

<b>Title:</b> Level Crossings <b>IA No:</b> LAWCOM0027  <b>Lead department or agency:</b> <b>Law Commission</b> <b>Scottish Law Commission</b> <b>Other departments or agencies:</b> Department for Transport Office of Rail Regulation	<b>Impact Assessment (IA)</b>		
	<b>Date:</b> September 2013		
	<b>Stage:</b> Final		
	<b>Source of intervention:</b> Domestic		
	<b>Type of measure:</b> Primary legislation		
<b>Contact for enquiries:</b> Sarah Young <b>02033340279</b>			
<b>Summary: Intervention and Options</b>			<b>RPC Opinion:</b> RPC Opinion Status

Cost of Preferred (or more likely) Option				
Total Net Present Value	Business Net Present Value	Net cost to business per year (EANCB on 2009 prices)	In scope of One-In, Two-Out?	Measure qualifies as
£1,402.43 m	£m	£m	No	In/Out/zero net cost

**What is the problem under consideration? Why is government intervention necessary?**

There are approximately 7,500 to 8,000 level crossings in Great Britain. The legislation regulating level crossings is complex, out of touch with modern developments and difficult to locate. This has a detrimental effect on the safety and efficiency of the transport network, as it hinders the ability of railway operators to understand and comply with their safety obligations and of regulators to enforce those duties effectively. Level crossings create the greatest risk of catastrophic accident (>5 deaths) on the railways. Under the current law it is often difficult, time-consuming and expensive to close level crossings. In Scotland, the interaction of level crossings law with statutory public access rights is unclear. Primary legislation is required to effect the necessary changes to the current legal framework.

**What are the policy objectives and the intended effects?**

1. Improve safety at crossings; 2. Promote the efficient operation of railways and, where present, highways/roads, enhancing cooperation between rail operators, traffic and highway authorities; 3. Modernise the law; provide clear lines of responsibility and improve governance 4. Provide easier, faster and simpler means to close level crossings where appropriate, providing replacement crossings where necessary, which will increase safety and reduce road user delays. 5. Remove bureaucracy, reducing inefficiencies for operators and regulators.

The intended effect is to deliver a modern regulatory regime which is clear, transparent and clarifies uncertainties in the law.

**What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)**

Option 0: Do nothing.

Option 1: Targeted regulatory reform, based on two key elements:

1(a) New, more coherent safety regime  
1(b) Faster, simpler closure procedures

Option 1 is a proportionate response to a long-standing problem. It works with and ties into the existing modern legislative framework for health and safety, with which operators and regulators are familiar. Where changes are made, they are targeted, in order to remedy inadequacies of, or fill gaps in, the existing system.

**Will the policy be reviewed?** It will not be reviewed. **If applicable, set review date:** N/A

Does implementation go beyond minimum EU requirements?			N/a		
Are any of these organisations in scope? If Micros not exempted set out reason in Evidence Base.	<b>Micro</b> Yes/No	<b>&lt; 20</b> Yes/No	<b>Small</b> Yes/No	<b>Medium</b> Yes/No	<b>Large</b> Yes/No
What is the CO <sub>2</sub> equivalent change in greenhouse gas emissions? (Million tonnes CO <sub>2</sub> equivalent)			<b>Traded:</b>		<b>Non-traded:</b>

**I have read the Impact Assessment and I am satisfied that (a) it represents a fair and reasonable view of the expected costs, benefits and impact of the policy, and (b) that the benefits justify the costs.**

Signed by the responsible SELECT SIGNATORY: Frances Patterson Date: 24 Sep 2013

# Summary: Analysis & Evidence

# Policy Option 1a

## Description:

### New safety regime

Price Base Year 2012/13	PV Base Year 2012/13	Time Period Years 60	Net Benefit (Present Value (PV)) (£m)		
			Low: Optional	High: Optional	Best Estimate: £18.53

COSTS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	N/A	N/A	N/A
High	N/A		
Best Estimate	Negligible		

#### Description and scale of key monetised costs by 'main affected groups'

*Transitional costs* - Implementation of the new regime (new risk assessments and setting up new mechanisms for co-operation, etc); Legal advice required to draft a code of practice.

*On-going costs*- Time and legal advice to keep regulations up to date (Regulators); Increased co-operation activities (Railway operators and traffic authorities); Administration/inspection associated with level crossing plans (Railway operators, traffic authorities, regulators).

#### Other key non-monetised costs by 'main affected groups'

None

BENEFITS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	0	0.03	£0.76
High	0	1.06	£36.13
Best Estimate	0	0.54	£18.53

#### Description and scale of key monetised benefits by 'main affected groups'

There would be no anticipated transitional benefits.

*On-going benefits* – Increased efficiency of road and rail networks - £60,000 per year, best estimate (Private sector); Reduced risk of catastrophic accident - £12,459 per year, best estimate (railway operators and regulators); Reduced risk of other accidents and near misses - £472,139 per year, best estimate (Operators and regulators).

#### Other key non-monetised benefits by 'main affected groups'

Railway operators, local authorities and regulators would benefit from a more coherent, modern and accessible legal framework. This would produce the further benefit of increased efficiency and effectiveness in the implementation and enforcement of safety standards, due to greater co-operation between actors and reduced bureaucracy. As a result, the public could benefit from increased safety at crossings and increased efficiency of the road and rail networks.

#### Key assumptions/sensitivities/risks

#### Discount rate (%)

1-3.5

1. The reform of safety regulation would reduce fatalities, weighted injuries and near misses at level crossings by 0-5%; 2. The reform of safety regulation would reduce the risk of catastrophic accident at level crossings by 0-5%.

## BUSINESS ASSESSMENT (Option 1a)

Direct impact on business (Equivalent Annual) £m:			In scope of OITO?	Measure qualifies as
Costs:	Benefits:	Net:	Yes/No	IN/OUT/Zero net cost

# Summary: Analysis & Evidence

# Policy Option 1b

Description: New closure procedure

Price Base Year 2012/13	PV Base Year 2012/13	Time Period Years 60	Net Benefit (Present Value (PV)) (£m)		
			Low: Optional	High: Optional	Best Estimate: m £1383.9

COSTS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	N/A	N/A	N/A
High	N/A		
Best Estimate	Negligible		

### Description and scale of key monetised costs by 'main affected groups'

*Transitional costs* - Establishing the new decision-making procedure (DfT); Staff training (DfT).  
*On-going costs* - The costs associated with public level crossing closures are taken into account in the AXIAT model and are produced as net benefits in the section below.

### Other key non-monetised costs by 'main affected groups'

None

BENEFITS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	0	0.69*	£716.9
High	0	3.75*	£1428.0
Best Estimate	0	2.16*	£1383.9

### Description and scale of key monetised benefits by 'main affected groups'

There would be no anticipated transitional benefits.  
*On-going benefits* - Faster and less expensive closure procedure (railway operators and local authorities); Cost savings from public level crossing closures (railway operators and local authorities); Cost savings from reduction in the compensation paid for the agreed closure of private crossings - £2,160,000 per year, best estimate (railway operators). \*Excludes costs of public level crossing closures.

### Other key non-monetised benefits by 'main affected groups'

The public would benefit from increased safety on the road and rail networks as increased level crossing closures would reduce the safety risk inherent in level crossings. There would also be a benefit in the form of increased convenience for the general public due to the increased efficiency of road and rail networks. There would be less time spent by road users waiting at crossings. There would also be potential for increased railway line speeds.

<b>Key assumptions/sensitivities/risks</b>	<b>Discount rate (%)</b>	1-3.5
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Assumptions:

1. Post reform increase in the closure of private level crossings ranges from an additional 15% to 25% on current levels.
2. The benefit from public road level crossing closures critically assumes access to sufficient funding to support a programme of closures.

## BUSINESS ASSESSMENT (Option 1b)

Direct impact on business (Equivalent Annual) £m:			In scope of OIOO? Yes/No	Measure qualifies as IN/OUT/Zero net cost
Costs:	Benefits:	Net:		

# Evidence Base

## Background to problem

1. A level crossing is a place where a railway is crossed by another type of way on the same level. Today, there are some 7,500 to 8,000 level crossings, including public and private level crossings on mainline, heritage and miniature railways, as well as those in dockyards and other commercial premises. We seek to create a framework that would help railway operators, traffic authorities,<sup>1</sup> and central government to find the right balance of safety and convenience for road and rail users.
2. The Department for Transport (DfT) and Office of Rail Regulation (ORR) proposed a project to review the law relating to level crossings as part of the Law Commission's Tenth Programme of Law Reform. It was agreed that the project would be a joint one between the Law Commission (England and Wales) and the Scottish Law Commission because much of the legislation applies throughout Great Britain.
3. The Commissions' Report recommends reform in two main areas – safety regulation and procedure for closing crossings. Our analysis below follows this structure. In addition, our reform would clarify the law relating to private and public access rights over railways.

