INDEPENDENT REVIEW COMMITTEE ON HONG KONG'S FRANCHISED BUS SERVICE

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Some Safety Aspects of Melbourne Route Bus Services

First report prepared by Stanley & Co Pty Ltd for the Independent Review Committee on Hong Kong's Franchised Bus Services

August 2018.

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1. Context

Subsequent to a fatal bus accident on Tai Po Road on 10th February, 2018, and taking account of other recent serious incidents involving franchised bus services, the Chief Executive of the Hong Kong Special Administrative Region of the People's Republic of China announced the establishment of an Independent Review Committee on Hong Kong's Franchised Bus Services, chaired by the Honourable Mr Justice Michael Victor Lunn.[1]

In a letter dated 20th June, the author (Professor John Stanley) was invited to provide expert advice to the Independent Committee (the Committee). This advice is, inter alia:

- to describe the operations and management of the bus system in Melbourne together with the regulatory and governance arrangements, in particular with regard to the monitoring of bus safety;
- having been provided with such information about the franchised bus services of Hong Kong, if so required, to summarise the system and, having regard to the bus system in Melbourne, give an opinion of the adequacy of the regulatory and monitoring systems in Hong Kong, making recommendations as to any changes to those systems, as in your opinion, are warranted to enhance the safety of the franchised bus system in Hong Kong;
- if asked, to give evidence in Hong Kong to support the opinions set out in your report.

A number of specific questions were also listed in the brief for this work, relating to particular safety practices of route bus operations in Melbourne.

This report deals with the first of the above dot points: the setting for route bus safety in Melbourne. It also responds to the specific questions posed by the Committee about various aspects of Melbourne's route bus service. Section 2 briefly introduces Melbourne's public transport services and the role of buses therein. It provides some historical context to industry operation, which has been an important influence on the development of safety measures, and also includes some high level indicators of safety outcomes. Section 3 presents the legal, regulatory and contractual framework for Melbourne route bus operation, with a particular focus on safety. The most relevant national and state law is considered, recognizing that heavy vehicle road law in Australia has been a key focus of the national micro-economic reform agenda for nearly three decades. Section 4 focuses specifically on monitoring of safety performance. Section 5 provides answers to the specific questions posed by the Committee in relation to Melbourne's route bus operations, while Section 6 presents the main conclusions regarding Melbourne route bus safety, highlighting some particular issues that will be explored in the follow-up report on Hong Kong's franchised Route Bus System.

[1] https://www.info.gov.hk/gia/general/201803/28/P2018032800415.htm. Viewed 25th June 2018.

2. Introduction to Melbourne's public transport services

2.1 Public transport in Melbourne: in brief

Melbourne, with a population of 4.8 million in 2017, has an extensive public transport network. This currently caters for around 10 per cent of all passenger transport trips in the metropolitan area and 18 per cent of work trips. The share of person kilometres is larger, at around 14 per cent, because PT trips tend to be longer than car trips, which are the dominant form of personal travel in metropolitan Melbourne (e.g., accounting for 76% of work trips in 2016).

Melbourne has developed at low densities[2], with a little over half London's population calling the city home but doing so on about five times London's land area. The low density settlement pattern makes public transport service provision a challenge.

The backbone of the Melbourne public transport (PT) network is its radial heavy rail network, supported by the world's longest tram network in the (mainly) inner urban area and buses in outer suburbs and in those few radial corridors that lack heavy rail. Melbourne's bus services perform two roles: they provide a trunk **mass transit** service, which is mainly about getting people in and out of their neighbourhoods, providing benefits to users and creating wider societal benefits in terms of congestion reduction, lower emissions and fewer accidents. Buses also provide a **local transit** role, which is mainly about getting people around their neighbourhoods, primarily in middle and outer suburban areas, with the major benefit being one of social inclusion. Local bus services also connect with trunk public transport services (mainly heavy rail). The trunk services need high frequencies and direct services. The local services can be more circuitous and are usually less frequent but still need to be timed to meet trunk services, for transferring passengers. Some services have tried to do both tasks, usually to the detriment of trunk service patronage, but there is an increasing tendency to separate the service structures by function.

Victorian Government Budget papers (Victorian Government 2018) indicate that Melbourne's trains currently have around 240 million passenger boardings annually, trams 205 million and buses 120 million, giving a total annual metropolitan public transport (PT) task of about 565 million annual boardings (bus share 21%). Significant anecdotal evidence from bus operators suggests, however, that bus boardings are higher than the 120 million, particularly because of an observed increasing tendency of school children to not tag on when boarding the bus. That (strong) anecdotal evidence suggests that bus patronage is probably around 10% higher than the 120 million government figure.

PT patronage overall is growing, partly because the city's population growth rate has averaged a very high 2.4 per cent annually over the last decade, including strong population and employment growth in the central city and surrounds, the

[2] ~750 persons/km2, if a large rural municipality on the urban fringe is excluded, and around 4000 persons/km2 in the central/inner areas.

main PT destination market. Bus patronage, as measured, however, has stabilised in recent years, although this may mask some growth because of the concern about the apparent increasing failure of school children to tag on.

The lowest population (and employment) densities are in the outer suburbs, where population is growing rapidly[3], buses mainly operate at low frequencies (30 to 60 minute headways), service levels are not keeping up with population growth and peak traffic congestion levels are high, adversely impacting bus operations (speeds and reliability). One consequence is that bus boarding rates overall are low, at around 1 boarding per scheduled kilometre (120 million boardings and 120 million scheduled service kilometres)[4]. Rail boarding rates are 10.3/scheduled km and tram 8.6/scheduled km, helped by a free tram travel zone in the Central Business District (CBD), higher population and job densities in tram operating areas and increasing lengths of segregated operating conditions. [5]

Customer satisfaction surveys show bus at 77 (on a scale to 100), tram also at 77 and train at 74, which are similar ratings across the modes. On-time running is defined as a trip arriving no earlier than 59 seconds before the due time or later than 4 minutes 59 seconds after that time. Using this definition, train services have a 92% on-time performance and bus 82%, reflecting a lack of on-road priority for bus operation.[6]

2.2 Historical context

Bus services in Melbourne receive considerable financial support from government to ensure their viability. Fare revenues collected through the public transport integrated ticketing system, known as Myki, go to government and government pays the route bus operators to provide services that are specified by government and detailed in ten-year contracts between government and the respective operators (of whom there are currently 12, holding 15 contracts). These services can, of course, be varied during the course of a contract, at the initiative of the operator or government, and the contract spells out details of how this is to be done.

The current level of government payments for bus services, which constitute total service costs, both operating and capital, is $680 million, which amounts to $5.67 per scheduled kilometre and the same amount per passenger boarding (given the boarding rate of 1/service kilometre). Fare revenues cover about one-

[3] Almost 60 per cent of Melbourne's population growth over the 2011-16 period was in the outer suburbs.

[4] As noted, this may understate patronage because of concerns about school children not being properly counted.

[5] All data in this paragraph is derived from data Victorian Government (2018), *Budget Paper 3: Service Delivery*
https://www.budget.vic.gov.au/budget-papers.

[6] Tram on-time running is not reported in State Budget papers, the source of the train and bus figures.

fifth of this total cost to government (depending on assumptions about how revenues from multi-modal trips, and system joint costs, are allocated).

An unusual aspect of the Melbourne route bus system, in an Australian context, is that about two-thirds of the service has been provided by the private sector since inception, 80+ years ago in some cases. Government ran the remaining third until they tendered those services to private operators about 20 years ago. Typically, family-owned businesses started operating private route bus services and have commonly continued to run them but with some consolidation of contracts into a smaller number of family-owned businesses over the past decade or so, to get scale economies.[7] Some well-known multi-national operators have now obtained service contracts, in one case by winning the tender for what were previously government-operated route bus services and in another by buying out a large family-run business.

The privately owned route bus businesses ran their services from the fare-box until the early 1970s, when government did not support a fare increase and service subsidies were required to sustain service levels. Subsidy requirements have continued to increase since that time. Contracts have been re-negotiated periodically by government with the family-owned businesses in question, or with operators who purchased those businesses in recent years, the contracts providing the legal and commercial basis for service funding support (or subsidy) from government, for providing the services that government requires and specifies in the contract. Legal disputes have arisen over time, particularly in the late 1980s, about whether government could step in and tender a privately provided service over an existing private operator, when that operator had started the service but government provides a continuing service subsidy to the operator. The bus industry argues that if an operator started a service they have continuing legal rights to provide that service. Government disagrees. The industry won a contested case on 'route ownership' in the Federal Court about 20 years ago but the case did not settle this issue of what has become known as 'grand-father rights'.

Current route bus services in Melbourne are a mix of competitively tendered services (about a third of the network) and negotiated services, the former being the previously government-provided services and the latter those started by private operators (including extensions/additions to those services). In regard to the latter, performance-based incentive/penalty clauses now create the possibility that a long-standing operator *could* lose their service contract, if service quality is patently inadequate, compared to contract Key Performance Indicators, but this has not been tested. In the current round of contract re-negotiation, a seven-year contract has been agreed, the contract remaining silent about what will happen to those contracts at the end of their seven-year life.

2.3 Bus Operator Accreditation

This background on the family-run origins of the majority of Melbourne's route bus services is very important for understanding the current route bus safety

[7] Current fleet size is around 1700 buses, spread across 15 contracts.

setting. In the early 2000s, the Melbourne family-owned route bus operators were concerned about a possible fight with government over route service 'ownership rights' coming up to contract expiry/renewal, due in 2008. Would government seek to do again what it had tried unsuccessfully to do in the late 1980s: tender long held private route bus services? Or could operators, working through their industry association (Bus Association Victoria), which was led by the current author through this period (from 1999 to 2008), negotiate a contract roll-over with government? Is so, how might this be accomplished?

A central part of the bus industry approach to this tender/not tender deliberation was a concerted effort to take the high ground on transport-related economic, social and environmental issues, such as by

- quantifying and publicizing the role of buses in reducing urban congestion
- measuring the substantial contribution of route bus services to promoting social inclusion
- elaborating the environmental benefits of bus (improving air quality, reducing greenhouse gas emissions) and, in terms of the subject matter of the current report
- being proactive in promoting bus safety.

The Victorian bus industry argued the societal importance of a safe bus system and actively worked with the Victorian State Government to develop and put in place the elements that were needed to ensure this outcome. **Bus operator accreditation formed a central part of the safety foundation**. Importantly, this issue was on the national road transport reform agenda at the time and NSW and Victoria led the bus industry's push in progressing the idea through that national reform agenda, working with the industry national body, the Bus Industry Confederation, and with the federal and respective state governments

The Victorian bus industry and the State Government both saw safety as a very important objective for bus services and the issue was a very good fit with the bus industry's aim of taking the high ground on key economic, social and environmental issues affecting, and affected by, bus operation. Importantly, there was a strong relationship of trust developed over this period, between the bus industry and the State's (then) Director of Public Transport (Jim Betts), founded on many shared goals. This trusting relationship enabled safety objectives to be actively pursued.[8] Also, the nature of Victorian negotiated route bus contracts, being essentially cost-plus contracts, based on efficient costs, but including a small incentive/penalty component, meant that the additional agreed (with government) service delivery costs associated with bus operator accreditation, which were small, could be passed on to government in the form of a contract variation attributable to policy change. This meant that the industry had an opportunity for safety gains with little pain. The commercial setting in Hong Kong is in contrast to this Victorian contractual setting, which may make

[8] That relationship of trust is reflected in a published paper from the industry association CEO and the Director of Public Transport to the Thredbo International Conference on Competition and Ownership in Public Transport held in Lisbon in 2005 (Stanley, Betts and Lucas 2007).

implementation of an operator accreditation program, should one be desired, more difficult than in Victoria. This is a matter to be considered in the Stage 2 work for this brief.

Bus operator accreditation, as a program, was intended to ensure that a person could provide a safe, efficient and effective bus service. It started with three elements:

1. A Transport Management Course for bus and coach operators run by Monash University, the scope of which depended on the type of service an operator wanted to provide. One senior representative of each contracted route service operator needed to complete the course, which included four units, one of which was 'Safety Risk Management for Bus Operators', but also included units on the legal/regulatory framework, financial management and business development.
2. Management Information Systems
3. Maintenance Management Systems.

As discussed in Section 3.3 below, these three elements remain as key regulatory requirements for accredited route bus operators. The safety focus of accreditation more broadly has been substantially enhanced over the decade or so since inception, to focus increasingly on building what can be best described as a **safety risk management culture,** as discussed in section 3.3.

The bus operator accreditation system forms a major focus of this report because the author sees it as potentially the single most significant point of difference between the Melbourne safety regime and that in Hong Kong. As elaborated above, the institutional setting of Victorian route bus operation was particularly receptive to the development of this safety agenda at the time of its inception.

2.4 Safety Performance of Melbourne Route Bus Services

2.4.1 Fatalities

One weakness of the Victorian transport system is the absence of comprehensive publicly available data on the safety of the various elements of the system. Some data that sheds light on safety performance is outlined below but is recognized as being short of what is really needed to form cause-effect conclusions.

