when looking at the lower cost.
- 3.8.2 In addition, the erection of a bridge has the possibility to affect a lineside neighbour. As a result of this and the above, this option was discounted.
- 3.8.3 Another option considered for Moorgate Halt was a pedestrian underpass which would allow closure of the crossing. Again, this option would completely remove risk at the crossing and would allow users to reach either side of the railway without having to traverse the level crossing.
- 3.8.4 However, an underpass introduces new risks such as potential flooding and antisocial behaviour issues, this is likely with the reported misuse at Moorgate Halt level crossing. An underpass may also require land purchase in order to correctly gradient the structure. At this particular location, the steep gradients

on either side of the crossing would likely cause major issues with the construction of an underpass.

- 3.8.5 Due to these constraints and additional risks, this option has been discounted.
- 3.8.6 Miniature Stop Lights were also considered as part of the optioneering for Moorgate Halt. This option provides an 84.64% risk reduction at this location and would serve as mitigation for users by providing an active warning of an approaching train. However, due to new signals in the area of Moorgate Halt level crossing, there is a risk of a train straddling the level crossing. This could lead to user confusion and someone attempting to traverse the crossing whilst a train is on approach in the other direction, with the straddling train blocking sighting.
- 3.8.7 In addition, the option does not remove the risk in comparison to the two previous but still comes in at a significant cost. The option performs poorly on the cost benefit analysis, moderately after GDF has been applied, and has therefore been discounted.
- 3.8.8 Two forms of Overlay MSLs have been considered also. The first is a VAMOS overlay solution.
- 3.8.9 VAMOS is similar to the Miniature Stop Light (MSL) system by providing a visual indication of a train approach via a red or green light. However, this system is cheaper than the traditional MSL solution as it does not link into the signalling system. Instead, treadles are overlaid onto the track allowing a train to 'strike in' at a designated point. Once a train strikes in the system will display a red indication which shows a user it is not safe to cross. After the train has passed over the level crossing, it will 'strike out' changing the indication to green, showing a user it is safe to cross.
- 3.8.10 A VAMOS system is not technically feasible at this location. Due to the new signalling introduced by the project, a signal would be located within the 'strike in' point. This means that there is a possibility that a train could be held at a danger signal whilst the VAMOS system is showing a red aspect. If this were to happen, the VAMOS system would fail and go into 'dark mode'. This would cut all aspects from the system, and a colour aspect would not be shown.
- 3.8.11 This would likely lead to confusion on whether it is safe to cross or not. A user may cross whilst the system is in dark mode and a train on approach. Also, the risk of a train straddling the crossing remains with this option. This increases the risk of a collision between a user and a train greatly and should not be considered further.

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- 3.8.12 The other overlay MSL solution is known as FLEX but this is interfaced with the signalling system.
- 3.8.13 A flex system does not remove the risk of a train straddling Moorgate Halt level crossing. The same risk of confusion to a user would remain alongside the potential of a dark mode scenario. The system also has a significant cost whilst not removing the entire risk at the crossing, the CBA result is poor with a moderate result after applying GDF. As a result, this option should be discounted.
- 3.8.14 With the addition of more frequent and faster train, closure of the Crossing is the most effective way to remove the increased risk associated with this Crossing.
- 3.8.15 An option to divert the right of way over the level crossing using the alternative route FP SADD 244 to the south has been investigated. This option would eliminate the risk at the crossing and would allow users to access either side of the railway without having to traverse the level crossing.
- 3.8.16 Currently, the existing footpath SADD 244 via underbridge MVL3/29 is in a poor condition making it difficult for the majority of users to utilise this access. However, the project is proposing to improve this route considerably through de-vegetation, installation of new steps and further repair works on the entirety of the right of way. If the route was to be improved significantly making it accessible for users, this option is the most effective and suitable for this location. These proposals are considered in the evidence of Lee Barraclough, Chris Cary, and Sean Wotherspoon.