## Problem under consideration

### Safety regulation

4. Level crossings are regularly closed to road users, some for up to 45 minutes in the hour. There is a need to rebalance the legal framework at level crossings so that the road and rail networks are encouraged to operate as efficiently as possible, and road users are not tempted to use the crossing improperly (for example by driving across as the barriers are coming down).
5. Level crossings safety regulation is often complex, antiquated and difficult to find. The system is inflexible and heavily relies on public sector involvement to make level crossing orders under the Level Crossings Act 1983, which specify the safety requirements for each public vehicular crossing and some private crossings. Level crossings are regularly inspected to current standards but level crossing orders usually remain unchanged for 25 to 30 years. Level crossing orders cannot be changed generically, which prevents wholesale uptake of new technology. Overall, the legal framework does not enable or incentivise the players to change arrangements for the most efficient use of the road and rail networks at a level crossing.

### Closure procedure

6. Closing crossings improves safety by removing the risk inherent in level crossings and reduces road user delay due to waiting while the barriers are down. However, existing procedures for closing level crossings compulsorily are time-consuming and expensive and are not generally applicable to all types of level crossings. The lengthy and expensive Transport and Works Act 1992 and Transport and Works (Scotland) Act 2007 procedures are designed for projects of regional or national significance, not for the closure of individual level crossings, yet they provide the only means of compulsorily closing any type of level crossing. The methods available for private level crossing closure are very limited, particularly in Scotland. In practice, private level crossings are only closed by agreement between the beneficiary of the private right of way over a crossing and the railway operator. The costs involved in such closures remain very high.

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<sup>1</sup> Where we refer to traffic authorities in this impact assessment that should be read to include roads authorities in Scotland.

## **Rights of way**

7. In addition, we have identified aspects of the law relating to rights of way across the railway which are unhelpful to the management of safe and convenient level crossings and we propose reforms to modernise and tidy up aspects of the relevant law.
8. Some private level crossings were created as easements or, in Scotland, servitudes and others were created by special Acts as statutory rights of way. It is not clear that these types of level crossing are treated in the same way under the current law.
9. There is a lack of clarity over whether public or private rights of way across the railway may be acquired under the law of prescription.

## **Scottish access rights**

10. The Land Reform (Scotland) Act 2003 created wide access rights, but clarification is needed as to whether such rights may be exercised over the railway.

## **Policy objective**

11. The recommendations aim to modernise and simplify the legal framework that governs level crossings so as to make it more coherent, modern and transparent.
12. We take the view that the regulatory regime for level crossings should aim to:
  - improve safety at level crossings;
  - promote the efficient operation of railways and, where present, highways/roads, by enhancing co-operation between relevant actors, and taking account of the need to strike a balance between the interests of rail, road and other users;
  - modernise the law; improve governance and provide clear lines of responsibility.
  - provide easier, faster and simpler means to close level crossings, providing replacement crossings where necessary, in order to increase safety by reducing the risk of accidents (including catastrophic accidents), and reduce road user delays due to waiting when the crossing is closed.
  - remove bureaucracy, thereby reducing inefficiencies for operators and regulators.
  - clarify the law relating to private rights of way across the railway and make the law consistent for easements and servitudes and statutory rights of way;
  - clarify that access rights under the Land Reform (Scotland) Act 2003 do not in general apply on or across the railway;
  - give Scottish Ministers certain powers to facilitate access across the track in limited circumstances.

## **Rationale for intervention**

13. The conventional economic approach to government intervention to resolve a problem is based on efficiency or equity arguments. The Government may consider intervening if there are strong enough failures in the way markets operate (e.g. monopolies overcharging consumers) or if there are strong enough failures in existing government interventions (e.g. waste generated by misdirected rules). In both cases the proposed new intervention itself should avoid creating a further set of disproportionate costs and distortions. The Government may also intervene for reasons of equity (fairness) and redistributive reasons (e.g. to reallocate goods and services to the less advantaged groups in society).
14. In the case of safety, cost inefficiencies arise from prescriptive and inflexible legal provision that applies to individual level crossings. This makes it difficult to introduce improvements to safety or convenience where, for example, there has been technological advancement. Not only is there a

lost opportunity to take advantage of the associated private benefit to the railway industry and passengers, through cost savings, but the public is also adversely affected as they cannot benefit from new developments which enhance safety, convenience, efficiency or all three.

15. The current mechanisms for closure of level crossings do not generally apply to all types of level crossing. The only procedures which currently enable the closure of all types of level crossing are those provided by the Transport and Works Acts 1992 and 2007. Those procedures are designed for large-scale projects of regional or national significance and the procedures are inefficient and costly for the purposes of level crossing closure. Under the current law, level crossings are not always closed even where there is a clear net benefit from doing so. Facilitating level crossing closures brings wider benefits. Each crossing represents an inherent safety risk to users of the road and the railway, which is removed when a crossing is closed. In addition, closing crossings could improve the efficiency of the road network through reduced road user delay.
16. Reduced road user delay brings benefits to the wider public and economy. Reducing delay increases convenience for the general public who use crossings when making journeys. Reducing delay also brings significant benefits for economic actors who use the road network in their business activities, as waiting times are reduced and efficiency is improved. Level crossing closures may also bring environmental benefits, as greenhouse gas emissions may be reduced when vehicles spend less time idling while waiting at crossings.
17. Changes to the law relating to rights of way are needed to provide clarity and avoid future legal challenges. In Scotland, there is a need to clarify the application of Land Reform (Scotland) Act 2003 access rights across the railway. The recommended changes can only be achieved through the use of primary, and some secondary, legislation to amend, repeal and replace existing law.

#### **Scale and context**

18. In 2010 there were approximately 4,000 public level crossings (where the railway is crossed by a footpath, bridleway or highway and the public therefore enjoys a right of way over the crossing) in use on the mainline network, comprising:
  - (a) 1,747 on vehicular highways;
  - (b) 2,073 on public footpaths; and
  - (c) 130 on public bridleways.
19. There were just over 2,600 private level crossings (where there is a private right of way, such as an easement/servitude, across the railway) in use on the mainline network, comprising:
  - (a) 2,383 on private vehicular roads;
  - (b) 248 on private footpaths; and
  - (c) 11 on private bridleways.
20. In addition, there are an estimated 1,000 to 1,500 level crossings on heritage and miniature railways.

#### *Safety regulation at level crossings*

21. There are currently three sources of regulatory control over level crossings:
  - a) individual level crossing orders made by the Secretary of State under the Level Crossings Act 1983, each of which governs the safety and convenience at an individual level crossing.
  - b) individual private special Acts passed to allow the building of the railways. Many of these Acts date back to the early or mid-nineteenth century;
  - c) Health and Safety at Work etc Act 1974 and regulations made thereunder.

*Safety risks at level crossings*

22. There are currently various measures of risk on the rail network including total system risk and train accident risk, as discussed below. The figures include catastrophic incident risks, and these are separated out below. Fatalities and injuries on the rail network are often expressed as fatalities and weighted injuries (FWI). In its response, the Rail Safety and Standards Board (RSSB) noted that it assesses harm and risk in terms of fatalities, major injuries and minor injuries. When combining injury information into a composite measure, each fatality is given a weight of 1.0 and each major injury a weight of 0.1. The combined total is called fatalities and weighted injuries (FWI).<sup>2</sup> See RSSB definition below, table 1

Table 1. Injury degrees and weightings

Injury degree	Definition	Weighting	Ratio
Fatality	Death occurs within one year of the accident.	1	1
Major injury	Injuries to passengers, staff or members of the public as defined in schedule 1 to RIDDOR 1995 amended April 2012. This includes losing consciousness, most fractures, major dislocations, loss of sight (temporary or permanent) and other injuries that resulted in hospital attendance for more than 24 hours.	0.1	10
Class 1 minor injury	Injuries to passengers, staff or members of the public, which are neither fatalities nor major injuries, and: <ul style="list-style-type: none"> <li>for passengers or public, result in the injured person being taken to hospital from the scene of the accident (as defined as reportable in RIDDOR 1995<sup>3</sup> amended April 2012)</li> <li>for workforce, result in the injured person being incapacitated for their normal duties for more than three consecutive calendar days, not including the day of the injury.</li> </ul>	0.005	200
Class 2 minor injury	All other physical injuries.	0.001	1000
Class 1 shock/trauma	Shock or trauma resulting from being involved in, or witnessing, events that have serious potential for a fatal outcome, eg train accidents such as collisions and derailments, or a person being struck by train.	0.005	200
Class 2 shock/trauma	Shock or trauma resulting from other causes, such as verbal abuse and near misses, or personal accidents of a typically non-fatal outcome.	0.001	1000

Source: RSSB Annual Safety Performance Report 2012/13, page 3

23. Collisions between trains and road vehicles, as opposed to collisions with pedestrians or cyclists, at level crossings are classified as train accidents. Train accidents include derailments, collisions, buffer stop collisions, train fires and trains striking road vehicles both at and away from level crossings, and trains striking animals and objects on the line.

*Catastrophic incidents*

24. Level crossings account for about 36% of train accident risk on the railway.<sup>3</sup> A catastrophic accident (or “serious train accident”) is defined by RSSB as an incident where there are multiple deaths and serious injuries, typically a train accident, but also including major fires on trains.

<sup>2</sup> RSSB Road-Rail Interface Special Topic Report, April 2010, p 7

<sup>3</sup> This evidence was provided by RSSB in their written response to the Law Commission, Level Crossings Joint Consultation Paper, No 194.

RSSB provided us with an estimated cost of £40 million (in 2010 prices)<sup>4</sup> for a catastrophic accident at a level crossing.