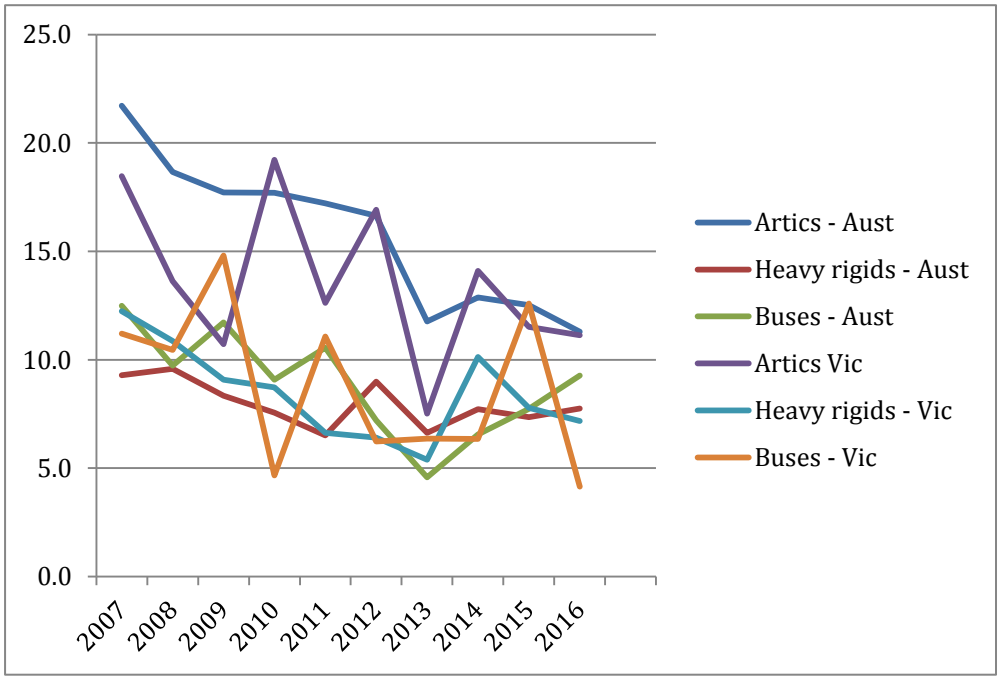
Aggregate data from the (Federal) Bureau of Infrastructure, Transport and Regional Economics (2017) shows that annual deaths from Victorian road crashes involving buses averaged 5.4 over the 1989-1998 decade, 4.3 over the decade to 2008 and 3.5 over the subsequent 8 years to 2016, suggesting improved outcomes over the period during which bus operator accreditation has been in place. Metropolitan fatalities seem to be around 2 per year, based on individual accident data, but it is not clear from the available data just what the route bus share is (probably most).

If the bus operator accreditation system is to be judged a success, you should expect to see fatality rates falling faster in operational settings that have such a system in place than in those that do not. Truck operators do not need to be

accredited, so a comparison between changing safety outcomes for buses in Victoria and trucks in Victoria and in Australia more broadly is one way to shed some light on whether Victorian bus operator accreditation *may* be helping to improve safety outcomes. Figure 2.1 sets out some relevant data in this regard. It shows heavy vehicle involved fatal crash rates per billion vehicle kilometres travelled by state, the best exposure measure (i.e., it measures fatality outcomes relative to the scale of the transport task involved). Articulated trucks have higher involvement rates in fatalities than rigid trucks and buses are generally similar to rigid trucks, with Victorian buses not markedly superior to buses elsewhere in Australia. Note that, if bus passenger loadings are taken into account, rather than just distance travelled, then buses would be much safer than both articulated trucks and heavy rigid trucks, per billion passenger kilometres (including the driver).

Victorian bus performance seems to be broadly in line with that for buses in Australia as a whole, based on Figure 2.1. However, Table 2.1 suggests that Victorian bus fatality rates per billion vehicle kilometres travelled improved at a faster rate than was the case for buses in Australia as a whole, over the 2007-16 period, faster than for rigid trucks and at around the same rate as for articulated trucks in Australia as a whole but Victorian buses performed much better than articulated trucks in Australia as a whole in absolute fatality rates per billion vehicle kilometres travelled (Figure 2.1). This data is thus *consistent with* Victorian bus operator accreditation improving safety outcomes, although it is not conclusive in terms of cause and effect.

Figure 2.1: Heavy vehicle involved fatal crash rates per billion vehicle kilometres travelled by state



Source: Data source: https://bitre.gov.au/publications/ongoing/road-trauma-involving-heavy-vehicles.aspx. From data in Table 3.2. Viewed 12 June 2018.

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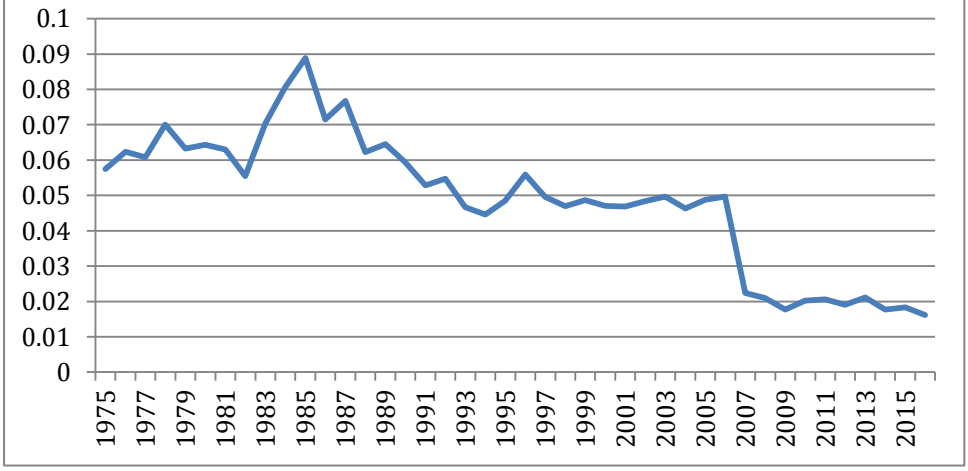
Table 2.1: Compound average annual rates of change in heavy vehicle involved fatal crash rates per billion vehicle kilometres travelled by state: 2007-2016 (% per annum)

Location	Articulated trucks	Heavy rigid trucks	Buses
Australia	-6.8	-2.4	-5.7
Victoria	-4.1	-4.8	-6.7

Source: Data source: https://bitre.gov.au/publications/ongoing/road-trauma-involving-heavy-vehicles.aspx. From data in Table 3.2. Viewed 12 June 2018.

Figure 2.2 sets out data on US bus-related fatality rates per million miles travelled, to help shed light on performance compared to Victoria. To compare Australian/Victorian and US data (Figures 2.1 compared to Figure 2.2), we need to divide the Australian/Victorian results by 1000 and then multiply by 1.6 (to convert billions to millions and then kilometres to miles, respectively). This means dividing the Australian/Victorian data by .0016. So a Victorian bus-related fatality rate of about 4.2/bvkms in 2016 (Figure 2.1) is equivalent to (4.2*0.0016) = .0067 per million miles. This looks to be less than half the US rate (of .016 in 2016). US bus operators are not required to be accredited, so that again the Victorian result *is consistent with* accreditation having a beneficial safety outcome.

Figure 2.2: Fatalities in US bus crashes per million miles travelled



Source: Analysis Division, Federal Motor Carrier Safety Administration, Large Truck and Bus Crash Facts 2016, FMCSA-RRA-17-016, May 2018.

2.4.2 Injuries

A report prepared by Monash University's Victorian Injury Surveillance Unit for for Transport Safety Victoria (Laughlin and Berecki-Gisolf 2017) suggests that there were 846 admissions to Victorian hospitals as a result of bus-related injuries over the ten years from 2005/06 to 2015/15, or an average of 85 per year. The rate of such admissions increased at an annual average rate of 2.8%

over that period. However, the report does not separate out route buses. However:

- 72.1% of injuries were in the Melbourne metropolitan area
- 68.3% of those injured were female and
- 64.4% of those injured were aged 60 or over.

More detailed data on the nature of incidents involving these injuries suggests that, of the 846 bus-related injuries resulting in hospital admission:

- 44.9% involved injury suffered in a traffic accident, primarily involving boarding or alighting (which would not normally be thought of as a 'traffic' accident)
- 82.6% of cases did not involve a collision
- fractures were the most commonly recorded injury.

A slightly smaller data base that used only Emergency Department cases that were subsequently admitted (N=830) showed that:

- 23.9% were people injured while on public transport or getting on or off
- 20.4% involved cars, bikes, motor bikes in collision with PT
- 12.4% involved a person (pedestrian) hit by PT
- nearly 40% of presentations were classified as 'other or unspecified', which suggests a need for better data recording.

In terms of areas for attention, in reviewing all the data involving hospital admissions, Laughlin and Berecki-Gisolf 2017, p. 13) conclude that older women falling 'due to sudden bus movements, being off balance, or tripping when getting on or off the bus are suffering fractures upon impact with the floor or possibly fixed objects within the vehicle' stands out. With the ageing of the population, the incidence of 'slip, trip and fall' injuries may increase unless given attention. Driver 'training to avoid unnecessary, sudden or unpredictable vehicle movement, and awareness campaigns for passengers to ensure they take care when travelling on buses and when boarding and alighting, especially for those passengers who are unable to be seated during travel', was proposed.

Transport Safety Victoria receives incident reports from bus operators, which cover more than fatal and serious injury accidents (TSV 2017a). The 2016 Annual Report records 514 bus-related incidents, within which there were:

- 2 fatalities (both metropolitan collisions, one with a pedestrian and the other with a motor cyclist)
- 62 serious injuries, well down on the 70 in 2015 but about in line with the annual average of 58 over the 2012 to 2016 period (this is less than the average annual number reported by Laughlin and Berecki-Gisolf (2017) cited above, suggesting a tighter definition of a serious injury by the TSV analysis)
- an increase in the number of slip, trip and fall incidents, which accounted for 26/62 serious injury incidents in 2016, with 10/26 attributed to

heavy braking and 13/26 to boarding/alighting), confirming this as a priority area for action.

This data suggests that driving skills need continued attention in terms of, in particular, risks of slips, trips and falls by older people (mainly women), showing one of the benefits of the incidence reporting requirements of the accreditation system. TSV suggest that they are being increasingly data driven, in terms of identifying risk areas for improving safety outcomes. TSV's interpretation of the data is that fatigue is not coming through as a problem area (Shaun Rodenburg, pers. comm.). However, the number of slips, trips and falls might suggest driver distraction or driving practice might be a factor. Telematics applications noted in Section 5.2 are supportive of better safety outcomes in this regard.

Ideally, the serious injury data would be isolated by bus market (e.g., route, charter, tour, etc) and normalized against million vehicles kilometres of travel, to enable comparison with systems elsewhere. Data does not permit such analysis at this time.

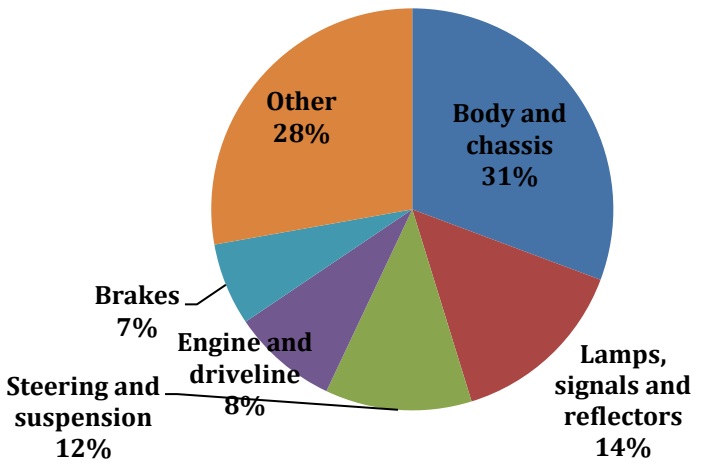
2.4.3 Conclusion from the data analysis

The fatality data in Section 2.4.1 suggests that Victorian bus and coach operations, in general, perform relatively well compared to US operations and compared to Australian truck and bus operation. More broadly, in terms of both fatalities and serious injuries, the safety regulator (TSV) is of the view that the Melbourne's route bus operations perform well in safety terms, as discussed further in Section 4. TSV is seeking to refine its data collection processes to enable more definitive conclusions to be drawn but the significance of slips, trips and falls is apparent in the data, impacts most relevant to route bus operation, with driver practice and customer education identified as areas for improvement. Operator training programs are taking the driver element into account and telematics applications should assist the achievement of better outcomes. Also, TSV is planning customer awareness raising initiatives, to increase awareness of the risks of slips, trips and falls.

2.5 Annual vehicle inspection results

Another indicator of safety of the bus fleet is the result of the compulsory annual vehicle inspection that all buses exceeding 4.5 tonnes GVM must undergo. Road Safety Inspections (RSI) conducts the largest number of such bus inspections in Victoria, having a market share of over three quarters and conducting about 5500 annual inspections. Of these, two-thirds are large buses and one-third small. The current author is an external director of RSI. Figure 2.4 shows the broad nature of the defects, body and chassis defects accounting for the largest share (30.7%), the largest contributors thereto being emergency exit issues (371/1892) and exterior panel issues (262/1892), such as rust spots. Lamps, signals and reflectors accounted for 14.5%, the main contributors being headlamps (238/896) and rear lights (157/896). The total number of defects identified over a 12 month period, irrespective of seriousness of the defect, was 6164. In terms of the main safety concerns, 16 defects were rated as critical, of which 11 related to brake performance.

Figure 2.4: Defects found in RSI Annual Inspections over 12 months to May 2018 (%)



Source: Derived from Road Safety Inspections Pty Ltd data provided to the author.

Unfortunately it is not possible to extract separate data on metropolitan route buses but the Manager of RSI (Brett Gibbs, pers. comm.) advises that route bus operators tend to be larger operators, who usually have better maintenance performance. However, RSI has had occasion over the past year to write to Transport Safety Victoria about the safety condition of some metropolitan route buses, seeing itself as part of the chain of responsibility and advising the Director of Transport Safety of its concerns. A large number of one operator's vehicles were subsequently taken off the road for a time. I note this example as one that demonstrates chain of responsibility being used by a responsible organization to proactively head off potential safety problems before they result in a major accident (and at the risk of some loss of business by the reporting entity). It is common knowledge, given media publicity, that the operator in question won the service rights to Melbourne's extensive SmartBus (trunk) network and previous State Government-run services (about one third of the total service level) in a competitive tender. This raises questions about whether or not the operator may have bid too low for the tender and possibly cut corners in maintenance to survive. This is an important question for safety management, considered further in the second report under this brief.

RSI further advised that, over the past two years, they have found an increase in the number of vehicle defects identified in annual inspections, including for route service buses. RSI's Manager suggests that this is partly due to vehicles doing larger numbers of annual kilometres and retention of older buses in service for longer, given the very high population growth being experienced in Melbourne at present. It is also influenced by the matter noted in the previous paragraph. RSI is monitoring this trend and will report its findings to the Transport Safety Director, if necessary.

Road Safety Inspections' Headquarters in Port Melbourne, with mobile trailer.