4. STOCKPORT ROAD LEVEL CROSSING

4.1 Stockport Road – LOCATION

- 4.1.1 Stockport Road is a footpath crossing on the outskirts of Mossley. The surrounding area is a mixture of rural land and urban area with local amenities and businesses. The crossing is located in the rural part of the surrounding area.
- 4.1.2 The Crossing is located on the railway line between Mossley station and Greenfield Station.
- 4.1.3 Figure 4 below shows an aerial view of the crossing:



4.2 Stockport Road – RAIL OPERATIONS

- 4.2.1 As stated on the risk assessment, normal passenger services run along this between the hours of 00:01 and 23:59 with approximately 120 services per day operated by Transpennine Express. Freight services also traverse this line with approximately 13 services running through the full 24 hours. The number and frequency of services can fluctuate depending on operational requirements, engineering works or during times of disruption. At this location the crossing spans two lines with a maximum line speed of 65 mph.
- 4.2.2 This is different to Moorgate Halt usage, although the crossings only being situated under 2 miles from each other, this is likely due to the risk assessments being written at different times of the year. There are no junctions or cross overs between the two crossings, so therefore any trains that pass over one must pass over the other.
- 4.2.3 Passenger trains range in length with most around 90m in length, with freight trains approximately 300m in length.

4.3 Stockport Road – PHYSICAL FEATURES OF THE CROSSING

- 4.3.1 Stockport Road Crossing is a 'passive' crossing, meaning that level crossing users are not provided with an active warning of approaching trains. However, whistle boards are present at Stockport Road.
- 4.3.2 The line curves in both directions at this location which affects the sighting of an approaching train. The installation of OHLE and stanchions will further

reduce the already limited sighting at this Crossing. This sighting deficiency is currently mitigated by whistle boards.

- 4.3.3 Whistle boards are the responsibility of the train driver to sound their horn which can sometimes lead to either no warning being sounded or inconsistent warning times. This is based on whether the train driver sounds the horn on approach to the board, at the board or beyond the board.
- 4.3.4 There are no sources of lighting present so a user would require their own personal light source. LED solar deck lights are installed to demarcate the footpath during the hours of darkness.

4.4 Stockport Road – LEVEL CROSSING RISK

- 4.4.1 Network Rail has undertaken an NRA for the Crossing as part of the ongoing risk assessment regime. The up-to-date NRA for the Crossing is dated 13/12/2024.
- 4.4.2 The current ALCRM score for the Crossing is C6 (0.000427083 FWI). At present, there are 457 level crossings on the North West Route. Out of this figure Stockport Road crossing is ranked number 158. However, if you compare this level crossing to other crossings of a similar type it is ranked 33 out of 75.
- 4.4.3 Factors informing this risk score include:
 - (a) High frequency of train movements: high train frequency increases risk;
 - (b) Relatively high line speed: At 65mph on both lines.
 - (c) Another train coming; as the line is very heavily used and there is a mix of longer passenger trains, long freight trains and shorter passenger trains there is a significant risk that a level crossing user's view of an approaching train could be obscured by a second train that has just passed over the crossing.
 - (d) Deficient sighting for users

4.5 Stockport Road – RISK ASSESSMENT

- 4.5.1 The current sighting at the crossing is deficient due to a track curve in both directions, this is currently mitigated by whistle boards. The project is proposing to increase the line speed to 75mph. If this were to happen, the sighting would be even more deficient in all directions and the whistle boards would also be non-effective in their current position.

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4.5.2 Quieter, more modern electric rolling stock and continuous welded rail, means trains are significantly quieter than they used to be, so there is a much-reduced audible warning of approaching trains than what a user may expect when standing at a crossing. In addition, the further away the horn is being sounded by the train driver, the more difficult to hear when a user is making their decision to cross.