25. The overall cost of £40 million for each catastrophic accident at a level crossing, including fatalities, injuries, legal costs, charges to train operating companies for delays, damage and disruption, was calculated on the basis of the catastrophic accidents which have occurred at level crossings since 1968. The accidents were at Hixon (11 deaths and 45 people injured), Lockington (9 deaths and 11 people injured) and Ufton Nervet (6 deaths and at least 50 people injured). These figures represent the estimated cost of a multi-fatality accident caused by the operation or maintenance of the railway. Where an accident is caused by third party actions, the contractual payments made by Network Rail to train operating companies for damage to infrastructure which causes delays are likely to be somewhat lower and an estimate nearer to £30m might be more appropriate.
26. RSSB has provided a table of event frequency and consequences for level crossings accidents as modelled by the SRM v7.<sup>5</sup> See table 2 below.

Table 2: Frequency of train-related accidents and consequences for level crossings<sup>6</sup>

Number of fatalities	Incidents per year		
	SRMv7 (all train accidents)	SRMv7 – Level crossings only	
>= 5 fatalities	0.1733	0.0141	8.1%
>= 10 fatalities	0.0547	0.0035	6.5%
>= 25 fatalities	0.0162	0.0013	8.3%

#### *Risk of accidents and near misses*

27. According to RSSB, there has been an average of 14 collisions per year between trains and road vehicles at level crossings since 2002/03.<sup>7</sup> 95% of train accident risk at level crossings is to road vehicle occupants in relation to accidents involving freight train collisions (HET-11, in the Risk Profile Bulletin). For passenger train collisions (HET-10), the figure is closer to 84%.<sup>8</sup>
28. Chart one below shows the breakdown of fatalities and weighted injuries (FWI) over the ten year period from 2002-3 to 2011-12. The chart does not include suicides. For the purposes of the impact assessment we use the average over 10 years of actual FWI, but exclude the Ufton Nervet disaster from the catastrophic incident FWI.<sup>9</sup> The ten year average is nearly 11 FWI per year caused by incidents which have fewer than 5 fatalities at level crossings.

<sup>4</sup> An updated value is used later on in our cost benefit analysis.

<sup>5</sup> The Safety Risk Model (SRM) is a quantitative representation of the potential accidents resulting from the operation and maintenance of Network Rail's network, created by the Rail Safety and Standards Board. The current version is version 7, which was published in August 2011. Further information from RSSB may be found at [www.rssb.co.uk](http://www.rssb.co.uk).

<sup>6</sup> Consultation response No 100 – Rail Safety and Standards Board.

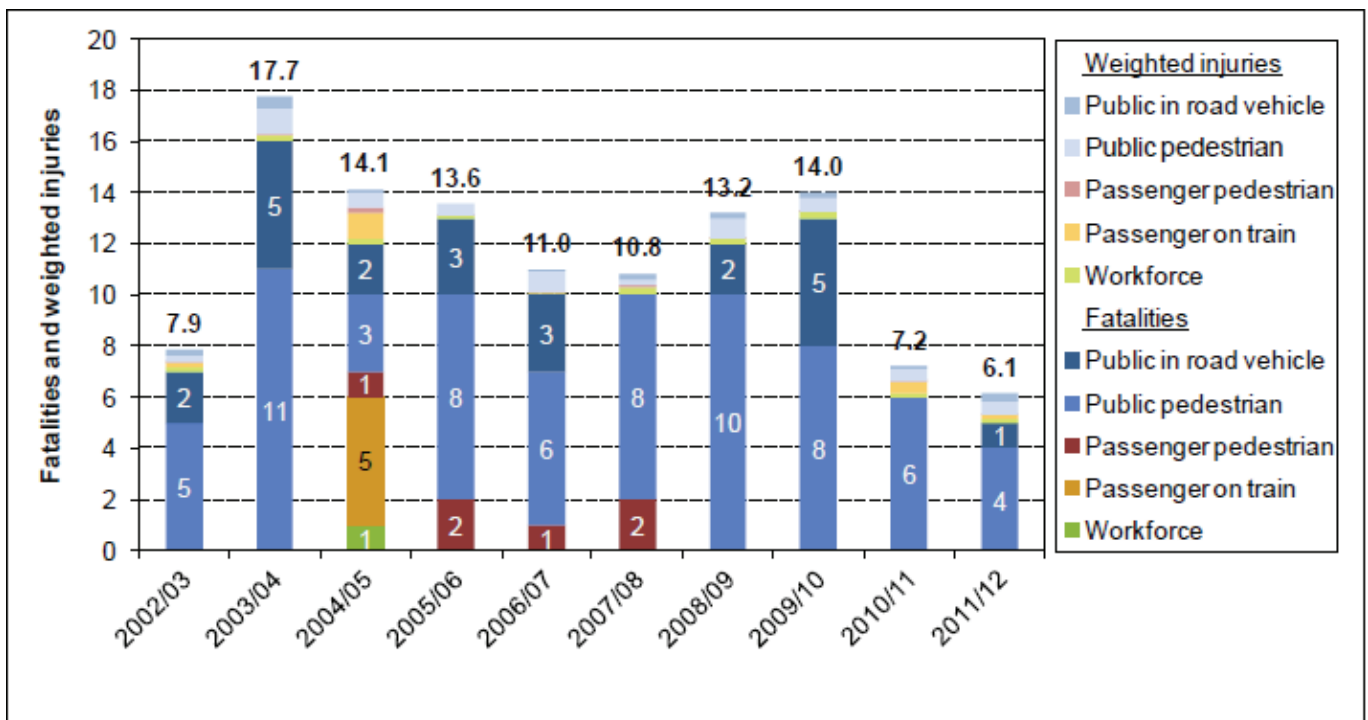
<sup>7</sup> Annual Safety Performance Report 2011/12, RSSB, page viii.

<sup>8</sup> Consultation response No 100 – Rail Safety and Standards Board.

<sup>9</sup> 7.135 FWI resulted from the Ufton Nervet disaster and this represents an outlier point, that is an exception which would skew the average.



Chart One: Actual Fatalities and Weighted Injuries at Level Crossings 2002/3-2011/12



Source: RSSB Annual Safety Performance Report 2011/12. page 186

### Suicides

29. Suicides at level crossings form approximately 9 to 14% of suicides on the railway. The incidence of suicides at level crossings can be seen in Table 3 below:

Table 3: The number of suicides and suspected suicides at level crossings

	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Pedestrian	17	17	19	23	21	20	22	32	26	24
Road vehicle occupant	0	1	1	2	1	0	1	1	0	0
Total	17	18	20	25	22	20	23	33	26	24

Source: RSSB Annual Safety Performance Report 2011/12, page 187

30. The Government is committed to reducing opportunities for suicide. The Department for Health published a cross-government suicide prevention strategy in September 2012.<sup>10</sup> One of the objectives is to reduce the availability and lethality of suicide methods, including reducing the number of suicides on the railways.
31. The Strategy states that reducing access to lethal methods of self harm is known to be an effective way of preventing suicide. One reason is that suicidal behaviour is sometimes impulsive, so that if a lethal method is not immediately available a suicidal act can be delayed or prevented altogether. Although method substitution does occur, a number of people will not go on to use another method and lives can be saved.
32. The Rail Safety and Standards Board is carrying out research on how to reduce the number of suicides on the railway network. While numbers of suicides have fallen nationally, numbers of suicides on the railway have not. RSSB suggested that railway suicides are rarely planned to any great extent, rather they are a more impulsive result of an intent (which may itself be only short lived) to kill oneself.<sup>11</sup>

<sup>10</sup> Department of Health, Preventing Suicide in England, September 2012. [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/156153/Preventing-Suicide-in-England-A-cross-government-outcomes-strategy-to-save-lives.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/156153/Preventing-Suicide-in-England-A-cross-government-outcomes-strategy-to-save-lives.pdf)

<sup>11</sup> See for example RSSB Research Brief T845.

33. The railway industry experiences a number of costs due to suicides on the railway. The railway operator's costs include management time to react to the incident; contractors to clean up incidents and repair infrastructure; and a percentage of cost to fund the British Transport Police (BTP) response to incidents. There is also the cost of mitigation measures to reduce suicides.
34. Train operating companies bear costs including: delays to train services; a percentage of cost to fund the BTP response to incidents; rolling stock repair costs; passenger compensation; sickness and mental health issues for drivers and other workers; and retraining (3 - 4% of drivers do not return to work). Network Rail estimates that suicides cost the industry at least £50m each year, of which suicides at level crossings cost approximately £5m to £25m each year.