BusVic, the Victorian bus industry association, is sponsoring a PhD scholarship at Monash University on the topic of *Road Safety Impacts of Bus Safety Inspections*. The current author sits on the review committee for that research, which is using data from RSI and also from governmental sources in its analysis. Some of the preliminary findings of that research, by PhD student Jianrong Qiu, are as follows (Qui 2018):

- the likelihood of defects being identified in an annual inspection increase with vehicle age and odometer reading. Every year increase in age results in a 7.4% increase in the odds of a defect and a 100,000 kilometre increase in the odometer reading leads to a 6.2% increase in these odds
- of the vehicle makes inspected, the risk of failing an inspection (i.e., a defect being identified) was lowest for Volvo and Denning buses, followed by Scania and Mercedes. Other vehicles were at higher risk of defects being identified
- the odds of failing are significantly higher for vehicles run by small operators
- failure rates vary by operator, with some being markedly better than others. Singapore based CDC was rated as the best operator in the study's sample, in terms of the likelihood of vehicle defects. This high performance level was a characteristic of the business before it was acquired by CDC but CDC has taken active measures to continue a high

level of safe operations, across the business (e.g., installation of Mobileye across its route bus fleet in Melbourne).

More broadly, RSI and BusVic attribute the best performance levels in annual inspections mainly to the strength of the individual business's level of commitment to safety (safety culture).

RSI regularly reports to Victorian bus operators on its findings about defects found in annual vehicle inspections (e.g., in presentations to the well-attended BusVic Annual Maintenance Conference and reports in the BusVic monthly communication to members, as required). The inspection data also goes to the transport safety regulator, TSV, which does its own analysis thereof. This monitoring system, which includes both the industry association, which operates RSI as an arm's length business, and the safety regulator, is a useful way of identifying areas where maintenance practices may need to be tightened, areas that are working well, operators whose performance is good and those who may need to lift their game. TSV was complimentary of RSV's initiative in highlighting concerns with maintenance standards of a particular operator, as evidence of chain of responsibility working well. Monitoring processes are discussed further in Section 4.

The overall conclusion from the evidence sources noted above is that Melbourne's route bus services appear to perform well in safety terms. Reporting systems need to be improved, to enable more definitive conclusions, route bus data (for example) not being separately identifiable in the TSV data set. TSV expressed the view, however, that Melbourne route bus operators perform well in safety terms and, as noted in Section 4, this affects the nature of the monitoring processes that are used. Operator accreditation sitting firmly behind route bus safety is likely to be an important contributor to the good safety outcomes.

3. Legislative, regulatory and governance arrangements

3.1 National framework

There are two main legislative/regulatory foundations for route bus operation in Melbourne: first, the Heavy Vehicle National Law; and, second, Victorian bus-specific legislation. This section deals with key elements of the national law and section 3.2 considers the main Victorian legislation.

New vehicles released on to the road in Australia need to meet the requirements of the Commonwealth Motor Vehicle Standards Act 1989 at the time of their release. Under this legislation, Australian Design Rules (ADRs) set out national standards for vehicle safety, anti-theft and emissions, usually based on United Nations Economic Commission for Europe (UNECE) requirements, commonly applying in Australia with a lag of several years. These standards are generally performance based, rather than prescriptive, and cover issues such as occupant protection, structures, lighting, noise, engine exhaust emissions, braking and a range of miscellaneous items.[9]

In-service aspects of heavy vehicle operation are dealt with under Australia's National Heavy Vehicle Law (HVNL), which is intended to provide a nationally consistent framework for the in-service operation of heavy vehicles. This national law is developed through the Council of Australian Governments (COAG) Transport and Infrastructure Council, initially implemented as law in Queensland and then intended to be adopted by other States and Territories. The relevant set of national law and regulations is:

- Heavy Vehicles National Law Act 2011
- Heavy Vehicles (Vehicle Standards) National Regulations 2013
- Heavy Vehicles (Mass, Dimension and Loading) National Regulations 2013
- Heavy Vehicles (Fatigue Management) National Regulations 2013
- Heavy Vehicles (General) National Regulations 2013.

The recent New South Wales Joint Standing Committee on Road Safety report on *Heavy vehicle safety and use of technology to improve road safety* (NSWJSCRS 2018) notes the scope of the National Heavy Vehicle Law. Key elements relevant to route bus operation relate to requirements for:

- standards heavy vehicles (HVs) must meet before they can be used on the road
- allowable HV mass and dimension limits
- ensuring parties in the chain of responsibility are held responsible for ensuring the HVNL is complied with, including responsibilities to ensure drivers of HVs do not exceed speed limits, breach fatigue management requirements or breach mass, dimension or loading requirements
- preventing drivers of heavy vehicles from driving while impaired by fatigue and

[9] https://infrastructure.gov.au/vehicles/design/

- nationally consistent penalties.

Implementation of the heavy vehicle national law in Victoria is through the Heavy Vehicle National Law Application Act 2013 (No. 30 of 2013), where Annexure 2 of the Act details the relevant law. Most relevant to the Hong Kong Committee's deliberations is Chapter 6 (Vehicle Operations – Driver Fatigue) of Victoria's Application Act and the associated Heavy Vehicles (Fatigue Management) National Regulations 2013. The focus in what follows is on Chapter 6 of Victoria's Application Act but also notes Chapter 5, since both Chapters set out duties of a number of identified parties in the **chain of responsibility** (COR) to behave or not behave in particular ways, as outlined further below. Chain of responsibility is a very important safety feature of the Australian and Victorian legislative setting for heavy vehicle operation.

3.2 Fatigue Management and chain of responsibility

Chapter 1 of the National Heavy Vehicle Law says that the Object of that Law is:

> *... to establish a national scheme for facilitating and regulating the use of heavy vehicles on roads in a way that –*
>
> *(a) promotes public safety; and*
> *(b) manages the impact of heavy vehicles on the environment, road infrastructure and public amenity; and*
> *(c) promotes industry productivity and efficiency in the road transport of goods and passengers by heavy vehicles; and,*
> *(d) encourages and promotes productive, efficient, innovative and safe business practices.*

Safety is thus a significant foundation, as it has been since the national heavy vehicle reform agenda started in 1991.

Matters that are related to management of fatigue in the operation of heavy vehicles are dealt with in the Law's *Chapter 6 Vehicle Operations – driver fatigue*, together with the *Heavy Vehicle (Fatigue Management) National Regulation.* Chapter 6, Section 220 (1) of the Act states that its main purpose is *to provide for the safe management of the fatigue of drivers of fatigue-regulated heavy vehicles while they are driving on a road*. Section 220(2) indicates that it does this by:

> *(a) imposing duties on drivers of fatigue-regulated heavy vehicles and particular persons whose activities influence the conduct of drivers of fatigue-regulated heavy vehicles in a way that affects the drivers' fatigue when driving on a road; and*
> *(b) imposing general duties directed at preventing persons driving fatigue-regulated heavy vehicles on a road while impaired by fatigue; and*
> *(c) imposing additional duties directed at helping drivers of fatigue-regulated heavy vehicles to comply with this Chapter, which are imposed on particular parties in the chain of responsibility; and*
> *(d) providing for the maximum work requirements and minimum rest*

requirements applying to drivers of fatigue-regulated heavy vehicles; and

(e) providing for recording the work times and rest times of drivers, amongst other things.

Buses with a gross vehicle mass exceeding 4.5 tonnes are covered by this regulation. The emphasis of duties on those in the driver fatigue chain of responsibility is an important distinguishing feature of the framework, recognizing that driver behaviour and associated fatigue can be influenced by a number of parties other than drivers. The **chain of responsibility** in relation to heavy vehicle route bus driver fatigue encompasses, in particular: **the driver; the employer, prime contractor or operator; and schedulers**. The COR for heavy trucks also includes consignors and consignees and those with a role in loading.

Under the Regulation, the driver has a duty *to avoid driving while fatigued* (Section 228), employers/contractors/operators have a duty *to ensure that business practices will not cause [a] driver to drive while fatigued* (Section 230) and schedulers have a duty *to ensure [a] driver's schedule will not cause [the] driver to drive while fatigued* (Section 233). Section 234 follows this up and says that schedulers need to take account of *traffic conditions and other delays that could reasonably be expected*, when drawing up a driver's schedule.

More broadly, Section 229(1) introduces an "all reasonable steps" requirement or duty, saying that:

> *A party in the chain of responsibility (a **party**) for a fatigue-related heavy vehicle must take all reasonable steps to ensure a person (the **other person**) does not drive the vehicle on a road while the other person is impaired by fatigue*.

This *all reasonable steps* requirement is also explicitly set down for schedulers in Section 233 as follows:

> *(1) A scheduler for a fatigue-related heavy vehicle must take all reasonable steps to ensure the schedule for the vehicle's driver will not cause the driver to –*
>
> *(a) drive while impaired by fatigue*
>
> *(b) drive while in breach of the driver's work and rest hours option; or*
>
> *(c) drive in breach of another law to avoid driving while impaired by fatigue or while in breach of the driver's work and rest hours option.*

Under changes being made to the national law later this year, to align with national workplace health and safety law, the primary duty obligation will be assessed against a 'so far as is reasonably practical' test, rather than the 'reasonable steps' standard. The National Heavy Vehicle regulator advises that (NHVR 2018, p. 10)

... this test takes into account and weighs up relevant matters including:

- *the likelihood of the risk occurring*
- *the degree of harm*
- *what the person knows about the risk*
- *ways to remove or reduce the risk and whether they are feasible*
- *whether the costs are proportionate to the risk.*

Victorian Bus Safety provisions already incorporate the 'so far as is reasonably practical' test.

Schedule 1 to the Regulation sets out the maximum work times and minimum rest times/options. For route bus operations the relevant work/rest hours option is *Standard Hours – solo driver of a fatigue-related heavy vehicle* (i.e., bus >4.5 tonnes GVM). There is also a Standard Hours – solo driver of a fatigue-related bus option, which is mainly for long distance charter/touring work that extends over a one to four week cycle. Table 3.1 sets out key elements of *Standard hours – solo driver of a fatigue-related heavy vehicle.*

Table 3.1: Standard hours – solo driver of a fatigue-related heavy vehicle.

TIME	**WORK**	**REST**
In any period of…	A driver must not work for more than a **maximum** of…	And must have the rest of that period off work with at least a **minimum** rest break of…
5 ½ hours	5 ¼ hours work time	15 continuous minutes rest time
8 hours	7 ½ hours work time	30 minutes rest time in blocks of 15 continuous minutes
11 hours	10 hours work time	60 minutes rest time in blocks of 15 continuous minutes
24 hours	12 hours work time	7 continuous hours stationary rest time*
7 days	72 hours work time	24 continuous hours stationary rest time
14 days	144 hours work time	2 x night rest breaks# **and** 2 x night rest breaks taken on consecutive day

Notes: *Stationary rest time is the time a driver spends out of a heavy vehicle or in an approved sleeper berth of a stationary heavy vehicle. #Night rest breaks are 7 continuous hours stationary rest time taken between the hours of 10pm on a day and 8am on the next day (using the time zone of the base of the driver) or a 24 continuous hours stationary rest break.

Source: https://www.nhvr.gov.au/safety-accreditation-compliance/fatigue-management/work-and-rest-requirements/standard-hours

So far as urban route bus operation is concerned, a 100 kilometre provision in the National Law means that bus drivers do not need to carry work diaries if their daily runs do not take them more than 100 kms from base. Record keeping around work and rest is still required under the100 kms provisions, however, with Section 319 setting out what the driver's record keeper (generally the employer, for route bus services) needs to record. These requirements include driver details (name, licence number), dates the driver has driven and associated vehicle registration number(s), total daily work and rest times, total weekly work/rest times and roster and trip schedules. The role of the scheduler is very important in assuring compliance with fatigue requirements for route bus operation in Melbourne route bus operation and most companies use industry-standard software for this purpose (e.g. Austrics or Hastus).

3.3 Principal Victorian Legislation and Regulations for Melbourne route bus operations

3.3.1 Transport Integration Act 2010 (No. 6 of 2010)

The high level legislation that underpins Melbourne's route bus safety system is the Transport Integration Act 2010, an Act that consciously sets out to drive an integrated approach to transport policy making, planning and delivery in Melbourne and Victoria. This Act provides the high level policy framework and establishes three policy advisory/planning/delivery bodies. Key relevant components of the Act are:

1. Vision, objectives (inc. safety) and decision-making principles (Part 1, Divisions 1, 2 and 3 respectively).
2. The Act establishes the role of Head, Transport for Victoria (Part 4A, Division 1) – the lead agency whose primary purpose is *to ensure that a transport system is provided that is consistent with the vision statement and the transport system objectives*.
3. It also establishes the Public Transport Development Authority (Part 5, Division 1A) – whose primary object is *to plan, coordinate, provide, operate and maintain a safe, punctual, reliable and clean public transport system consistent with the vision statement and the transport system objectives*.
4. The Act then establishes the position of Director, Transport Safety (Part 7, Division 1) – the primary object of the Director, is *to independently seek the highest transport safety standards that are reasonably practicable consistent with the vision statement and the transport system objectives*.

Safety is thus recognized as an objective in the Act, where it is part of one of six objectives (social and economic inclusion; economic prosperity; environmental sustainability; integration of transport and land use; efficiency, coordination and reliability; and safety and health and wellbeing). Safety is also part of the objectives to which the PTDA is directed and is the primary objective for the independent Transport Safety Director.

3.3.2 Bus Safety Act 2009 (No. 13 of 2009)

This Act is vital for route bus operation for two main reasons. First, it provides a two gateways through which anyone wanting to operate a route bus service must pass to be eligible to operate such a service. That gateway is **bus operator accreditation**. The Heavy Vehicle National Law does not include bus operator accreditation , this being a state requirement, with NSW and Victorian being the States that are most active in taking this approach. Second, and most importantly, it establishes the safety expectations within which bus operations take place, in terms of **safety principles** and **safety duties**, together with some key compliance mechanisms.