4.6 Stockport Road – PREVIOUS INCIDENTS

4.6.1 There have been no reported incidents at this crossing.

4.7 Stockport Road – OPTIONEERING

4.7.1 The table below shows the CBA and GDF on the options considered.

Option	Original ALCRM risk score	New ALCRM risk score	New ALCRM FWI	Safety benefit %	Indicative Costs	Cost Benefit Ratio
Closure by Diversion	C5	M13	0.000	100 %	£20,000	19.4948
Closure by Pedestrian Over Bridge	C5	M13	0.000	100 %	£1,200,000	0.3249
Closure by Pedestrian Underpass	C5	M13	0.000	100 %	£4,000,000	0.0975
Installation of Miniature Stop Lights (MSL)	C5	C6	0.000179946	73.69 %	£1,200,000	0.0145
Installation of VAMOS (OMSL)	C5	C6	0.000179946	73.69 %	£350,000	0.128
Installation of FLEX (IOMSL)	C5	C6	0.000179946	73.69 %	£950,000	0.0196

Option	CBR	GDF value (CBR 2.5)	Outcome
Closure by Diversion	19.4948	48.7369	GREEN
Closure by Pedestrian Over Bridge	0.3249	0.8123	AMBER
Closure by Pedestrian Underpass	0.0975	0.2437	RED
Installation of Miniature Stop Lights (MSL)	0.0145	0.0363	RED
Installation of VAMOS (OMSL)	0.0489	0.128	RED
Installation of VAMOS (OMSL) with FLEX	0.0196	0.0489	RED

4.8 Stockport Road – CONCLUSIONS

4.8.1 An option considered by the project was the installation of an over bridge which would enable closure of the level crossing and completely removes risk at the crossing whilst allowing users to traverse from one side of the railway to the other. However, installation of a bridge is estimated to cost a considerable amount and performs poorly on a cost benefit analysis, moderately after applying GDF.

4.8.2 The gradients at this location could prove an issue in constructing an over bridge, with a steep embankment on the up side. This is likely to increase the

costs of construction, considerably weakening the benefit cost ratio as this progresses. Taking this into account alongside other more preferable options, the option of a bridge has been discounted.

- 4.8.3 Another option considered for Stockport Road was a pedestrian underpass which would allow closure of the crossing. Again, this option would completely remove risk at the crossing and would allow users to reach either side of the railway without having to traverse the level crossing.
- 4.8.4 However, as stated earlier in the proof, an underpass introduces new risks such as potential flooding and antisocial behaviour issues; flooding issues could be more problematic here due to the River Tame.
- 4.8.5 An underpass may also require some purchase of land to correctly gradient the structure. As such, because of the land issues, flooding issues and cost of the project, this option has been discounted as the cost significantly outweighs the safety benefit.
- 4.8.6 Miniature Stop Lights were also considered as part of the optioneering for Moorgate Halt. This option provides an 73.69% risk reduction at this location and would serve as mitigation for users by providing an active warning of an approaching train. However, as there are more cost-effective solutions, this option was discounted.
- 4.8.7 Again, two overlay MSLs were considered.
- 4.8.8 A VAMOS system is not technically feasible at this location due to the new signalling, a signal would be located within the 'strike in' point. The option has therefore been discounted for the same reasons as Moorgate Halt.
- 4.8.9 A FLEX system was also investigated but later discounted due to the significant cost whereby a more cost effective solution was present.
- 4.8.10 Closure of the Crossing is the only effective way to remove the new proposed risk associated with the crossing.
- 4.8.11 There is a short diversionary route to the north of the crossing which utilises both existing infrastructure and a new route created by the TRU project. The new part of the route is on the west of the crossing and will pass through an adjacent landowner's field. The costs for this diversion are minimal due to the infrastructure in place currently, with some minor works completed to the new route and access.

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4.8.12 As shown by the optioneering table above, the cost benefit analysis is positive and shows a strong case to proceed with this option as the most suitable way to mitigate the increase in risk.

5. WITNESS DECLARATION

5.1 Statement of declaration

5.1.1 My proof of evidence includes my declaration as an expert witness which also applies to my summary of my evidence.