### **Closure of level crossings**

35. In practical terms, closure of private level crossings is usually achieved by the railway operator reaching an agreement with the beneficiaries of the right of way to extinguish the right, i.e. closing the level crossing. Network Rail has successfully closed over 600 private level crossings since its closure campaign began in 2009. On average, each private level crossing closure has cost £50,000. Over the next 10 years, Network Rail aims to close around 100 crossings per year. Network Rail anticipates that the pace of private level crossing closure will slow once landowners have disposed of the least valuable or useful level crossings. Heritage railways are unlikely to seek to close level crossings, because they are often key features of the historic form of the railway.
36. It is possible, though unusual, to use the Transport and Works Act 1992 or the Transport and Works (Scotland) Act 2007 procedures to close public or private level crossings.<sup>12</sup> These powers are rarely used unless a larger development is planned, as the procedures are cumbersome and more appropriate for projects of regional or national significance.
37. There are some other powers to close public level crossings under the current law, but each is available in limited circumstances only. In England and Wales, sections 118A and 119A of the Highways Act 1980 provide for the stopping up or diversion of a public footpath or bridleway (but not a vehicular way) crossing the railway on safety grounds only. Section 116 of the Highways Act 1980 provides a general power for a magistrates court to order a vehicular highway to be stopped up. In Scotland, the Roads (Scotland) Act 1984 is somewhat wider in its application in that it allows a road to be stopped up where it has become dangerous or unnecessary. There are no equivalent provisions for level crossing closure in Scotland to those available under the Highways Act 1980, although the Lands Tribunal for Scotland can discharge servitudes over private level crossings under the Title Conditions (Scotland) Act 2003.
38. The Transport Research Laboratory undertook a major research project in 2008 into the effect of traffic delays at level crossings with a view to finding ways to reduce the delays.<sup>13</sup> RSSB has provided a chart illustrating the cost of road user delay in six examples of level crossings which all had a business case for closure (and bridge replacement) and relate to crossings in West Sussex and North Yorkshire only. See Table 4 below.

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<sup>12</sup> The Transport and Works (Scotland) Act 2007 has not to date been used to close any individual level crossing.

<sup>13</sup> E Delmonte and S Tong, Traffic Research Laboratory Report No PPR377, *Investigation into traffic delays at level crossings* (December 2008).

Table 4: Road user delay – Six examples of the cost implications<sup>14</sup>

Crossing reference	Road user delay (million minutes) per annum	Road user delay (£m) per annum 2012 prices and undiscounted
1	5.8	0.9
2	6.2	1.0
3	1.5	0.2
4	3.0	0.5
5	4.9	0.8
6	1.4	0.2
Average road user delay	<b>3.8</b>	<b>0.6</b>

*Notes*

1. Road user delay (£m) per annum: this is derived from road user delay (million minutes) per annum by multiplying by £0.155 per minute in 2012 prices (undiscounted). This is based on £13.91 per vehicle hour in 2010 prices (from WebTAG), divided by 60 (to convert hours to minutes), divided by 1.58 (to convert users to vehicles based on the average vehicle occupancy from WebTAG) and multiplied by 1.05 (to reflect general inflation between 2010 and 2012). No adjustment to reflect the value of time growth is required. The use of an average vehicle occupancy of 1.58 for all the crossings is an approximation only since average occupancy varies according to the proportion of buses and pedestrians within the road user totals.

2. Road user delay (£m) per annum: this does not take account of road traffic growth during the appraisal period.

39. Delay to trains is difficult to attribute to a single level crossing. Generally speaking, trains will only be delayed if there are a sufficient number of level crossings on a particular stretch of track to justify a reduction in the line speed. Removing a single crossing will in most cases not affect the line speed decision. On the other hand, delay consequent on accidents at or damage to a level crossing is more readily quantifiable, although this would have to be balanced against any delay occasioned by damage to bridges.

## Description of options considered

### Option 0: Do nothing [base case]

40. Retain the existing law relating to level crossings. The key feature and problems of the current law are summarised here, in table 5 below

Table 5: Current law: Key features and associated problems

Current law	Key features and associated problems
Orders are made under the Level Crossings Act 1983 to regulate the specific safety protection at each level crossing. There is a level crossing order for most public vehicular level crossings, and some private crossings (to which the public have access). Level crossing orders are usually reviewed every 20 years.	Level crossing orders can only be made for certain level crossings (public or to which the public has access). They are difficult to amend and tend to remain in place for twenty to thirty years, when the equipment wears out. They tend to discourage duty-holders from amending arrangements, where appropriate, in light of regular safety inspections or technological advancement.
A private level crossing can be closed by agreement between the railway operator	Where no agreement can be reached, there is no procedure for closing a private level

<sup>14</sup> RSSB response 2012

<p>(usually Network Rail) and the beneficiary of the right of way.</p>	<p>crossing apart from under the Transport and Works Act 1992 or the Transport and Works (Scotland) Act 2007 and in Scotland by the Lands Tribunal in relation to servitudes.</p>
<p>The law relating to safety at level crossings is often complex, out-dated and difficult to find.</p>	<p>The rigid requirements set out in level crossing orders and special Acts disincentivise the duty-holders from finding the most efficient solution for road and rail users. In particular, road user needs are not explicitly considered when level crossing orders are made and convenience and efficiency suffer as a result. Generic changes to the protection at level crossings cannot easily be made when developments in technology or changes to safety requirements occur. Regulators and rail operators incur costs due to the need to obtain specialist legal advice to interpret and comply with level crossing law.</p>
<p>There are different procedures available for closing different types of level crossing.</p> <p>In England and Wales, the Transport and Works Act 1992; the Highways Act 1980 (for non-vehicular paths); or, by agreement with the landowner (for private crossings);</p> <p>In Scotland, (1) under the Transport and Works (Scotland) Act 2007; (2) by means of a discharge agreement between the railway operator and the beneficiary of a private right of way; (3) by means of stopping up the road under the Roads (Scotland) Act 1984, in the case of a public level crossing; and (4) In relation to a servitude across the railway, by discharge by the Lands Tribunal for Scotland.</p>	<p>There is no universally available method of closure, designed for the purposes of closing level crossings, with or without replacement.</p> <p>Using any of the existing methods, it is difficult, costly and time-consuming to close level crossings. Some procedures require the highway or roads authority's agreement. Public consultation is not required. This process is made slower and more difficult by the absence of a single procedure, available for all level crossings. ORR and Network Rail support the closure of level crossings where appropriate, due to their inherent risks.</p> <p>Private level crossings can only be closed against the will of the beneficiary of the right of way by using the procedure under the Transport and Works Act 1992 or Transport and Works (Scotland) Act 2007, which are cumbersome, expensive and designed for large-scale public works projects. In Scotland a private level crossing which involves a servitude can be closed against the will of the beneficiary of the servitude. However, most private level crossings in Scotland are statutory rights of way crossings rather than servitudes.</p>
<p>The Land Reform (Scotland) Act 2003 makes no express provision about access rights over railways.</p>	<p>The law is unclear</p>
<p>Land law relating to the acquisition and extinguishment of rights of way across the railway is unclear.</p>	<p>Many special Acts created statutory rights of way across the railway. It is unclear how far the law on easements and servitudes applies to these level crossings and this leaves questions open as to how to extinguish such rights, creating uncertainty for railway operators and landowners when making closure agreements. It is possible that public or private rights of way across the railway may be created by long use or, in Scotland, by prescription. This creates the risk of new level crossings developing in circumstances where safety or convenience</p>

## Option 1: Targeted regulatory reform

### (a) New, more coherent safety regime

41. Safety at level crossings would be governed entirely by the general scheme under Part 1 of the Health and Safety at Work etc Act 1974. Primarily, duty-holders would have responsibility for carrying out risk assessments and making arrangements to keep risk as low as reasonably practicable. Agreements, in the form of level crossing plans, may be made for the management of individual level crossings where appropriate and where Ministers ("the appropriate national authority") consider it appropriate to issue a direction requiring arrangements to be made for a particular level crossing. Duties to co-operate and to consider the convenience of all users would support the creation of effective working relationships between the key players and improve the balance of convenience, thereby improving the coherence of the system for managing safety at level crossings and, as a result, the efficiency of the road and rail networks.
42. The general duties under HSWA 1974 Act would be accompanied by the Level Crossing Plans Regulations and, possibly, codes of practice under the Act. Level crossing orders would cease to have effect and special Acts would be disapplied insofar as they are inconsistent with the provisions of a level crossing plan or direction. The Secretary of State would be empowered to repeal provisions of special Acts insofar as they relate to safety or convenience of users of level crossings. ORR would be empowered to create statutory codes of practice under section 16 of HSWA 1974.
43. The railway operator and traffic authorities would be under a duty to co-operate when assessing and managing safety risks at level crossings. Co-operation would include sharing information, joint planning and on-going meetings to anticipate future risks.
44. Railway operators and traffic authorities should actively assess risks and review their arrangements to make sure that the road and rail intersection is being used as efficiently as possible. They might wish to agree arrangements, possibly by making a level crossing plan under the proposed Level Crossing Plans Regulations.
45. Railway operators and highway authorities should also have a duty under the Level Crossings Bill to consider the convenience of road and rail users when making arrangements at a level crossing.

### (b) Faster, simpler closure procedures

46. We aim to create a new system to enable the closure of individual public and private level crossings with or without replacement. Existing procedures would remain in place and may be used where appropriate, such as where a level crossing should be closed as part of a large development, or where a landowner agrees with the railway operator to release or discharge a private right of way over the railway.
47. Only the railway operator or traffic authority would be entitled to apply for the closure of a level crossing using the new procedure. The application may include a request for permission to build a replacement for the level crossing, such as a bridge or underpass.
48. The application to the Secretary of State, Welsh Ministers or Scottish Ministers ("the national authority") would be followed by consultation, including consultation with any landowners or, where appropriate, beneficiaries of the right of way. Unlike the Transport and Works Act 1992 and Transport and Works (Scotland) Act 2007, there would be no public inquiries. An oral hearing would be exceptional, but may be held at the discretion of the national authority. An oral hearing would be required if certain interested parties request a hearing.
49. The national authority would take into account representations and reach a conclusion, based on all relevant considerations, including a non-exhaustive statutory list of factors, including the safety and convenience of all rail and road users. Where the national authority orders closure of a level crossing, they may order that the closure is conditional upon the completion of works specified in the order. Closure orders would be subject to statutory judicial review.