The two gateway conditions are set out in Part 4 Division 1, of the Bus Safety Act 2009. Section 21(1) says:

> *The purpose of accreditation under this Part is to attest that a person who operates a commercial bus service or a local bus service has demonstrated to the satisfaction of the Safety Director, and can continue to demonstrate to the satisfaction of the Safety Director, that the person has the competence and capacity to manage the risks to safety associated with operating the commercial bus service or local bus service.*

Section 26 then says that

> *... in determining whether an applicant has, and will continue to have, the competence and capacity to operate a commercial bus service or local bus service safely, the Safety Director must have regard to (a) whether the applicant or the responsible person has completed an approved training course.*

The only such Victorian approved course is the Safety Management Course for Bus Operators run by Monash University, which was noted in Section 2.3 above. Every route bus operator must have a responsible person in the business who has passed this course, which currently comprises four subjects:

> Subject 5101: Introduction to Bus Safety
> Subject 5102: Bus Safety Risk Management for Bus Operators
> Subject 5103: Financial Management
> Subject 5104: Business Development

The subjects cover the legal and regulatory environment, safety risk management procedures that align with the safety expectations of the Bus Safety Act 2009 and Bus Safety Regulations 2010 and business skills that would be expected of an efficient route bus operator.

Vital parts of the Act are **safety principles** and **safety duties** that are expected of bus operators. Two principles are noted here.

- **Principle of shared responsibility** (Part 2, Section 9). This principle states that the safe operation of bus services is the shared responsibility of the operator, bus safety workers, procurers, persons who determine the location of bus stopping points, or who design, construct, install,

modify or maintain a bus stopping point or bus stop infrastructure, the Safety Director and members of the public. This principle thus links to the Chain of Responsibility in the National Law, as discussed below.

- **Principle of accountability for managing safety risk** (Section 10), which talks about risk allocation: *Managing risks associated with the provision of bus services is the responsibility of the person best able to control the risk.*

These two principles (shared responsibility and accountability for managing safety risk) go to the process of *ensuring safety* and the concept of *bus safety duties* in the Act and link back to the national law. Section 14 of the Act deals with *The concept of ensuring safety* and does so as follows:

> *(1) To avoid doubt, a duty imposed on a person under this Act or the regulations to ensure safety, so far as is reasonably practicable, requires the person to—*
>
> *(a) eliminate risks to safety so far as is reasonably practicable; and*
>
> *(b) if it is not reasonably practicable to eliminate risks to safety, to reduce those risks so far as is reasonably practicable.*
>
> *(2) To avoid doubt, for the purposes of this Act or the regulations, regard must be had to the following matters in determining what is (or was at a particular time) reasonably practicable in relation to ensuring safety—*
>
> *(a) the likelihood of the hazard or risk concerned eventuating;*
>
> *(b) the degree of harm that would result if the hazard or risk eventuated;*
>
> *(c) what the person concerned knows, or ought reasonably to know, about the hazard or risk and any ways of eliminating or reducing the hazard or risk;*
>
> *(d) the availability and suitability of ways to eliminate or reduce the hazard or risk;*
>
> *(e) the cost of eliminating or reducing the hazard or risk.*

The provisions of (2) above reflect the direction in which the associated National Law is moving later this year. Division 2 of the Victorian Act then imposes general safety duties on the operator of a bus service, the procurer of a bus service, bus safety workers (defined below) and on those who are involved in bus stops and bus stop infrastructure. The identification of these parties, in accord with the idea of shared responsibility, reinforces the idea of chain of responsibility, which has been an important part of Australian Heavy Vehicle Road Law for about 20 years (when the present author was one of the National Road Transport Commissioners who introduced it).

As currently provided in Victorian legislation, the primary safety duty is an obligation to eliminate or minimise potential harm or loss (risk) by doing all that

is reasonably practicable to ensure safety (as per Section 14 of the Bus Safety Act). The National Heavy Vehicle Regulator argues that[10]

> *... the best way to do this is to have safety management systems and controls in place, such as business practices, training, procedures and review processes that:*
>
> - *identify, assess, evaluate, and control risk*
> - *manage compliance with speed, fatigue, mass, dimension, loading and vehicle standards requirements through identified best practice*
> - *involve regular reporting, including to executive officers*
> - *document or record actions taken to manage safety.*

The main focus of national heavy vehicle chain of responsibility action is in the areas of fatigue management, speeding and overloading (essentially trucks in the latter case).

Safety duties are imposed on all persons who have the capacity to affect bus safety. The Victorian Bus Safety Act's definitions of ***bus safety work*** and ***bus safety worker*** are relevant here, in terms of identifying people to whom safety duties might apply. In terms of route bus services, for example, bus safety workers would include bus drivers, schedulers who set the timetables, mechanics and testers who repair or assess the vehicle. The bus operator and those who procure a bus service are separately identified as having safety duties in the Act. Those people who are subject to safety duties have an enforceable responsibility to eliminate risks to health and safety *where reasonably practicable* or to work to reduce those risks *so far as is reasonably practicable* (SFAIRP). As noted above, this principle of SFAIRP is not yet part of the National Law but will become so in October 2018.

Division 3 of the Act provides for bus safety inspections and bus safety audits, while Part 8 (Section 65) requires accredited operators to *notify the Safety Director of prescribed incidents in accordance with the regulations*.

3.3.3 Bus operator accreditation, bus safety and chain of responsibility

Bus operator accreditation requirements in Victoria involve a training gateway noted in section 3.3.2 and a range of safety requirements as set out in the Bus Safety Regulations 2010 (S.R. No. 110/2010). Two key safety systems that accredited (route) bus operators must have in place are:

1. a Management Information System (MIS) (Section 18 of the Regulations) and
2. a Maintenance management System (MMS) (Regulations Section 19).

Both these systems, related to the operation of the bus service, must be kept *in accordance with the requirements notified in writing to the accredited bus operator by the Safety Director*. Section 4.3 sets out a little more detail about those requirements.

[10] https://www.nhvr.gov.au/safety-accreditation-compliance/chain-of-responsibility/change-to-chain-of-responsibility

The Bus Safety Regulations 2010 also set out the requirement for an annual bus safety inspection to be undertaken by a licensed bus tester (Section 23), where the inspection is to be guided by the matters set out in Chapter 6 of the Road Safety (Vehicles) Regulations 2009 and in Schedules to those Regulations. Certificates of Roadworthiness and Test Reports are covered in Chapter 6 of those Regulations, with Vehicle Defect Notice provisions in Chapter 7.

Incident reporting is also an obligation imposed on accredited operators by the Bus Safety Regulations, where such incidents include accidents, mechanical failures, explosions/fires, divergence from the highway, a failure to comply with legislative requirements, contraventions of the operator's drug and alcohol policy, etc.

In summary, as currently provided in the Victorian legislation, and will shortly be provided in the national law, the primary safety duty is an obligation to eliminate or minimise potential harm or loss (risk) by doing all that is reasonably practicable to ensure safety (as per Clause 14 of the Victorian legislation), this duty extending to all parties in the chain of responsibility. For Melbourne route bus operators, bus operator accreditation brings these various elements together in a safety risk management system that seeks to develop a safety risk management culture.

3.3.4 BusVic assistance to operators complying with accreditation requirements

BusVic is the industry association for bus operators in Victoria, having performed this role for over 70 years. It has around 500 members, these being primarily school and route bus operators, holding service contracts with the State Government, but also including some tour and charter bus operators. Among its various roles in promoting its members' individual and collective interests, the Association represents the majority of bus operators in negotiating service contracts with government[11], particularly route and school service contracts, and represents them in negotiations over the legislative and regulatory settings within which they operate, including the accreditation regime.

BusVic has played a very active role in establishing the implementing bus operator accreditation in Victoria. For example, it has contributed substantially to course content in the Monash University training program that accredited operators must complete. Importantly, it has developed template responses to the requirements for Management Information Systems (MIS) and Maintenance Management Systems (MMS), based on ISO 39001, which should enable its members to develop and implement safety risk management systems that meet the requirements of the accreditation regime, provided they are diligently applied. An on-line tool provides guidance to bus operators in meeting the various components required of an MIS and MMS under the Victorian Bus Safety Act and Regulations, with templates available for large and small operators and customising these templates to particular business circumstances encouraged.

[11] The largest route operators tend to do their own negotiations but BusVic represents the majority of urban route service operators.

Larger operators tend to tailor their systems more than small. These have been developed in consultation with the safety regulator.

3.4 Bus Contracts and the Bus Services Act 1995 (No. 68 of 1995)

The implementation of contracts for route bus services in Melbourne is the subject of the Bus Services Act 1995, which gives the Director (of the Public Transport Development Authority, known as Public Transport Victoria) the power to enter into a service contract with an accredited person (operator) for the provision of route or area-based services (Section 26). Section 27 of the Act sets out a number of key elements that the contract is to encompass, such as maximum length (10 years), the manner of contract termination, service standards, maximum fares, operator remuneration arrangements and penalty provisions, which could relate (for example) to safety performance (but do not at present).

Under the ten-year metropolitan route bus service contracts that expire in mid-2018, incentive/penalty provisions relate to patronage growth (incentive possibility only) and on-time running/service cancellations. The contracts that will replace those contracts generally retain this focus. Safety is not a KPI under the contracts and safety performance is not subject to incentive/penalty provisions under the contracts but poor safety performance could result in the Safety Director removing an operator's accreditation, which would mean loss of contract. The new contracts are understood to provide for a Passenger Experience Regime, which is about the Operator's performance with respect to number, response and resolution of passenger complaints that fall within the operator's control. Relevant KPIs are yet to be developed but the focus is wider than safety.

3.5 Penalties under the Heavy Vehicle National Law Application Act 2013

A route bus operator could have their accreditation suspended or removed by the safety regulator but the most likely consequence of failure to meet the requirements of the Heavy Vehicle National Law, as applied to route buses in Victoria, may be application of a monetary penalty. Appendix 1 of the Application Act sets out the relevant penalty scales. Some examples are provided in Table 3.2 for context. The definitions of minor, substantial, severe and critical, under driving and rest hours in the last two rows in the table, are set out in Schedule 1 of the Heavy Vehicle (Fatigue Management) National Regulation. Examples are as follows:

- *Minor*: working > 5¼ hours in 5½ hours; working 12 to 12¾ hours in what is meant to be a 12 hour work period
- *Substantial*: working more than 12¾ hours but less than or equal to 13¼ hours in what is meant to be a 12 hour work period
- *Severe*: working greater than 13¼ hours but no more than 13½ hours in what is meant to be a 12 hour work period
- *Critical*: working greater than 13½ hours in what is meant to be a 12 hour work period.

Table 3.2: Examples of penalties for offences against the Heavy Vehicle National Law

Section Number and Provision	Maximum Penalty ($)
Chapter 5: Vehicle operations speeding	
204(1) Duty of employer, prime contractor or operator to ensure business practices will not cause driver to exceed speed limit	10000
2017(1) Duty to ensure driver's schedule will not cause driver the exceed speed limit	10000
219(1) Liability of employer etc for driver's contravention of speeding offence **Limit 50-60km/h** - By <15km/h - 3000 **Limit of 70-80 km/h** - By <15 km/h - 3000 - By 15 km/h or more - 5000 **Limit of 90 km/h** - By < 15 km/h - 3000 - By 15 km/h or more - 5000 **Limit of 100 km/h** - By < 15 km/h - 5000 - By 15 km/h or more - 10000	
Chapter 6: Vehicle operations – driver fatigue	
228 Duty of driver to avoid driving while fatigued	6000
229(1) Duty of party in the chain of responsibility to prevent driver driving while fatigued	10000
230(1) Duty of employer, prime contractor or operator to ensure business practices will not cause driver to drive while fatigued	6000
233(1) Duty to ensure driver's schedule will not cause driver to drive while fatigued	10000
237(1) Duty not to make a demand that may result in driver driving while fatigued	10000
250(1) Operating under standard hours – solo drivers Minor: 4000 Substantial: 6000 Severe: 10000 Critical: 15000	
261(2) Liability of employer, etc for driver's contravention of maximum work requirement or minimum rest requirement Minor: 4000 Substantial: 6000 Severe: 10000 Critical: 15000	

Source: Heavy Vehicle National Law Application Act 2013, Appendix 1.

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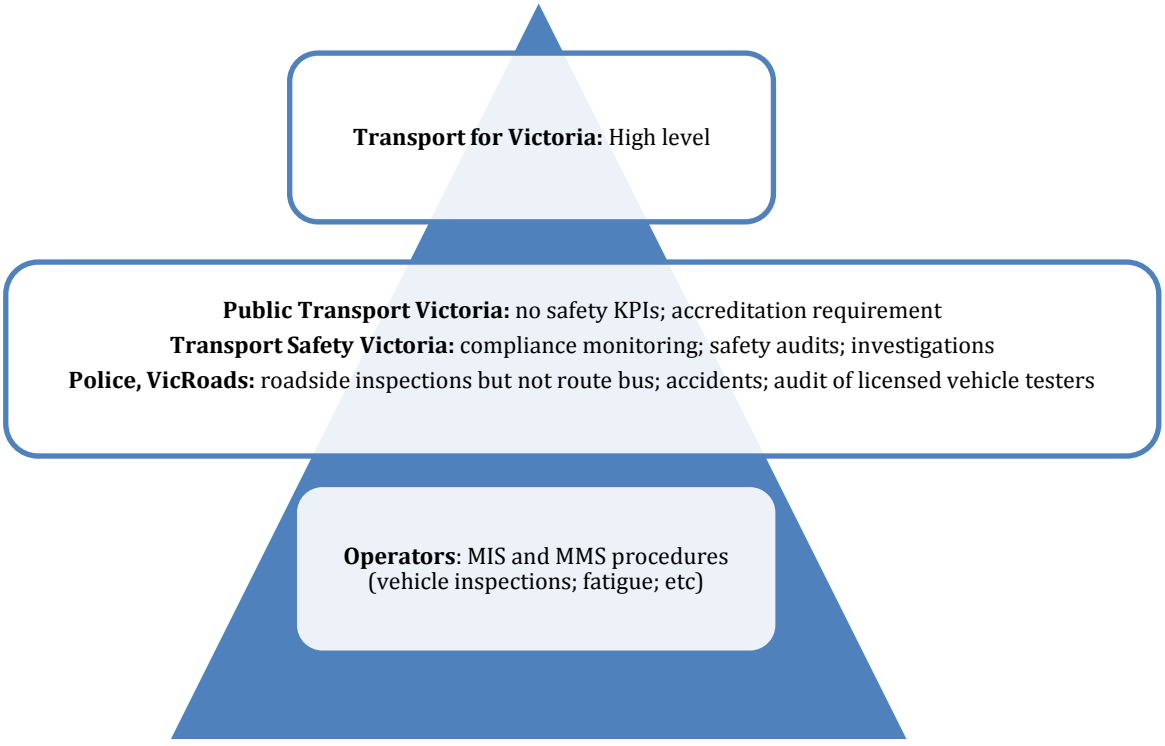
4. Monitoring of bus safety

4.1 Key Players

Figure 4.1 sets out the author's interpretation of the present safety monitoring system for route buses in Victoria, in terms of Victorian governmental agency roles.