50. ORR would keep a list of closure orders that should be publicly available.

### **Main affected groups**

51. The main groups affected by these proposals are:
- a) Department for Transport; Scottish Ministers and Welsh Ministers
  - b) Regulator: Office of Rail Regulation
  - c) Rail operators: Network Rail, heritage and miniature railways
  - d) Train operating companies and freight operating companies
  - e) Businesses that use level crossings, such as farmers, commercial docks and harbours
  - f) Interest groups for disabled people, rights of way and access groups and those interested in rural affairs, environmental affairs and heritage
  - g) Rail users (drivers and passengers)
  - h) Vehicular road users (private and commercial)
  - i) Non-vehicular road users: pedestrians, cyclists, horse riders, wheelchair users.

### **Responses to consultation on the draft impact assessment**

52. Network Rail thought the net present values (NPV) represented a reasonable range and also recognised significant uncertainties about the underpinning assumptions.<sup>15</sup> However, there were some concerns regarding possible double counting, e.g. savings from improved safety regulation potentially already incorporated in AXIAT model.
53. DfT and ORR provided a joint response to the draft impact assessment as the sponsors of the level crossings project. We have adopted their suggestion to separate the analysis of the safety regulation and closure proposals. DfT and ORR were concerned that moving to a HSWA based approach may result in transitional training and implementation costs.
54. A number of consultees, including DfT, ORR and RSSB, helpfully indicated where figures may need to be recalculated in order to provide a more accurate estimate of the likely costs and benefits of our proposals.

## **Costs and benefits analysis**

55. This impact assessment identifies both monetised and non-monetised impacts of intervention, with the aim of understanding the overall impact on society and the wider environment. The costs and benefits of each option are measured against the “do nothing” option. Impact assessments place a strong emphasis on valuing the costs and benefits in monetary terms (including estimating the value of goods and services that are not traded). However there are important aspects that cannot sensibly be monetised. These might include impacts on equity and fairness, either positive or negative, or enhanced (or diminished) public confidence.
56. The impact assessment process requires that we make an assessment of the quantifiable costs and benefits even when there is insufficient material on which to base those calculations. Where possible we have spoken to practitioners to inform our view of the likely aspects to be affected by the change in policy and have used this as the basis for our calculations. Where it has not been possible to obtain a rough indication of numbers in this way we have had to make a realistic estimate. In such cases we have taken a conservative approach and have tended to use figures that we considered likely to under-estimate benefits and over-estimate costs. We have used a range of estimates in our calculations. Some of the assumptions apply in both the cost and benefit calculations.

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<sup>15</sup> The net present value (NPV) refers to the difference between the present value of a stream of costs and a stream of benefits, where the present value is the future value expressed in present terms by means of discounting.

57. The NPV is calculated over a 60 year period with the current year (2013) being year 0. We have used a discount rate of 3.5% for the first 30 years and 3% for the next 30 years, in accordance with accepted government practice. We have used a different discount rate for safety benefits (1.5% for the first 30 years and 1% for the next 30 years) in accordance with ORR guidance. The price base year is 2012/13 with any exception to this being clearly indicated.
58. GDP deflators have been used to uprate all monetised values to 2012/13 prices.<sup>16</sup>

## **Option 0: Do Nothing**

59. This option demonstrates the ongoing costs and benefits of non-intervention and is therefore the “base case” against which the other option for intervention is compared.

### **Safety Regulation**

#### **Costs:**

##### Complex and conflicting legislative regime

60. Regulators and railway operators face costs associated with understanding the legislation relating to level crossings. The complexity often gives rise to the need to seek formal legal advice.

##### Inadequate relationship between the railway operator and the regulator

61. Changes to the safety measures at an individual level crossing must be approved by ORR and contained in a level crossing order, which imposes a significant cost in time and resources on both railway operators and regulators. There is no mechanism to make generic changes to the safety regulation for a class of level crossings. This results in low uptake of technological advances and a corresponding lack of efficiency savings by railway operators and public bodies.

##### Inefficient management of road and railway networks.

62. Although road-rail partnerships have been successful in some areas, many local highway authorities fail to co-operate with railway operators to find the optimum balance of efficient use of the road and railway intersection at a level crossing. This reduces the efficiency of both networks. Railway operators may continue to maintain safety protection at a level crossing that is no longer in use, producing inefficient resource allocation. In addition, the current legal regime does not prevent barriers from being closed against the road for up to 45 minutes in the hour, which reduces the efficiency of the national road network as a whole.

### **Closure**

#### **Costs:**

63. Closure is very difficult under the current regime and the processes are cumbersome, expensive and slow, imposing time and resource costs on railway operators. As mentioned above, private crossings can be closed by agreement with the landowner, resulting in an average payment of £50,000 per crossing in 2012/13 by Network Rail to landowners. This figure is likely to rise over the coming years as the crossings which remain to be closed are of higher value to landowners concerned, and Network Rail predict payments of over £800,000 per crossing.
64. The current legal regime permits level crossing barriers to be closed to road traffic for up to 45 minutes in the hour. This imposes costs on business users, and the public generally, in the form of costly road user delays, particularly during peak hours. Estimated costs are included in the AXIAT calculations below.
65. There is no single power suitable for the compulsory closure of both public and private level crossings. The Transport and Works Act 1992 and the Transport and Works (Scotland) Act 2007 have wide powers and may be used to close public or private crossings. Lengthy timescales, complex procedures and high legal and personnel costs make the 1992 and 2007 Acts unsuitable for the compulsory closure of most individual level crossings.

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<sup>16</sup> Using HM Treasury guidance data last updated 27 June 2013 available at <https://www.gov.uk/government/publications/gdp-deflators-at-market-prices-and-money-gdp-march-2013> accessed 18th July 2013

66. Railway operators continue to maintain level crossings where they are not needed because there are no simple legal mechanisms to close the level crossings.
67. There is a safety cost, borne by rail and crossing users, due to the inherent risk of accidents at existing level crossings. As illustrated by the figures above, every level crossing is a safety risk.

#### **Land law**

68. A private level crossing may be closed by the beneficiary of the right of way agreeing with the railway operator to extinguish the private right of way over the crossing. Where the private level crossing was created by statute, there is some doubt as to whether the agreement is binding on future owners of the land. This could lead to costly litigation.
69. It is not clear whether rights of way over the railway may be created by prescription, or in England and Wales, by implied dedication (long use). If new level crossings can come into being through this method, that will create additional maintenance costs as well as the costs of the inherent risk associated with level crossings.

#### **Benefits:**

70. The only benefit identified is the avoidance of costs associated with the implementation of reform proposals.

### **Option 1: Targeted regulatory reform**

#### **Option 1(a): New, more coherent safety regime**

##### **Costs:**

##### **Transitional costs**

##### Training

71. While some training would be required this could take place as part of regular professional development. Consultation responses indicate that the move to a HSWA-based safety regime is unlikely to require additional specific training.

##### Implementation of the new safety regime

72. The proposed reform would not change substantive safety requirements at crossings. Assuming that railway operators are carrying out adequate safety inspections and making adequate risk assessments to meet their duties under Part 1 of HSWA 1974, and Regulations thereunder, there should be no need to carry out additional inspections as a result of the new safety regime. Railway operators may choose to carry out additional inspections to decide whether to create level crossing plans, although this could be done as part of the normal inspection timetable. ORR might choose to inspect new arrangements at level crossings under the new regime in order to assess whether HSWA duties are being complied with. Costs may result if railway operators decide to create new arrangements as a result of agreements reached in terms of level crossing plans.

##### New process of on-going planned co-operation

73. Railway operators and traffic authorities would be required to co-operate with each other in connection with level crossings. Any costs associated with the duty to co-operate are likely to reduce over time.

##### New regulations under section 15 of HSWA 1974

74. A draft set of Level Crossing Plans Regulations is annexed to the Commissions' Report. Implementation of the regulations would be a matter for the Secretary of State and would result in some costs for DfT and ORR.

##### Approved codes of practice



75. In the event that an approved code of practice is made by ORR under the proposed power in the Bill, there would also be a cost to Network Rail of implementing such a code of practice in relation to safety at level crossings.

**On-going costs**

Updating an approved code of practice and regulations

76. Over time any approved code of practice that is made would require to be updated, as would regulations made under section 15 of HSWA 1974. This would incur costs in staff time at ORR and drafting resources of lawyers at DfT in respect of revised regulations. There would also be training costs for the staff of other relevant bodies, such as railway operators.

Ongoing co-operation activities

77. Railway operators and traffic authorities would need to provide resources to meet the duty to co-operate in relation to level crossings. These may include regular meetings and the exchange of information. The costs associated with these activities would be likely to be met by their existing funds for external liaison and safety management.

**Benefits:**

**Transitional benefits**

There are no anticipated transitional benefits.

**On-going benefits**

78. The most significant savings would result from the operation of a comprehensive, modern, simpler, and clearer system of safety regulation. It would also result in more efficient use of the road and rail networks. This would result in benefits for the general public, including the private sector, in the form of a potential increase in safety at crossings and an increased efficiency of the road and rail networks. This might also result in a slight reduction in the risk of accidents and in the risk of catastrophic accidents. The key on-going benefits would be:
- (a) economic benefits for public and private sector due to greater efficiency of road and rail networks;
  - (b) potential for slightly reduced risk of catastrophic accident;
  - (c) potential for slightly reduced risk of accidents and near misses.

Greater efficiency of road and rail network

79. Delays to road users' journeys across a whole spectrum of modes of travel (bus, car, lorry, etc) may be reduced as a result of new arrangements at level crossings, creating significant economic benefits for businesses which use the transport network. Road user delays associated with the 6 examples of level crossings used in the AXIAT assessment represent the most severe cases.<sup>17</sup> A conservative estimate of a 5-15 per cent reduction in road user delays based on the 6 cases provides some indication of the scale of savings nationwide. However, care should be taken with its interpretation. On the one hand the estimated savings considerably undervalue the potential savings as they are restricted to a very small percentage of all level crossings. However, on the other hand, the lengthy delays occur in a minority of cases and these may already be scheduled for closure in which case the benefit will be incorporated into the AXIAT model. See table 6 below.

Table 6: Savings from reduced road user delays

	Percentage reduction in road user delays
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66. <sup>17</sup> See paragraph 38 for an explanation of the research using AXIAT (the Alternative to Level Crossings Assessment Tool).

	5% reduction [low estimate]	10% reduction [best estimate]	15% reduction [high estimate]
A. Per annum savings @ % reduction x £600,000	£30,000	£60,000	£90,000
B. Present value over 60 years @3.5% and 3.0%	£761,258	£1,552,701	£2,283,773

80. The new duty of co-operation on traffic authorities and railway operators would require traffic authorities to engage with the railway operator in agreeing safety arrangements in relation to public level crossings. They may also choose to use the powers under the new Level Crossing Plans Regulations to create a level crossing plan. The duty to co-operate could facilitate more efficient use of the road and rail network by encouraging long-term joint planning of the road and rail networks. More co-operation would produce benefits for rail operators and traffic authorities by an estimated 10 percent improvement across the board reducing inefficiencies and duplication in how they implement safety regulations. It would also have the potential to create opportunities for higher line speeds on the rail network.
81. This would produce a further economic benefit, as a reduction in time spent with vehicles idling at level crossings when the barriers are down could improve fuel efficiency for business and leisure users. There may also be an environmental benefit, due to reduced exhaust emissions and reduced consumption of fossil fuels.

#### Reduced risk of catastrophic accidents

82. The proposed move to reliance on HSWA 1974 for the regulation of safety at level crossings aims to reduce the risk of catastrophic accidents on the rail network. However, we accept that the level of the reduction is difficult to quantify. Therefore we consider that the reduction in risk could range from 0-5%.
83. Using the RSSB average cost of a catastrophic accident involving a third party on a level crossing of about £31.2 million (in 2012/13 prices) we have calculated the potential savings if the risk of catastrophic accidents was reduced by 0-5%, with 2.5% as our best estimate. These are included in the table below. The present values are calculated assuming the benefits start accruing in year 1 and not year 0. We have assumed for the purposes of our calculations that incidents involving 10 or more people are included in the statistics for incidents involving five or more people.

Table 7: Potential cost reductions relating to catastrophic accidents

	<b>Annual probability of incident</b>	<b>Costs per year</b>	<b>Present value</b>
Incident involving $\geq 5$ people	0.0141	£439,161	£15,383,810
	<b>Reduction in incident probability</b>	<b>Savings per year</b>	<b>Present value of savings</b>
Low: Reduction of 0%	0	£0	£0
<i>Best: Reduction of 2.5%</i>	<i>0.0004</i>	£12,459	£436,439
High: Reduction of 5.0%	0.0007	£21,802	£763,724

84. This table shows the potential annual savings attributable to a reduced risk of catastrophic accidents. The best estimate of the total annual savings is just under £12,500 with a present value over 60 years of just under £440,000.
85. The average cost provided by RSSB is an average of the costs of the previous three accidents on level crossings. It is important to recognise that the costs of a catastrophic accident vary enormously, but immediate costs include: the loss of life and injury costs; physical damage to the

rail network and train; pain, grief and suffering; lost economic output; medical and healthcare costs; material damage; police and fire service costs; and insurance administration. There are also the costs of dealing with the accident in the short term, including clearing up the area in which the accident occurred, and the implementation of temporary arrangements such as temporary speed restrictions, disruption and cancellation of rail services.

86. RSSB describes catastrophic accidents as having a “rippling effect”, as they can have large consequential costs, including legal and court costs, public inquiries and inquests or, in Scotland, fatal accident inquiries. A large portion of the costs is due to diversions and closure of the line and long-term arrangements such as altered timetables while any infrastructure damage is repaired. These cause disruption to the rail services, lost time resulting from transport delays, charges to Network Rail resulting from extended journey times, and loss of revenue from passengers choosing alternative means of transport. There are also the costs of repairs to the rail network and the cost of improvements to the safety measures.
87. The reduction in risk should take into account any additional risk on the road where a level crossing is replaced with a bridge or underpass. Our best estimates suggest that there is no or negligible additional risk of accident where the alternative to the level crossing follows the same route as the road. Where a lengthy road diversion is created, the risk may increase and this would have to be taken into account when considering whether to divert the road.

#### Reduced risk of accidents and near misses

88. We also anticipate that a move to reliance on HSWA 1974 for safety regulation would potentially result in a reduced risk of accidents and near misses. We estimate that there could be a reduction in the overall risk of accidents at level crossings of in the region of 0 – 5%, with 2.5% as a best estimate.
89. In our calculations we have used the actual reported fatalities and weighted injuries (FWI) from RSSB. The 10 year average of FWI per year, excluding those caused by incidents in which there were five or more fatalities, is nearly 11 FWI. The potential reduction in FWI per year is thus 0 to 0.542 FWI, with a best estimate of 0.271 FWI.
90. Suicides are not usually included in Network Rail's calculation of the costs incurred at a level crossing. For this reason, we present any costs of suicide and savings arising from suicide risk reduction separately.
91. It is possible to express the cost of accidents at level crossings in economic terms. This entails combining the risk of an injury occurring with the economic loss that such an injury would occasion to the injured person and the consequent loss to the wider economy. On this basis, the economic effect of an accident would vary from person to person. In order to extrapolate a wider picture, a standardised cost must be assumed that applies to every death or other injury at a level crossing. Table 8 has been generated using the average value of the prevention of a fatality of about £1.72 million in 2012/13 prices.<sup>18</sup>

Table 8: Potential cost reductions relating to incidents involving < 5 fatalities

	<b>Average FWI</b>	<b>Costs per year</b>	<b>Present value</b>
Incident involving < 5 FWI	11.0	£18,885,545	£661,560,641
	<b>Reduction in FWI</b>	<b>Savings per year</b>	<b>Present value</b>
Low: Reduction of 0%	0	£0	£0
<i>Best: Reduction of 2.5%</i>	<i>0.271</i>	<i>£472,139</i>	<i>£16,539,029</i>
High: Reduction of 5.0%	0.542	£944,277	£33,078,023

<sup>18</sup> Based on DfT 2010 valuation of about £1.65 million. The value derives from the willingness to pay for various road improvements in order to avoid the losses associated with a fatality (See WebTag 3.4.1).

92. This table shows the potential annual savings attributable to a reduced risk of accidents. The best estimate of the annual savings is just over £470,000 with a present value over 60 years of just under £16.6 million
93. There would also be a reduction in the associated accident costs, such as rail repair. Although we do not have sufficient information about the number and type of accidents at level crossings to estimate a total annual infrastructure repair cost, RSSB estimates that approximately 75 metres of rail infrastructure has to be repaired per accident, with a 50% increase in costs for lines which have a line speed of over 80mph.
94. It is likely that risks of accidents at a level crossing would further reduce where more convenient measures are created at that level crossing. This would be because users would not need to run risks in order to use the level crossing in the most convenient manner. We have taken a conservative approach to quantifying the benefits of our safety procedure and we have not quantified this reduction in the calculations below.

Table 9: Option 1(a) Summary of Annual key costs and benefits and NPV

	Low estimate	Best estimate	High estimate
Transitional Costs	N/A	N/A	N/A
On-going Costs <sup>19</sup>	N/A	N/A	N/A
Transitional benefits	£0	£0	£0
On-going Benefits			
Reduced risk of catastrophic accidents	£0	£12,459	£21,802
Reduced risk of accidents/near misses	£0	£472,139	£944,277
Reduced road user delays	£30,000	£60,000	£90,000
Total annual benefit	£30,000	£544,598	£1,056,079
<b>NPV over 60 years</b>	<b>£761,258</b>	<b>£18,528,189</b>	<b>£36,125,520</b>

### Option 1(b): Faster, simpler closure procedures

#### Costs:

#### Transitional costs

##### The establishment of a decision-making procedure

95. A new decision-making procedure would involve departmental staff time as well as the costs of setting up the systems for decisions to be made, meetings and hearings to take place, albeit in existing buildings and considered by Ministers and their officials. It may be that this work could be undertaken at DfT and the Scottish Government by the existing units dealing with orders under the Transport and Works Acts but it may be that this additional work stream would increase costs to some extent. DfT is best placed to quantify these costs.
96. The Commissions' report is accompanied by a draft Bill and draft Level Crossing Plans Regulations. However, adjustments to the regulations may be required before they can be implemented. A DfT lawyer is paid approximately £55,000 to £65,000 in 2012 prices, with a median of £60,000.