Transport for Victoria, the portfolio policy agency and main adviser to the responsible Ministers, exercises a high level role over system performance and gets reports from constituent agencies. Safety involvement of TfV is most likely to be in terms of major incidents like the Hong Kong accident. System monitoring essentially happens at the next level down, by two sectoral agencies established by the Transport Integration Act 2010 (**Public Transport Victoria** (PTV), or the Public Transport Development Authority, and **Transport Safety Victoria**, as elaborated in Section 3 above), plus **Victoria Police** and **VicRoads.**

Figure 4.1: Victorian government agencies involved in bus safety monitoring



4.2 Public Transport Victoria

In terms of route bus operations, PTV is the contract manager and monitors operator performance against the requirements of their service contracts. As noted in Section 3.4, contract KPIs do not include a specific safety indicator, although PTV indicates that it sees safety as ultimately more important than all other service requirements. In safety terms, PTV is mainly concerned that route

bus operators hold appropriate operator accreditation and the agency works closely with operators to identify areas where industry-wide safety enhancements seem desirable and can be cost-effectively built into the contractual regime.

A recent example concerns the addition of security screens for bus drivers. Industry research and driver reports indicate that driver abuse and assault is a growing concern and that driver screens would enhance driver safety (not so much against liquids) (Dawson et al. 2017). PTV was closely involved throughout and has supported the retro-fitting of security screens to existing buses and their inclusion in the vehicle specification for new contracted route buses. About one in three buses have now been retrofitted and the whole route bus fleet should be completed by end-2019. Retro-fitting costs are shared 50/50 between PTV (government) and operators and new vehicles screens will be covered under vehicle ceiling price provisions in operator remuneration, funded through the contract.

PTV holds regular contract meetings with route bus operators, where industry/operator issues are discussed. Particular safety issues may be discussed in these meetings, such as fatal accidents, major vehicle maintenance concerns, and such like. This is about open communication and identifying ways to improve safety, particularly at system level.

PTV has BusTracker software (Smartrak) which it uses to monitor on-time running and feed customer information Apps and real-time information screens at stops that have such screens. This data is not used to monitor driving hours, partly because it does not include any rostering details. PTV does not see fatigue as a problem in terms of route bus operation but recognizes that it may occasionally be an issue with longer distance regional services, charter and touring services.

PTV advised the author that Victoria Police think PTV is in the chain of responsibility for route bus driver fatigue, as the service contracting agency, presumably because the contracts specify service standards/schedules. This suggests that PTV should be actively monitoring fatigue factors. PTV disagrees, arguing that rosters are outside its control and that rosters are the key factor in fatigue management. This is not the place to debate these positions but it is important to note that agencies are taking chain of responsibility obligations seriously and there is debate about just who forms part of that chain.

4.3 Transport Safety Victoria

Because of its legislative and regulatory responsibilities, **Transport Safety Victoria** is front and centre in terms of monitoring route bus safety. Incident reports filed by bus operators, in accordance with accreditation requirements and contractual terms and conditions, form part of its monitoring process, some of the data from those reports being used in Section 2.4 above to report on serious injury outcomes. Annual vehicle inspections undertaken by licensed testers, also discussed in Section 2.4, are another important source of monitoring data for TSV. Both incident reports and Vehicle Inspection Reports are

increasingly being used diagnostically to identify emerging problem areas in a timely way.

More broadly, there are two main ways that TSV monitors bus safety performance. First, it has a **compliance program**, which mainly involves road-side inspections (primarily trucks), and inspections at major tourist destination locations (primarily buses and coaches). These inspections are undertaken with Victoria Police and VicRoads, to identify driving offences, including offences against driver working hours and rest requirements, and vehicle defects. So far as buses and coaches are concerned, these inspections are mainly outside the metropolitan area at highly patronized tourist destination car parks but they also include programs associated with major metropolitan events, such as the Melbourne Spring Racing Carnival. Police involvement is partly because their knowledge of working/rest provisions is extensive and VicRoads because of their understanding of vehicle inspection requirements. TSV advises that it typically undertakes about 30-40 compliance checks annually, most regional.

In terms of route bus operation, TSV compliance checks tend to occur if intelligence suggests a particular operator may need to be checked. This may lead to Victoria Police, VicRoads and TSV visiting the operator's depot(s) and undertaking appropriate investigations (e.g., of vehicle conditions and/or driver records).

In addition to its compliance audit program, TSV has a **safety audit** program that checks (for example) the Management Information System and Maintenance Management System that accredited route bus operators must have in place. This checking is against expected content set out in documents issued by TSV to operators (TSV 2012 a, b), which have their authority base in Sections 18 and 19 of the Bus Safety Regulations 2010. The TSV Management Information System document (TSV 2012a), for example, indicates that an MIS must include the following:

- Safety policy
- Governance and internal control arrangements
- Documented safety accountabilities and authorities
- Information management process
- Safety information communication process
- Drug and alcohol management processes
- Hazard, risk and change management process
- Emergency management process
- Process to establish bus safety worker competence
- Processes for incident reporting and investigation
- Internal audit procedure.

It further suggests that operators may choose to include regulatory compliance information and safety performance targets and performance measures. Relevant example are provided in TSV (2012a) and in BusVic's bus operator accreditation guidance document.

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The Maintenance Management System requires accountabilities and authorities for all persons involved in activities associated with the MMS to be clearly defined and documented, each such person to be appropriately trained and have the required competence to do the job, and must prescribe the maintenance activities that will be performed, as specified by the manufacturer or other sources considered appropriate by the accredited operator (TSV 2012b). The requisite vehicle inspection regime is set out (pre-trip, periodical and annual) and operators need to use appropriate sources to develop an inspection regime that includes these inspections in a way that ensures their vehicles are safe and roadworthy at all times. VicRoads also provides guidance material to assist in this regard (VicRoads 2015).

TSV advises that, while compliance with accreditation requirements was the initial focus of its operator safety audits, which started about 8 years ago, the focus is increasingly on discussions based around safety culture and safety risk management. To support this focus, the agency periodically publishes material that provides advice to operators about such matters as safety culture (TSV 2017b) and incident contributing factors (2017c). Bus operators are very supportive of this approach and find TSV auditors business-like and helpful, working with operators (for example) to find solutions on difficult matters like safe bus stops (where stakeholders are multiple and responsibilities not well known).

TSV notes that it undertakes around 560 audits annually, which indicates that operator audit frequency is considerably less than annual. Given resource constraints, TSV's approach is to categorize operators into risk levels and undertake more frequent audits on those operators thought more likely to be at risk of poor safety outcomes. It notes that around 100 infringement notices are typically issued annually and that some operators have had their accreditation suspended (no metropolitan route operators). None has had accreditation cancelled. TSV's general approach is to work co-operatively with operators to improve performance and the agency regards industry safety performance as very good, particularly for route bus operators (who tend to be larger operators with good systems and maintenance facilities).

Discussions with TSV indicated that fatigue is not a major focus of their route bus operator audits, since operator scheduling/rostering systems are generally regarded as sound. Fatigue breaches, if they exist, are most likely to be identified in an accident investigation, which is obviously after the event. Fatigue (work/rest) breaches are more likely to be identified by Victoria Police in compliance checks but, as noted above, these are not generally associated with route bus services. TSV strongly believes that a systemic approach to safety risk management is the best way to minimise work/rest/fatigue problems and this is the way it approaches its role.

The discussions on work/rest/fatigue in the Melbourne regulatory setting identified a risk that this matter may involve *both* duplication and falling in the gaps between agencies. Apart from the semi-regular audits, monitoring by the regulator tends to be in response to accidents (after the event) and, in this situation, might involve both the National Heavy Vehicle Regulator, the State's

investigator from Transport Safety Victoria and Victoria Police. This potential duplication of safety roles seems unnecessarily wasteful.

More broadly, TSV lacks the resources and detailed understanding of the relevant specific regulatory requirements and operator implementation systems to do a thorough audit of compliance with all the regulations, including the complex work/rest (fatigue) provisions, each time it undertakes a safety audit. Victoria Police know the work/rest regulations but, so far as route bus operations are concerned, are only likely to be involved after an accident or if there has been a report about suspected poor practice. The (relatively new) National Heavy Vehicle Regulator (NHVR) was noted by both PTV and TSV as getting more heavily involved in this area and, because of the complexity of the field (e.g. in terms of understanding the allowable driving hours), the Police's greater interest in trucks and the NHVR's resourcing, this seems desirable, its national bus/coach legislation/regulations laying out (for example) the work/rest hour requirements.

4.4 Bus and coach operators

Under the accreditation regime, accredited bus and coach operators are required to undertake an annual internal audit of their MIS and MMS, including work/rest provisions, with some large operators indicating that they undertake such audits more frequently. Performance monitoring is also done under route bus service contracts but, as noted elsewhere, this does not include safety components.

5. Responses to Specific Committee Questions

5.1 Approach

The Committee brief for this report sets out a number of specific questions on which the Committee is seeking advice. Courtesy of BusVic, the bus operator voluntary industry association, discussions were held with a group of 8 Victorian bus operators, 7 of whom run route bus services, two being among the largest route bus operators in Melbourne. Discussions were also held with some individual operators. The tenor of these operators' answers to various questions posed by the Committee to the present author is set out below, complemented by governmental views on some of the questions.

5.2 Monitoring system

Q6. The adequacy of the regulation and monitoring of the bus system in Melbourne in ensuring and enhancing bus safety, including but not limited to the regulation and the observance of the regulations in respect of maximum driving hours, rest time and meal times for bus drivers, which address the problem of bus driver fatigue.

The monitoring systems used for route bus safety in Melbourne have been outlined in Section 4 above. Operators put a high priority on safety and recognize the importance of tackling fatigue risks, which are prominent in the accreditation system. Given the generally repetitive, timetabled and highly structured nature of route bus operations, operator monitoring of compliance with working and rest hours regulatory provisions depends heavily on the operator's rostering and scheduling systems, rather than on log books or electronic work diaries (recognized by the 100 kilometre provision, which says log books are not required to be kept for trips that remain within 100 kms of base). Larger operators have drivers typically start and finish through a kiosk where they tag in and out electronically, in some cases having to affirm at log in that they are ready for work and not fatigued. Smaller operators tend to have paper-based sign-ins but may still require the driver to sign that they are ready for work. Operators usually linking rosters and schedules to systems (e.g., Enterprise Resource Planning System) which provides management with alerts if a driver is getting close to legal work (fatigue) limits.

Good communication between drivers and management is seen as vital for fatigue management, with most operators indicating that they would prefer a driver to go home on pay if fatigued, rather than work. Drivers need to feel they can trust management to the point that they will feel comfortable reporting fatigue if it is present, knowing that this will be treated as 'unusual behaviour'. However, if this behaviour recurred, action would be taken.

Route bus operators tend to place some reliance on supervisors to visually check (eyeball) whether drivers seem fatigued at start of their shift and, if there are concerns, to discuss the matter with the driver and suggest the driver goes home if fatigued. The definition of signs of fatigue in the Heavy Vehicle National Law Application Act 2013 provides some guidance of what to look out for (and

could be embedded as part of a fatigue risk management procedure in an operator's Management Information System):

> ***Signs of fatigue*** *means that a person was or will be fatigued while driving a fatigue-related heavy vehicle on a road (whether the sign manifests itself before, during or after the driver drove the vehicle).*
>
> *Examples:*

- *lack of alertness*
- *inability to concentrate*
- *reduced ability to recognize or respond to external stimuli*
- *poor judgement or memory*
- *making more mistakes than usual*
- *drowsiness or falling asleep, at work (including microsleeps)*
- *finding it difficult to keep eyes open*
- *needing more frequent naps than usual*
- *not feeling refreshed after sleep*
- *excessive head-nodding or yawning*
- *blurred vision*
- *mood changes, increased irritability or other changes to a person's mental health*
- *changes to the persons health or fitness.*

Pre-trip assessment of some of these signs will be difficult and during-trip testing is not practical, other than with devices such as eyeball scanners (noted below as not effective in route bus operation). However, companies endeavour to make drivers aware of the signs of fatigue in driver training and drivers are encouraged to feel confident in not signing on to work if there is an issue (as noted above).

Monitoring of driver behaviour outside the work environment is seen as very challenging. For example, some drivers are known to occasionally drive for Uber outside of their bus work. Operators tend to rely on sign-in procedures, where drivers acknowledge they are ready for work, and supervisor checks as their immediate tests of work readiness but recognize this is a very difficult area.

Operators tend to plan their shifts with some built-in slack time, to allow for unexpected delays, due to congestion, accidents and such like. For example, while 5hrs 15 minutes can be worked out of 5hrs 30 minutes from shift start, route bus operators tend to leave 15 minutes slack, to reduce pressures to speed to maintain schedules. One large operator leaves 35 minutes instead of 15. Also, while a 7 hour rest break is required in 24 hours, operators allow for a 10 hour rest break, helped by the industrial award under which route bus drivers are employed specifying 10 hours rest, not 7 hours. The lack of split shifts perhaps makes 10 hours easier than it might be in Hong Kong. Also, it was suggested that the cost plus nature of Melbourne's negotiated bus contracts may mean that such safety cushions are easier to build into schedules than they would be under a competitive tendering regime. More broadly, working/rest hours issues tend to

arise on longer distance charter, tour or inter-regional route services than on urban route services. The *Standard Hours – solo driver of a fatigue-related bus option* noted in Section 3.2 is intended to help tackle this charter/touring area.