##### Training

97. DfT would bear the costs of training all relevant departmental staff. Local authorities would need to train relevant staff.

<sup>19</sup> There are small, non-monetised costs of updating codes of practice and on-going co-operation.

## **On-going costs**

### Increased number of level crossing closures

#### *Public road level crossings and Alternatives to Level Crossings Assessment Tool: AXIAT*

98. RSSB has developed the Alternatives to Level Crossings Assessment Tool or “AXIAT”. The model only applies to public vehicular level crossings. It considers the costs of maintaining an existing level crossing against the most favoured alternative, such as a bridge or underpass, and includes quantification of safety and delay benefits. The model is in the process of being refined by Network Rail and RSSB and its use is not yet widespread. Network Rail and RSSB currently consider that AXIAT would be used as a first hurdle before carrying out a full assessment of whether there is a business case for closing a public vehicular level crossing.
99. An initial study of level crossings in four counties in England (Dorset, Lincolnshire, North Yorkshire and West Sussex) indicated that there was an initial economic case for replacing 28 out of a total of 240 level crossings (or 11.25% of the total). Given the low number of public road crossings which are currently replaced, such modelling indicates that replacement should be more fully considered in relation to a greater number of level crossings.
100. The costs and benefits taken into account in AXIAT include:
  - a) Road user delay costs/benefits
  - b) Operating and maintenance costs and cost savings
  - c) Capital costs and cost savings, including construction and renewal costs.
101. The most significant benefit of level crossing closure is a reduction in traffic congestion, and AXIAT takes this into account. The delay caused to drivers at a public vehicular level crossing can be expressed in economic terms relatively easily. The two main approaches are to calculate either the lost productivity of those individuals delayed or the amount that they would be willing to pay not to be delayed. At a theoretical level, these approaches should give identical figures. However, this will not always be the case in practice. The assessment takes into account any increased delay caused by driving to a different level crossing.
102. Although there would be costs associated with the maintenance of the AXIAT system for making closure orders, there are dedicated units within DfT and the Scottish Government to support decision-making in connection with Transport and Works Act orders. Our proposed closure orders would be quicker and simpler than Transport and Works Act orders generally and so it is not anticipated that additional costs would be significant.

#### *AXIAT generated closure costs*

103. All the engineering and associated costs of closure are taken into account in the AXIAT model when determining whether it is economically beneficial to close a particular level crossing.
104. The costs and benefits fall within three main categories, namely user costs, operating and maintenance costs and construction costs. We do not set out the costs in detail as AXIAT results are presented as net benefits and are indicated in the section below.

## **Benefits:**

### **Transitional benefits**

105. We do not anticipate any transitional benefits for closure.

### **On-going benefits**

#### Simplified closure system

106. The simplified closure system should be cheaper and quicker to use than the Transport and Works Act 1992 and in Scotland, the Transport and works (Scotland) Act 2007 and other existing procedures. We assume that Network Rail and local traffic authorities are likely to be more inclined to pursue level crossing closures of all types. They should also require fewer resources to achieve each closure.

107. If implemented our recommendations would make it simpler to close level crossings, but this would not guarantee that more level crossings would be closed. The economic benefit of closing a particular level crossing would be weighed against the safety and convenience of all users, access to local amenities and all other relevant factors as set out in the closure procedure.
108. There is a continuing risk that the Government would decide not to fund the work needed to close level crossings. This is particularly important for those crossings, mainly public crossings, that would need to be replaced by a bridge or underpass.
109. We assume that the Government is more likely to fund level crossing closures where there is a simplified and efficient procedure in place to deliver those closures. In the impact assessment, we assume that the Government would fund level crossing closures where such closures would represent an acceptable level of benefit to cost ratio (BCR).

Increased number of private level crossing closures and reduced costs of compensating beneficiaries of private rights of way for extinguishment of the right of way

110. Without reform Network Rail expect to close about 60 private level crossings per year. We estimate that as a result of the availability of the new closure procedure, closure of level crossings by Network Rail is likely to increase by 25 per cent at most, with a best estimate of 20 per cent. See table 10 below.

Table 10: Estimated number of post-reform private level crossing closures per annum

	Low estimate	Best estimate	High estimate
A. Number of private closures	60	60	60
B. Post-reform percentage increase in private closures	15%	20%	25%
C. Additional number of private closures. [A x B]	9	12	15

111. Post-reform, there would be several ways to close level crossings. The Bill provides for a new system for closing both public and private level crossings. In addition, in relation to Scotland only, the Bill provides for statutory rights of way over private level crossings to be extinguished by the Lands Tribunal for Scotland.
112. The cost to Network Rail of closing private level crossings by agreement with the beneficiary of the private right of way (usually the adjoining landowner) and any replacement, ranges from £5,000 to £1m, with an average cost of £50,000.<sup>20</sup> This figure is already starting to increase as landowners seek upwards of £250,000 to agree to the extinguishment of their rights of way over private level crossings. The initial wave of private level crossing closures resulted in the closure of the less valuable level crossings. The cost of extinguishing the private right of way over remaining crossings is likely to be much higher in the future, although below we refer to the possible effect of the proposed new closure procedure in driving down the sums payable by railway operators to beneficiaries of private rights of way as compensation for extinguishing the right of way. More of these crossings may also require replacement by bridges or other alternatives, which would raise costs significantly. The cost estimate for a replacement vehicular bridge starts at £1.5 million.
113. The closure procedure that we recommend would increase the likelihood of compulsory extinguishment of private rights of way over level crossings, in which the compensation would be determined by compulsory purchase legislation. We also assume that the availability of compulsory closure would increase the number of closures by agreement, as the parties would be negotiating in the knowledge that compulsory closure might be ordered, together with

<sup>20</sup> Network Rail 2012 estimates

compensation at a rate assessed according to the principles of compensation for compulsory purchase. This could significantly reduce the amount paid to beneficiaries of private rights of way for extinguishment of the right of way over level crossings. See Table 11 below.

Table 11: Average annual savings from reduced costs associated with private closures.

	Low estimate	Best estimate	High estimate
A. Annual number of private closures	60	60	60
B. Post-reform additional closures	9	12	15
C. Total closures [A+B]	69	72	75
D. Without reform estimated average cost per closure	£70,000	£100,000	£150,000
E. Post-reform cost per closure	£60,000	£70,000	£100,000
F. Annual Savings [C x (D-E)]	£690,000	£2,160,000	£3,750,000
G. PV over 60 years	£17,508,929	£54,810,561	£98,907,223

114. We are aware that the cost of replacement would not be directly affected by our procedure. Network Rail has focused on lower cost, simple closures of private level crossings. The cost of replacement may be higher for more complex private level crossing closures in the future. However, this risk would also apply to Option 0.

#### Cost savings from public road level crossing closures

115. Currently, it is rare for a public vehicular level crossing to be closed or replaced. Nearly all of the level crossings closed are private level crossings which are closed by Network Rail following agreement with the beneficiary of the private right of way (usually the adjoining landowner) to extinguish the private right of way over the crossing. The AXIAT model for public road level crossings shows “cost savings”, which are the total cost of keeping the current level crossing minus the total cost of the best alternative to the level crossing. AXIAT is based on a sample of 1500 level crossings, which can be scaled up by a factor of 6.216667 to give savings for the whole of Great Britain. The “cost savings” are the savings of the preferred alternative to the level crossing over the existing provision. “Construction costs” in the AXIAT model are the costs of creating the best solution, including the compulsory acquisition of land where necessary and building costs. AXIAT is used as the first hurdle towards demonstrating a robust business case for closure of a public road crossing.
116. Where forecasted net cost savings are the same level as the construction costs (i.e. the Cost Savings to Construction Cost ratio = 1), and the inputs are reasonably robust, the AXIAT model would suggest that closure has a reasonable business case. In Table 12 below, based on a sample size of 240 level crossings, 28 level crossings met this threshold figure. Of the 28, 7 have a ratio of above 5 and of these 1 has a ratio greater than 10. The savings associated with a ratio greater than one are £390 million over 60 years and in the case of a ratio greater than 5 the associated savings are £196 million. See table 12 below.

Table 12: AXIAT calculations based on trial in 4 local authorities\*

<b>DRAFT AXIAT CALCULATIONS</b>	Total	Percentage	<i>Savings over 60 years</i>
Public road crossings in the 4 local	240		

authorities included in AXIAT trial			
Scaling ratio	6.216667		
Crossings with a ratio of “cost saving: construction cost” of >1	28	12%	£390 million
Crossings with a ratio of “cost saving: construction cost” of >5	7	3%	£196 million
Crossings with a ratio of “cost saving: construction cost” of >10	1	0.4%	
Cost savings to be made by closing crossings with a ratio of “cost saving: Construction cost” of > 5 in GB			£1218.467 million

\*Results based on data from “AXIAT version 1.8.2”.