One operator uses a Seeing Machines (company name) device to monitor driver eye movements while driving on a longer distance route service, to recognize signs of fatigue (Guardian brand). The operator currently has four units in operation and has been using them for 2½ years. If signs of fatigue are detected the device beeps, rattles the driver seat and sends a signal to a system monitor, who contacts the operator. They then ring the driver to check fatigue. The system was tested on the operator's urban route bus service but driver head movement when ticketing or talking to passengers proved challenging, leading to erroneous signals being sent. It is not being used on route buses. The operator sees the benefits from using the system on the longer distance (regional) route service as

- capture of fatigue issues instantly (micro sleeps), that the company would otherwise have had no way of knowing/assessing
- development of support policy to utilise that information in real time as a preventative measure
- confidence from the drivers that there is a solid process to manage fatigue in real time.

Another operator uses an Electronic Work Diary on regional (longer distance) route services, to keep track of driver work/rest times, but none of the various route bus operators interviewed used EWDs on urban route services, since the 100kms rule effectively means they are not required. Rosters and schedules are the primary evidence material for compliance.

In terms of fatigue monitoring, an interesting operator response was a growing concern about the effect of prescription drugs on some drivers, particularly associated with a change in medication regime. This was noted as being an increasing occurrence and all operators were concerned about the trend. Drivers are advised to tell their General Practitioner that they are a bus driver, as part of initial and on-going driver training, so that this can be taken into account in prescribing medications. Operators made the point that daily eyeball checks by supervisors are increasingly on the lookout for this possibility. It is likely that BusVic, the industry association, will develop an industry level suggested response to this challenge.

In terms of drug and alcohol effects on fatigue, operators encourage drivers to self-report and the driver will usually be sent home for a verified first time, with counselling and possible dismissal involved for increased incidences. NSW requires operators to test 20% of drivers every year and Victoria is expected to follow this lead.

Q7. The capabilities and use of tachograph/black box systems in buses in Melbourne, in particular the availability and use of real-time monitoring of bus driver behaviour. If the latter system exists, what use is made of it to monitor the bus driver's driving behaviour and take remedial actions?

Tachographs are not used for urban route bus operation and black boxes are not required. However, most route bus operators have telematics systems and these are usual with new route buses. Being linked to Engine Management Systems, systems can typically alert drivers on whether they are over revving, idling excessively, braking too harshly, accelerating too quickly or speeding (regional operation). Driver performance can be assessed by the company (e.g., fuel efficient driving, driving that is more customer friendly) for training/re-training purposes. Equipment suppliers with whom discussions were held at the 2018 BusVic Annual Maintenance Conference (2-3 July 2018) suggested fuel cost savings of 10-15% from such systems, so there is an incentive for operators to install the equipment[12] and to encourage drivers to take notice of the alerts, with training used to improve driving practices when needed. These systems are also likely to provide a better customer experience and enhanced safety.

It is noted that Melbourne route buses commonly have multiple GPS devices fitted. One is associated with the ticketing system, Myki, another is part of the State Government's Smartrak (Bus Tracker) system, which is used to monitor on-time running, provide real-time arrival information and assess incentive/penalty payments under bus contracts. Neither of these systems is used to monitor driver behaviour. A third is for CCTV operation and fourth is the telematics system. The telematics system is the one that is used to monitor driver performance but it is not used for real-time speed monitoring of route buses because speed limit zones are not part of the system. However, it is noted in answer to Question 9(f) below that some operators use the Mobileye system, which can detect speed signs, if present, and indicate to the driver if the bus is exceeding that posted limit (as well as provide a warning if the bus gets too close to the vehicle ahead). Camera data can also be helpful in accident reconstruction.

5.3 Recruitment and training

Q8(a) The selection criteria for the recruitment of bus drivers in Melbourne. In particular, whether the local Transport Authority (e.g. Transport For Victoria) or bus operators in Melbourne use any psychological screening/assessment (as advised or recommended by psychologist or otherwise) to ensure that the recruited bus drivers possess the requisite temperament to perform their driving duties satisfactorily even when in stressful situations (e.g. when faced with verbal abuse from difficult passengers including those who are intoxicated).

Only one of the companies interviewed used psychological testing of applicants for driver positions, with a focus in that testing on the kinds of issues mentioned in the Committee's question. This testing sometimes led to drivers not being offered employment.

All companies interviewed agreed that their recruitment criteria for drivers were weighted about 70% towards whether the driver seemed likely to be good

[12] Operators usually get to keep cost savings they create during the course of the contract, by the nature of the cost-plus structure of their route contracts. It is not known if such savings are shared with drivers but this seems likely, at least in some companies.

in dealing with customers and 30% towards driving capability. They agreed that people can be taught to drive a bus but good customer relations skills are more difficult to teach/train. Customer relations skills were generally assessed at interview but all agreed this is hard to judge that way – a reason why one company has gone to formal psychological testing. There is no requirement from the regulator for such testing.

Most route bus operators employ their own trainers. PTV (government) customer satisfaction surveys measure driver performance on two criteria, which means that operator training focuses, inter alia, on these elements. Those two criteria relate to (1) whether the bus driver is courteous and helpful and (2) whether they drive safely and smoothly. Over the last 4 years or so, typically 80% of respondents to Public Transport Victoria's Customer Satisfaction Monitor survey are satisfied with bus drivers overall[13], which is around 3 percentage points higher than comparable satisfaction levels with tram drivers over the same period.

Training includes a focus on handling difficult customers, informed by industry-led research, particularly in light of a significant increase in verbal and physical assaults of drivers in recent years. For example, the average annual number of physical assaults reported to the Safety Director were twice as high from 2013-2016 as they had been from 2008-2012, with anecdotal evidence suggesting that actual incidents are far higher than what is formally reported to the Safety Director. This is a serious problem, since it can have immediate and longer term impacts on driver health and well-being and poses potential safety risks to passengers and others (e.g., from driver distraction).

BusVic, the industry association, commissioned two expert reports on identifying and managing abuse and has recently prepared a major report of its own on the topic, engaging with large numbers of bus operators, drivers, the Transport Workers Union and Authorised Officers (ticket inspectors) (Dawson et al. 2017). That research has identified a strong association between introduction of the smartcard ticketing system (Myki) and increased verbal and physical assaults of drivers. Fare non-compliance has reportedly increased substantially and created tensions with drivers who are supposed to request fare payment from passengers, as a contractual obligation. Operator response is usually to advise drivers to exercise care in requesting payment (e.g., from customers who present as drug affected) and to only ask once. Increased driver abuse has also been linked with increased late running of services, which is increasingly likely as Melbourne's population growth surges and traffic congestion levels increase.

In terms of abuse and assault, operator training typically concentrates on de-escalation through the driver controlling their own behaviour and 'what not to do', to reduce the chances of escalation. There is a general concern that there is no effective training available for aggression and that training is inadequate for direct confrontation. Greater physical protection of drivers is part of the solution and protective screens are being installed, with government funding assistance.

[13] Based on responses to the two criteria – rating scores are not published for each criterion separately.

These reduce the likelihood of physical assault but some do little, for example, to prevent spitting. Surveillance cameras (CCTV) are also being installed.

Training techniques tend to differ between operators but, in terms of customer related matters, there is usually a focus on incorporating training in five areas: routine interaction with passengers; managing difficult passengers; instructing passengers if necessary; self-protective procedures; and clear post-incident reporting and support procedures. Operators whose training focuses more on how to 'read' passengers have generally had fewer issues. This reflects the increasing emphasis on recruiting drivers who are more customer-focussed and risk aware. More broadly, in the event of trouble, route bus drivers are usually advised (trained) to stop the bus, open the doors, hit their duress button and call police or the depot.

To further reduce risks of assaults, BusVic is seeking bus driver classification as 'essential workers', which would double the scale of penalties for assault. It also proposes removal of the requirement that drivers request payment/touch on and proof of concession entitlement, with the obligation being removed from service contracts. Pre-recorded audible announcements plus signage about proper fare payment procedures are proposed as the alternative, helping to reduce driver exposure to the largest single source of abuse and assault. Industry wide training in de-escalation procedures is being considered.

One example of a driver safety training program, developed and implemented by the largest operator interviewed, is a 'Safe and Sound' module. This 20 page booklet includes, for example, content on safe customer interaction, how to get assistance during an incident, conflict in the work environment, signs of drug use and medical conditions, reactive behaviour, how to defuse situations, handling harassment, scenario discussion and some elements of self-defence. This company has also developed what they call 'Front Face', to keep drivers and others updated on safety and other matters, Front Face is an electronic bulletin board for sharing information and messages, which the company has found achieves more cut-through than a blackboard.

Q8(b) The requirements, if any, prescribed by the local Transport Authority for the training of new recruits to drive buses and the ongoing training of such bus drivers including refresher training and safety awareness training during their employment. If no such requirements have been stipulated, what is the training provided by the bus companies for new recruits and the ongoing training during employment of bus drivers?

Bus drivers need to hold a relevant driver licence (a medium rigid vehicle licence for most route buses), from VicRoads and driver accreditation, from the Victorian Taxi Services Commission. Driver accreditation requires a good driving record, no criminal convictions (including sex, alcohol or drug offences), and no medical condition which may affect the skills needed to drive a bus. It is worth noting that the medical examination required for bus driver accreditation must be carried out in accordance with specific national medical guidelines for drivers (Austroads and NTC 2017). The relevant driver health questionnaire to be completed by the medical examiner includes questions related to the Epworth

Sleepiness Scale. This should enable an initial general assessment of whether sleepiness type issues may be a potential concern for particular candidates.

Some bus companies require applicants to hold the relevant driving licence and driver accreditation when applying to become a driver but others provide full training and all provide field training of new drivers on the company's routes (e.g., for a week or so). There is no formal requirement from the safety regulator for particular forms of training. Instead, the regulator specifies general safety duties and expects accredited operators to develop and provide driver training programs that will help meet these expectations. Similarly, the Melbourne route bus service contract does not set down particular expectations in regard to driver training but requires that the operator provides a service that meets community and customer expectations in terms of criteria such as safety, customer service, reliability, etc, with driver training being implicit therein.[14] The answer to Q8(a) provided further details on training.

5.4 Safety-related devices, systems and measures

Q9. Whether the Transport Authority require bus operators in Melbourne to adopt (or whether the bus operators have proactively adopted) the following safety-related devices and/or systems and measures to enhance bus safety

Q9(a) Tachograph/black box systems? If so, does it allow real-time monitoring of bus driving? Does the system use data provided by the Global Positioning System (GPS). What use is made of the data obtained from the combined systems?

As noted in answer to Q7, tachographs are not used for route bus operation in Melbourne and black box systems are not required. There are usually multiple GPS-based systems operating on Melbourne route buses. As also noted in answer to Q7, route buses are increasingly incorporating telematics, linked to Engine Management Systems, which enable some aspects of driver behaviour to be monitored. Most Scanias, Volvo and Mercedes buses, which would account for the majority of the route bus fleet, have some such devices. Firms with this technology use it to alert drivers in real-time if their driving behaviour needs to change (for reasons listed in answer to Question 7) and to train drivers, if needed, in more customer friendly, cost-efficient driving practices. Some operators noted that it was often hard to find the time to make use of the data that is potentially available from their systems. Some contract third parties to prepare reports and Scania, for example, offers a service of this kind with its new vehicles (base information included in the purchase price, with more detailed analysis and reporting at an add-on price).

Q9(b) Electronic Stability Control and Roll Stability Control.

Neither of these is required on route buses in Australia. ESC provisions have recently (21st May 2018) been introduced for heavy vehicles, under Australian

14 https://static.ptv.vic.gov.au/PTV/PTV%20docs/Customer%20Satisfaction%20Monitor/1521080454/PTV_Customer-Satisfaction-Monitor_Oct-Dec_2017.pdf

Design Rule 35/06 – Commercial Vehicle Brake Systems, but route buses are exempted under Clause 5.1.8.1, because they are seen as having good stability. The vehicle standards section of the Federal Department of Infrastructure, Regional Development and Cities (pers. comm.) advises that this exemption also applies to Roll Stability Control for double deckers if used in a route operation, such as between Southern Cross Station in Melbourne CBD and Melbourne Airport Tullamarine.

Q9(c) Speed control by geo-fencing using GPS? If so, is the GPS signal affected by high-rise buildings in Melbourne. If so, with what consequences?

This does not exist in Melbourne at present, although its suitability at places like the Melbourne airport was seen as promising. GPS-based speed limit recognition and vehicular speed control was seen as possible but not currently available. Technologies like Mobileye include a speed limit sign recognition option and will alert the driver if the vehicle speed exceeds the posted limit. This is not GPS-linked, in terms of the speed limit, but depends on the Mobileye system identifying a relevant speed sign.

GPS drop out issues in Victoria were seen to be mainly an issue in remote areas. A Singapore-based operator suggested that differential GPS, as used in Singapore but not Melbourne, was seen as likely to overcome any problems of building presence.

Q9(d) Active speed retardation system, which may involve changing gears or application of brakes rather than merely cutting off the fuel supply to the engine? If so, are different speed limits set for different locations, e.g. to comply with different speed limits or to have regard to the nature of the road and area? Have bus companies considered the feasibility of retrofitting such a vehicle speed retardation system to buses already in service?

No active vehicle speed retardation systems are in use other than speed limiters that are set at 100, although all brakes are on a retarding system that cuts in before the brakes (e.g., going down a steep hill). No companies interviewed have considered retrofitting further retardation devices. The view was that it would need to be a requirement from the regulator, funded through service contracts, if government wanted it to be widespread.

Q9(e) Speed display unit in passenger compartments to provide passengers with real-time information of the speed of the bus at any given time?

There are no such speed display units on Melbourne route buses and speeding, *per se*, is not generally seen as a problem for route buses.

Q9(f) Collision prevention and lane-keeping devices?

Lane keeping devices are of two main types: those that warn the driver when the vehicle is drifting out of its lane (Lane Departure Warning Devices) and those that actively keep the vehicle in its lane (Lane Keeping Device). Advanced Driver

Assistance Systems such as these are not required on Australian route buses and companies argue that lane keeping technologies are mainly for operation at higher speeds than route buses usually achieve. Lane Departure Warning devices, however, are seen as useful and CDC, the operator noted for the quality of its fleet presented for annual vehicle inspections, has installed the Mobileye system for collision prevention and lane departure warning on all its Melbourne route buses, having also introduced the system in its international home base (Singapore). Speed detection is turned off and the warning distance from the vehicle ahead is set for urban operation. Operators see that these tools will become standard in the near future and will be incorporated into the fleet through retrofit and vehicle replacements. New Volvo Euro 6 hybrids were noted as having the technology, for example, and some operators have these vehicles on order. The NSW Joint Standing Committee on Road Safety has been very supportive of collision prevention and lane departure warning technologies for Australian heavy vehicle application (NSWJSCRS 2018 p. 19).

Q9(g) Driver alertness monitoring devices, including anti-dozing devices? If so, what equipment is used and over what period has it been used.

These devices enable the driver state (distraction and drowsiness) to be identified through analysis of head and eye metrics. As noted in section 5.2, one operator has installed a Guardian system from Seeing Machines and has had this system operating on four of its regional route service vehicles for 2½ years. However, it is not used on that operator's urban route buses, due mainly to the frequency of driver body turning movements, such as when serving passengers or watching surrounding traffic, leading to erroneous alerts. In somewhat similar vein, the NSW Joint Standing Committee on Road Safety recently concluded that *further research is required to determine the capacity of fatigue management technologies to accurately and reliably detect or predict driver fatigue* (NSWJSCRS 2018, p. 16)

Q9(h) Autonomous Emergency Braking System that allows a vehicle to detect its surroundings and automatically apply the brakes?

AEBS is already mandatory for certain classes of vehicles in Europe. It is available in Australia on school buses and coaches but not on route buses and is seen as having some challenges in urban operation in a city where traffic is very stop-start. In congested conditions, operators prefer technologies that tell them they are getting too close to another vehicle, rather than automatically slowing the vehicle down. Collision-avoidance and lane departure warning technologies are thus generally seen as preferable. However, operators see AEBS coming, following developments on the passenger car side.

Q9(i) Have bus companies retrofitted seat belts on buses? If so, did the bus companies encounter any difficulties in doing so, in particular because of the structural integrity of the bus?

Operators have not done this because of the difficulty and associated cost of so-doing, given structural integrity questions. New route buses in regional towns in New South Wales now require seat belts on a 3 for 2 basis (3 belts on a seat for 2

adults), because of the high student numbers carried. The operator view was that, if government wants seat belts on Melbourne route buses, then this is a policy decision and government should reimburse the operators for costs involved through their contractual payments. It will be costly and is seen as likely to be less cost-effective than emergent ADAS developments.

Q9(j) Have bus companies taken any specific measures to protect bus drivers from unruly passengers, e.g. the use of transparent protective screens or CCTV cameras?

All buses have CCTV cameras fitted and security screens are in the process of being fitted at present, as indicated in the answer to Q8(a).

Q9(k) Do bus companies apply any specific Road Safety Management System e.g. ISO 39001?

As explained in Section 3.3.4, Victorian bus operator accreditation requirements effectively require bus operators to have a system along these lines. As a consequence, BusVic developed a comprehensive operator accreditation help kit, in close consultation with the safety regulator (Transport Safety Victoria), encompassing the requisite Management Information System and Maintenance Management System, for those of its members wanting to avail themselves of this service. The Association has ~500 members and almost all use the service, which has separate versions for small and large operators. All operators need to customize the BusVic template documents to their own context. BusVic's templates were designed by a qualified Technical and Further Education (TAFE) trainer to be consistent with ISO 39001 requirements but are not formally associated therewith.

One company has embedded its system into an electronic diary, which helps ensure compliance. It reminds responsible people of what is due and when, including sending electronic messages to drivers.

Q9(l) Are bus companies able to take action against either drivers or passengers pursuant to any statutes, regulations, by-laws, etc without having to rely on the police.

Companies can take disciplinary action against drivers under their employment agreement but not against passengers. Passenger behaviour matters need to be referred to the police or to transit police.

5.5 The Future

Q10. The safety related devices, systems and measures that the Transport Authority in Melbourne is considering and/or intends to introduce in future on buses in Melbourne.

Transport Safety Victoria does not see itself as being in the business of prescribing particular safety requirements. Instead, it uses a safety duties approach. As outlined in Section 3.3.2, the primary safety duty is an obligation to eliminate or minimise potential harm or loss (risk) by doing all that is

reasonably practicable to ensure safety. TSV sees it as up to the operator to decide how to meet this requirement.

The contract manager, Public Transport Victoria, is more likely to be involved in specific safety initiatives, if it sees these as being an important development system-wide to improve safety, a decision that it usually reaches in close consultation with BusVic, the industry association. Driver security screens are the most-recent example. There are no similar initiatives under current consideration.

5.6 Key point

The dominant point that came through strongly in bus operator interviews is that safety is taken very seriously, in many cases reflecting the business's long standing family-owned and operated presence in its community. For all operators, safety and safety risk management is seen as a matter of culture and the safety regulator is emphasizing this perspective. One operator summed this attitude up very well:

> *We take an ethical stance and treat safety in our business the same way we would if it was our brothers, sisters, children, fathers or mothers affected.* ***If it is not good enough for our brothers, sisters, children, fathers or mothers, it is not good enough.***

Encouraged by the operator accreditation system, which they have supported, operators tend to focus on *safety processes* at least as much as they do on *safety technologies.* Fixed-price contracts mean that new technologies will probably need to be good for the operator's bottom-line as well as for safety, if they are to have widespread implementation, until such time as they are embedded in vehicle specifications in service contracts, with associated vehicle ceiling price provisions. Those specifications tend to rely on Australian design Rules, which typically lag Europe by several years. New technologies normally achieve widespread adoption only once they are incorporated in new vehicles.

The more progressive operators tend to buy European standard vehicles ahead of the time that they are mandatory in Australia. Emissions performance is the main reason this is currently happening, some operators buying new Euro 6 vehicles (e.g., Volvo hybrids) at a time when Euro 5 is all that is currently mandated. For safety, after-market safety solutions are increasingly being implemented, with telematics/collision-avoidance/lane departure warning technologies increasingly common. These go beyond current Australian Design Rule requirements, are not required by the safety regulator but are seen by operators as having safety, cost and/or customer benefits. The regulator's position is that it is an operator's duty to decide *how* they will meet their legislative and regulatory obligations with respect to safety and safety risk management – a performance-based approach.

Accreditation is seen by operators as having had a major measurement benefit. *It helps you to know what to check, where and how often*. *It leads to better identification and recording of incidents, which means we are under the*

microscope to take appropriate action. ***More things get measured and dealt with.*** All operators take a strict approach to accident/incident reporting under the accreditation system. This may tend to overstate the significance of incidents, such as accidents, on the Melbourne system, relative to other jurisdictions but bus operators would prefer that this is all out in the open, as encouragement to better performance.

More broadly on the question of fatigue and the role of technology in reducing risk, we note the following argument put by leading fatigue researchers Professor Ann Williamson and Dr Rena Friswell (2018, p. 2), in relation to devices that attempt to detect or warn drivers of fatigue or drowsiness:

> *There is good evidence that drivers are aware of the onset of fatigue and can respond to fatigue well before they become too drowsy to drive safely or fall asleep... These warning devices therefore only tell drivers about their current state when he/she is already aware. No-one falls asleep without knowing they are tired and therefore are at risk of falling asleep. The challenge is to get drivers to respond to these experiences of fatigue early enough, which these devices do not do. They activate late in the development of fatigue, often too late for the driver to find an appropriate place to stop.*

This argument was put in evidence submitted to the recent NSW Staysafe Committee *Inquiry into heavy vehicle safety and use of technology to improve road safety*. While it was primarily addressing truck driver fatigue, the argument also seems relevant to route buses. It suggests that technological devices whose purpose is more intended to warn of driving performance effects of fatigue, such as collision avoidance and lane departure warning devices, are more likely to be effective at enhancing road safety, reflected in the reality that such devices tend to be the moist widely implemented devices for warning drivers of the effects of fatigue on driver performance (Williamson and Friswell 2018).

Williamson and Friswell (2018 p. 3) further argue that:

> *The emphasis of all these technologies is on detecting fatigue when it occurs (treating the symptom) rather than managing work to make it less likely fatigue will occur (preventing the disease).*

An accreditation system based on safety risk management, operating within a chain of responsibility framework, is one way to approach treating the disease, supported by the most fit-for-purpose technologies. In the Australian context, Australian Design Rules provide the starting point. Telematics, collision prevention and lane departure warning technologies seem to be well placed to go beyond what is required (in the Melbourne setting) by the ADRs, looking cost-effective for operators and supportive of better safety and customer experience outcomes. While these systems are operator-owned in service, some of their outputs could, in theory, be used by the safety regulator for monitoring and compliance purposes. This is not a discussion that has been had at this time.

6. Conclusions

Evidence suggests that route bus operation in Melbourne is safe, a position that is agreed by the transport safety regulator (Transport Safety Victoria), the state government public transport system management authority/contracts manager (Public Transport Victoria) and the bus industry.

The industry argues that it has always had a strong safety focus and culture, with family-based businesses having a long-standing presence in their operating regions an important reason for this prioritization. These businesses identify with their staff, customers and communities and tend to treat potential safety risks to staff, customers and others the same way they would to similar risks to family members and other loved ones. The industry association, BusVic, has long supported operators in these endeavours, including working with its members to identify industry-wide changes that would support safety outcomes (e.g., responding to driver abuse and assaults).

The dominance of negotiated performance-based contracts, rather than competitive tendering, for the right to operate Melbourne route-bus services, seems likely to support this safety focus. Operators with negotiated contracts are less likely, in the author's view, to cut costs to sustain profitability, which is an inherent risk with competitively tendered (CT) contracts. The example noted in Section 2.5, about the poor condition of a number of buses used in the 30% or so of Melbourne's route bus service that is competitively tendered (since rectified), is consistent with this position. Setting specific minimum safety performance requirements in contracts may be one way to remove this inherent safety risk in CT contracts.

In the last decade or so, bus operator accreditation, with associated chain of responsibility provisions from National Heavy Vehicle Road Law, has more firmly embedded safety culture and safety risk management practices within the DNA of Melbourne route bus operations and also in the practices of the associated regulators and contract managers (because of chain of responsibility). This is being partly driven by both the national road transport reform agenda but also by state and industry priorities.

Route bus safety in Melbourne is primarily about safety risk management culture and practice. Assistive technologies are seen as enabling devices. Evidence is playing an increasingly important role in identifying those circumstances that most need attention in terms of improving safety outcomes. The current program of installing driver security screens is one example and responding to the problem of increasing slips, trips and falls by older customers is another, with driver assistance technologies likely to be a useful part of the response. Accident/incident reporting, however, needs to be improved to provide a more complete data base for analysis. This is receiving attention.

Australian new vehicle standards tend to lag Europe by a few years, partly because authorities see smaller benefits from some of those standards in low

density/low traffic volume Australian settings than in Europe. However, in terms of safety innovations, the dominance of European chassis suppliers in the Australian market means that European standard vehicles often arrive ahead of the date they are mandated in Australia. After-market safety solutions provide opportunities for safety improvement and are increasingly being adopted by route bus operators. Telematics linked to collision-avoidance/lane departure warning technologies seem to be the most common area of voluntary uptake in route bus operation, expected to result in safety enhancement, lower operator costs and an improved customer travel experience. Such ADAS tools are likely to roll out quickly as manufacturers embed them in new vehicles, in response to European (or US) standards. Australia lags in application times in this area, which needs attention, but after-market solutions help fill the gap.

Safety duties of accredited operators and bus safety workers form a key regulatory foundation for route bus safety. The primary safety duty is an obligation to eliminate or minimise potential harm or loss (risk) by doing all that is reasonably practicable to ensure safety. The safety regulator does not tell the operator how they should meet their safety duties but seeks to promote the development of a safety culture that will help to ensure they do so, in the way that best suits their business, staff and customer needs, recognizing the extent of the chain of responsibility (bus safety workers).

Fatigue is not currently seen as a major safety problem in route bus operation, by the safety regulator, government route bus contract manager or operators but is seen as an area requiring constant vigilance. It is seen to be well handled through scheduling and rostering, mainly using industry-standard software. The regulatory requirements, as outlined in Table 3.1, are somewhat complex but specialist scheduling/rostering consultants can support those operators who do not have the in-house expertise to confidently undertake this task. However, fatigue management is recognized as being a difficult process and may not emerge as a problem until *after* an accident occurs. This is also, in part because fatigue monitoring and compliance checking tends to fall between agencies. This needs attention locally and is expected to be settled with the National Heavy Vehicle Regulator taking a stronger role.

The public transport system manager/route bus contract manager, Public Transport Victoria, sees safety as a very high priority but does not include specific safety KPIs in route bus contracts. It relies on the bus operator accreditation system to deliver a safe system. It does, however, work with the bus industry to identify industry-wide enhancements that support safety outcomes, as with the recent introduction of driver security screens.

Driver monitoring devices are becoming increasingly common at operator level (not required by the safety regulator), for safety, cost and customer satisfaction reasons. Driver training is operator-based and, judged by safety outcomes, is working well. However, the author had a sense that there could be some benefit in industry-level production of best practice driver training materials, including ways of dealing with abuse/assault and other instances of poor customer behaviour, to ensure that all operators are at a high level and can remain so, in the face of increasing concerns about such matters.

Appendix 1, which summarizes some findings from a recent European evaluation of possible future technological inclusions for bus (and other vehicles), suggests that European route bus operation might expect to see the following safety initiatives being introduced in coming years:

- Alcohol Interlock Devices
- Drowsiness and Attention Detector Recognition
- Emergency Stop Signal
- Intelligent Speed Assistance
- Direct Vision and Vulnerable Road User Detection (pedestrians and cyclists).

This is a pointer to where other jurisdictions might need to be thinking.