117. If there is currently one level crossing closure pre-reform per year, then over 60 years there would be 60 closures. The AXIAT model identifies a total of 174 possible closures [28 x 6.2] (i.e. where the cost savings ratio is >1) throughout England and Wales that potentially deliver savings of about £2,418 million. This potential is only possible if there is both law reform and adequate funding enabling closure of all 174 level crossings, i.e. a further 114 closures.
118. If the first 60 closures target the high value savings (i.e. the cost savings ratio is >5) then the following scenario is envisaged:
- 43 [7 x 6.2] closures deliver cost savings ratio > 5 and secure total savings of about £196 x 6.2 = £1215 million. The additional 17 closures which would be achieved under the current law (giving a total of 60 over 60 years) are only available in the >1 cost saving category.
  - If total savings from closure of all 174 crossings are £2418 [£390 x 6.2] and £1215 are found in >5 category this leaves £1203 million savings to be derived from the remaining 131 closures. Each closure in the >1 to < 5 category must therefore deliver savings of £1203 million/131 = £9.2 m.
  - The additional 17 closures equate to about £156 million [17 x £9.2 m] pre-reform discounted net savings over 60 years.
  - If an additional 60 closures take place over 60 years this equates to additional £552 million savings [60 x £9.2 m]. If the full 174 closures occur, i.e. a further 54 closures taking it to the maximum 174 closures that are possible, the maximum potential savings is about £1,049 million [114 x £9.2 m]. See Table 13 below.



Table 13: Discounted net savings from additional level crossings closures

	Low estimate	Best estimate	High estimate
A. Annual closures without reform	<b>1</b>	<b>1</b>	<b>1</b>
B. Pre-reform closures over 60 years	<b>60</b>	<b>60</b>	<b>60</b>
C. Annual additional closures post-reform	<b>1</b>	<b>2</b>	<b>3</b>
D. Additional post-reform closures over 60 years	<b>60</b>	<b>114*</b>	<b>114*</b>
E. Discounted net savings from additional closures over 60 years [in 2012/13 prices]	<b>£699.4 million</b>	<b>£1,329.1 million</b>	<b>£1,329.1 million</b>

\* maximum possible closures capped at 174

#### Reduced opportunity for impulse suicides

119. The closure of a level crossing would remove easy access by members of the public to the railway at these points. This would reduce the opportunity for impulse suicides. The Department for Health's Strategy for the Prevention of Suicide states that removal of methods of impulse suicides can prevent some of those suicides from occurring. While this benefit is not quantifiable, suicides create a number of costs for both railway operators and regulators. These include the costs to operators of repairing infrastructure and compensating those affected (such as train drivers who suffer psychological injury) and the costs to the public sector of responding to incidents and training staff.
120. A summary of the annual costs and benefits is presented in table 14 below. It is not possible to provide annual savings from public road level crossing closures because the data is only available for a 60 year period.

Table 14: Option 1(b): Summary of annual costs and benefits\*

	Low estimate	Best estimate	High estimate
<b>Transitional Costs</b>	0	0	0
<b>On-going Costs</b>			
Private closures	n/a	n/a	n/a
<b>Transitional benefits</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>On-going Benefits</b>			
Savings from compulsory orders	£1,725,000	£2,160,000	£3,750,000
Savings from public closures*	n/a	n/a	n/a

\* only available as NPV for 60 year period

## Net impact of Option 1

121. The costs of the reform would be in enacting legislation and training those operating the new regimes, and, if level crossings are closed, the costs of closure and of building alternatives, such as bridges or underpasses.
122. The savings would be in the potential slight reduction of the risk of accidents, including catastrophic accidents, as well as significant savings if level crossings are closed with or without

replacement. Non-monetised benefits would include modernisation, clarification and simplification of the law, as well as better regulation.

123. It is also hoped that the rationalisation and modernisation of the relevant law would save time for those who have to manage and enforce the regulatory system and the lawyers who advise them.
124. There would be significant cost savings from reduced traffic congestion at level crossings if closure of level crossings occurs or level crossings are replaced with a bridge or underpass.

## Assumptions and risks

### Assumptions

125. The assumptions relied on for particular calculations are listed with the corresponding tables above.
126. We assume that the Department for Transport and the Scottish Government would seek to implement the draft Bill and the draft regulations.
127. We assume that railway operators and traffic authorities would be inclined to take advantage of the new closure procedure to close more crossings, both public and private, than they would have done without reform. We also assume that they would receive sufficient funding to support a programme of closures.
128. We assume that the increased efficiency and clarity produced by the new safety regime would result in a slight, unquantifiable reduction in the risk of accidents, due to the improved management of railway safety in general.

### Risks

129. Under the current regime, railway inspectors inspect level crossings, review the protective arrangements and assess risk. Where changes need to be made, ORR exercise the Secretary of State's power to make a new level crossing order in respect of a particular crossing. In order to meet compliance requirements under the proposed safety regime, it might be necessary for risk assessments to be carried out more frequently to ensure that risk is as low as reasonably practicable. This may be more costly than the making, management and operation of individual level crossing orders.
130. Far fewer level crossings than expected might be closed.
131. Level crossing plans would be voluntary. Therefore there is a small risk that there would be a low uptake in parties agreeing plans.
132. There is a risk that reduced waiting times for vehicles at closed crossings would not result in a reduction in greenhouse gas emissions, as drivers would instead choose alternative, lengthier routes which result in increased emissions.

## Level Crossings Bill impact assessment – specific impact assessments

### Equality impact assessment

The equality impact assessment initial screening document is attached.

### Competition assessment

We do not consider that the Level Crossings Bill, if implemented, would have any impact on competition.

## **Health and wellbeing**

We do not consider that the Bill would have any impact on health and wellbeing.

## **Small firms**

We do not consider that the Bill would have any particular impact on small firms.

## **Rural proofing**

Level crossings are common in rural areas and rural crossings frequently raise specific safety concerns. Small rural crossings can pose increased safety risks: overgrown hedgerows can reduce visibility and, due to a lower frequency of traffic compared with urban crossings, there may be less – or less modern - safety equipment at these crossings. Farmers frequently enjoy rights of way across the railway to access their land on either side of the track. These private crossings do not currently come within the safety system of level crossing orders under the Level Crossings Act 1983. Also, the only way to close private crossings is by agreement between the railway operator and the adjoining landowner.

The proposed changes would bring the safety regulation of all level crossings under the umbrella of the Health and Safety at Work etc. Act 1974. This would help to ensure up-to-date, flexible, and consistent safety provision at all crossings both public and private. The proposed changes to procedures for closing level crossings would be likely to result in increased closures of crossings, particularly private ones. Payments received by landowners for extinguishment of their right of way over the railway would be likely to decrease. The closure procedure would ensure, however, that the national authority takes into account a number of factors when deciding to close a crossing, such as available alternative routes, access to land and convenience of users. Therefore closures should not unduly impact on farmers who need to access their land or on rural communities where alternative routes may involve a long detour.

## **Human rights**

We have considered the Human Rights Act 1998 and consider that the Bill is compatible with the Act.

## **Sustainable development**

One of the objectives of the recommendations is to increase the efficiency of the road and rail networks and to create a legal framework for the future which would allow the most up-to-date safety measures to be implemented when and where appropriate. This increased efficiency and ability to take advantage of new developments in safety equipment, would reduce the intergenerational impact of the railway system in particular, as the costs of railway infrastructure over time would be decreased. For example, a continuing programme of renewing safety equipment in accordance with the most recent safety developments would result in more even distribution of costs over time, rather than all costs falling disproportionately on future generations at a point 30 or 60 years in the future when, as at present, a level crossing order expires or railway equipment reaches the end of its working lifetime. The Bill would produce some environmental impacts; although there might be some reduction in greenhouse gas emissions due to crossing closures (see below). We therefore consider that the Bill supports the principles of sustainable development.

## **Justice**

Breach of the obligations contained in level crossing plans or level crossing directions would be enforced under the current HSWA 1974 enforcement regime, which may result in criminal prosecution. We do not consider that this would have any significant impact on the justice system. The obligations, breach of which might result in prosecution under HSWA, would only be imposed on persons who are already subject to duties under HSWA. Therefore it is unlikely that the changes would increase the volume of cases going through the courts. There might be a slight impact on the railway regulator due to the need for more frequent inspections. In addition, the new obligations imposed would replace the existing regime of obligations under level crossing orders, so there would be no net increase in offences under

HSWA. Therefore we do not consider that the Bill would produce any significant impacts on legal aid, courts and tribunals, prisons and probation services, prosecuting bodies, or the judiciary.

## **Environment and greenhouse gas**

The Bill would produce some positive environmental impacts. Increased efficiency of the road networks would reduce vehicle emissions, due to reduced waiting times for vehicles at crossings. The Bill would increase the efficiency of the rail networks, as the closure of crossings would allow for increased line speeds. This might encourage increased use of rail transport instead of road transport. The Bill contains provisions that implement the requirements of the Environmental Impact Assessment Directive, to the extent that it applies to level crossing closures.