In terms of the Stage 2 work under this engagement, a few things about the Melbourne safety approach that this Stage 1 report has encouraged the author to be looking for in Hong Kong's approach will be:

1. whether there is anything similar to bus operator accreditation and, if so, how it works and its effectiveness, relative to Melbourne's system
2. whether chain of responsibility is an active concept in the route bus legal, regulatory, franchise setting in Hong Kong and, if so, whether it seems likely to be as extensive in its reach as that which covers Melbourne's route bus operation
3. the contractual/franchise environment and whether this seems likely to be supportive of route bus safety. This will include, for example, consideration of the incentives for safe operation in a competitively tendered setting, compared to those in a negotiated performance-based contract, and role of safety KPIs in contracts/franchise agreements, and
4. the timeliness of formally mandating particular safety features, following European or US standards, and extent to which operators proactively implement technological measures ahead of the times they are mandated.

The Stage 2 report will not be limited to these points but they seem likely to be very significant areas for focus.

Appendix 1: Some notes on European directions in bus safety

AEB (Autonomous Emergency Braking for vehicle), ESC (Electronic Stability Control) and LDW (Lane Departure Warning) have been mandatory for buses in the EU for a few years and are dispersing through the fleet. LDW systems warn the driver when the vehicle unintentionally leaves its lane but they do not bring the vehicle back to the lane.

A 2016 European Commission Staff Working Document, *Saving Lives: Boosting Car Safety in the EU* (EC 2016), looked at additional opportunities for requiring additional advanced vehicle safety features, including for buses. That report notes 55 possible measures that had been identified by a preceding Transport Research Laboratory Report, which EC (2016) then reduced to 19 measures for assessment as part of the review of the General Safety and Pedestrian Safety Regulations.
In terms of buses, EC (2016) supports:

- Intelligent Speed Adaptation, using GPS-based systems. The three main forms of ISA are:
    - Advisory, which alerts the driver when their speed is too great
    - Voluntary, where the driver chooses whether the system can restrict their vehicle speed and/or the speed it is restricted to
    - Mandatory, where the driver's speed selection is physically limited by the ISA system.

  Mandatory systems were noted as having the potential to have 30% accident savings and this approach is proposed for buses (from 1/9/2020 form new types and 1/9/22022 for all new vehicles)
- Lane Keeping Assistance – helps the driver to stay in their lane. Mainly for use over 65kph. Can only be corrective if lane marking is approached gradually. Does not sound like they are proposing it for bus but a bit confusing, given the later approach to bundling.
- Driver Drowsiness or Distraction Monitoring – too early to be mandated. Fatigue is noted as being a factor in 20% of accidents
- Front end design and direct vision – especially side vision for pedestrians and cyclists. Proposed to be mandatory.

Bundling of technologies was proposed, with system sharing between driver distraction and drowsiness, AEB and Land Keeping Assistance
A subsequent 2017 study by experts from the Transport Research Laboratory (Seidl et al. 2017) looked at 24 candidate measures in some detail, of which 10 were proposed for bus and coach. This report classifies measures according to whether they are:

- Driver Assistance – (permanent/on-going collision mitigation)
- Active Safety – (mitigation immediately pre-collision)
- Passive Safety – (protection during collision).

The bus and coach measures examined for possible introduction post September 2020 were as follows:

Driver Assistance (with comments re bus and coach)

Alcohol Interlock Installation Document (ALC)

Good evidence base. Proposed for all M vehicles. After-market solutions available. Getting more difficult to fit to new vehicles. Low cost.

Bus Fire Safety – Automatic Fire Extinguishers (BFS-AFS)

For engine compartment. Proposed to be mandatory for M2 and M3.Commercially available. Poor evidence base. Suggests 0.5-1.0% of EU buses burn annually and 60% of fires originate in the engine compartment. 60% of Swedish buses were equipped in 2012.

Bus Fire Safety – CNG Pressure Relief (BFS-CNG)

CNG fires can lead to jet flames. Poor evidence base.

Drowsiness and Distraction Recognition (DDR)

Proposed to be mandatory for all M. Quote "Systems that operate far in advance of collisions (distraction prevention measures such as phone blocking systems and distraction recognition measures such as distraction warning systems) are preferred to systems that present warnings regarding impending collisions; however, the latter technologies are more mature, and have greater supporting evidence for effectiveness (despite not being solely focussed on distraction), making them a better short term alternative for policy focus" . Perhaps introduce attention monitoring first and advanced distraction monitoring later. Overlaps with driver assistance cluster and with a range of technologies in terms of benefits. Low cost but contested by OEMs.

Intelligent Speed Assistance (ISA)

3 types: Advisory (alert the driver when their speed > speed limit); Voluntary (the driver chooses whether the system can restrict their vehicle speed and/or the speed it is restricted to); Mandatory (the driver's speed selection is physically limited by the ISA system). Proposed to be mandatory for all vehicle types but not suggesting which of the 3 approaches should be mandatory. Higher intrusiveness likely to be more effective but less acceptable. Systems could be based on maps of speed limits with GPS positioning of the vehicle or traffic sign recognition. TfL will implement for all London buses (~9000) in next few years. A study suggests that Voluntary ISA (mandated) could reduce all road accidents in the EU: by 25% (fatals); 18% (serious injury); or 11% (a;; injury severities combined). Camera based systems can share technology with: AEB, LKA, AEB-PCD.

Tyre Pressure Monitoring Systems (TPM)

Seat Belt Reminders (SBR)

Active Safety

Emergency Stop Signal (ESS)

Proposed to be mandatory for all M. Flashing frequency to mitigate risk of seizures. Activated automatically when vehicle speed >50km/r and the braking system is providing the emergency braking logic signal.

Reversing Detection or Camera System (REV)

Proposed to be mandatory for all M2 and M3. No real discussion of buses and coaches – mainly truck.

Direct Vision and Vulnerable Road User Detection (VIS)

A 2018 EC study then evaluated a range of measures that came from these earlier studies (Seidl et al. 2018),taking the opportunity to bunch measures to improve cost-effectiveness. Bus and coach measures evaluated were: ALC (Alcohol interlock installation document); DDR-DAD (Drowsiness and attention detector); DDR-ADR (Advanced distraction recognition, recognizing the distinction between the 2 stages of DDR noted in Seidl et al. 2017); ESS; ISA-VOL (Voluntary ISA – can be over-ridden by driver and switched off for the rest of the journey); REV (reversing camera system); TPM (tyre pressure monitoring); VIS-DET (Front and side vulnerable road user detection and warning – no braking); VIS-DIV (Minimum direct vision requirement – best in class approach. These measures were grouped into 3 policy option bundles:
PO1 = ALC; ESS.
PO2 = PO1 plus DDR-DAD; ISA-VOL; VIS-DET; VIS-DIV**
PO3 = PO2 plus DDR-ADR*; REV: TPM; VIS-DIV**.
Notes: Starting date new approved types 1/9/2021; 1/9/2023 all new vehicles; except for * = 2023/2025; ** = 2025 and no mandatory introduction for new vehicles.

The evaluation of these packages produced the results for buses and coaches set out in Table A.1.

Table A.1: Assessment results for bus and coach measures from Seidl. M. et al. (2018)

Indicator	**Policy Option 1**	**Policy Option 2**	**Policy Option 3**
Initial cost per vehicle	E6	E607	E970
Benefit-cost ratio	4.64	3.11	2.11
PV of cost	E2.4m	E262.0m	E444.5m
PV of benefits	E11.2m	E813.7m	E937.0m
Fatal casualties prevented	2	207	227
Serious casualties prevented	33	2064	2410
Slight casualties prevented	113	6421	8174

Source: From Seidl, M., et al. (2018) Tables 6, 7, 8, 13 and 33.

While PO1 has the highest benefit-cost ratio, it only includes 2 measures and it achieves little in terms of safety improvement (at low cost). PO2 produces much better safety benefits and a benefit-cost ratio of over 3. Using the data in this table, the implicit marginal benefit/cost ratio of going from PO1 to PO2 is 3.09, which is a strong result and almost the same as the total benefit/cost ratio for PO2 (because Po12 costs so little and does so little).

Conversely, the implicit marginal benefit/cost ratio of going from PO2 to PO3 is only 0.56. This marginal analysis suggests that the best package is PO2. PO3 adds 70% to the PV of costs but only 15.2% to the PV of benefits. So far as buses and coaches are concerned, therefore, the total BCR of 2.11 is somewhat misleading for this option, a point Seidl et al. (2018) seem to have missed. If implementation for buses and coaches could be separated off from that for other vehicle types, then PO2 seems the way to go.

PO2 includes ALC, DDR-DAD, ESS, ISA-VOL, VIS-DET and, later, VIS-DIV. It does not include TPM, REV or DDR-ADR.

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Hong Kong Franchise Bus Safety Framework: Including Comparisons with Melbourne Arrangements

Second report prepared by Stanley & Co Pty Ltd for the Independent Review Committee on Hong Kong's Franchised Bus Services

August 2018.

Contents

1. Context

This Part 2 report has been prepared for the Independent Review Committee on Hong Kong's Franchised Bus Services ('the Committee'). It follows up a Part 1 report prepared for the Committee by the author on *Some Safety Aspects of Melbourne's Route Buses* (Stanley & Co 2018). The purpose of the 2 reports, as set out in an emailed letter from Wilkinson and Grist dated 18 May, is:

a) to describe the operations and management of the bus system in Melbourne, together with the regulatory and governance arrangements, in particular with regard to the monitoring of bus safety

b) having been provided with such information about the franchised bus services of Hong Kong, ... and having regard to the bus system in Melbourne, give an opinion of the adequacy of the regulatory and monitoring systems in Hong Kong, making recommendations as to any changes to those systems as, in your opinion, are warranted to enhance the safety of the franchised bus system in Hong Kong

c) if asked, to give evidence in Hong Kong to support the opinions set out in your report.

The Melbourne report dealt with part (a) of these tasks. This report deals with part (b), making frequent comparisons with the Melbourne situation throughout. A further email from Wilkinson and Grist, dated 1 June 2018, requested that the response to part (b) include a review of a set of documents prepared by the Transport Department and Transport and Housing Bureau of Hong Kong, these documents being the respective submissions, and annexes thereto, by the two organizations to the Committee. The content of those documents forms most of the basis for this report.

In preparing this report, and the first report, the author has focussed on his area of primary expertise, which relates to public policy, particularly transport policy and the societal contribution of urban bus. The author is not an expert in bus operation but has expertise in matters to do with the institutional environment within which bus operates and how this can impact performance. The report thus avoids detailed critique of matters like Bus Captain training and technological innovation but does include discussion of how such matters can be treated within the broader institutional setting. If there are particular matters of detail that the Committee wishes to explore in greater detail, that can be done in subsequent evidence or follow-up submission.

Section 2 of this report summarises the author's understanding of the scale of Hong Kong's Franchised Bus Services (FBS) and the transport task they perform. It also presents some safety outcome data for those services. Some comparison with Melbourne/Victorian data from the first report is included, by way of setting a context for what follows. Section 3 outlines our understanding of the main governance arrangements that relate to FBS operation in Hong Kong, with a focus on safety. It compares these governance arrangements with those that apply in Melbourne and identifies the major points of difference. The discussion includes consideration of safety incentives in Hong Kong

franchises and compares these to incentives in Melbourne's route bus contracts, the discussion encompassing the use of competitive tendering, as compared to negotiated performance-based contracts, as alternative ways to allocate the rights to provide a public transport (bus) service. Section 4 focuses on governmental and operator goals for route bus service provision and how incentives and penalties can help government achieve its goals from such services, comparing Hong Kong and Melbourne arrangements. Section 5 includes discussion of two matters that have not been sufficiently picked up in the preceding sections, particularly working/driving/rest hours and new technologies to improve bus safety. Section 6 includes discussion of the key matters considered in this review and sets out the report's main conclusions. Sections 2 to 5 also include conclusions.

2. Hong Kong's Franchised Bus Services: Role and safety outcomes.

2.1 Franchised Bus Service transport task within the Hong Kong public transport system

It is fair to say that Hong Kong's public transport (PT) system is the envy of many other jurisdictions, for reasons such as its commercial outcome and high PT mode share. The Hong Kong *Public Transport Strategy Study – July 2017* (THB 2017) describes the roles performed by each public transport (PT) mode within the public transport system and the passenger tasks involved. It notes that the PT system caters for 12 million passenger trips daily, of which franchised bus (FB) services carry just over 4 million (33% of the PT task in terms of journeys). With a population of around 7.5 million, this suggests about 1.6 daily PT journeys per capita in Hong Kong, a very strong figure[1], with the franchised buses accounting for over 0.5 daily trips per capita. The Strategy notes that the FB fleet is around 5,000 vehicles operating over 580 routes and that the task performed by FBs has been stable over the past decade.

The Strategy points out that the FBs perform the trunk bus role, with public light buses (PLB) both feeding FB routes and providing service in areas with low demand (THB 2017). The public light bus task, however, is less than half that performed by the FBs, in terms of passengers carried (1.8m trips/day, compared to 4.1m). Non-franchised buses (NFB) help to relieve demand for FB services and PLB fixed route services when these are not cost-effective. The mode share of NFBs is less than 2% in terms of trips made. The FB/PLB bus travel market distinction is similar to Melbourne's differentiation between trunk services and local services.

Priorities identified for FBs in the *Public Transport Strategy Study* are as follows (THB 2017 p. 9):

(a) improving operational efficiency continuously;
(b) upgrading ancillary services for passengers;
(c) leveraging on distinctive edges to provide more diversified services;
(d) ensuring that the fare adjustment arrangement is up-to-date; and
(e) offering more fare concessions.

Safety is not mentioned here. This comment applies more broadly to the Strategy, which says in Chapter 2 that it (THB 2017, p.3):

> *... conducts a systematic review on the respective roles and positioning of public transport services other than heavy rail. It also looks into some important topical issues of the public transport sectors in detail. The objectives are to enhance the complementarity amongst the various public transport services with a view to ensuring that the public can enjoy efficient services with reasonable modal choices on*

[1] Total trips are typically 3-4 per day per capita.

the one hand, and the public transport operators can enjoy long-term sustainability on the other.

The important topical issues do not include safety. The Strategy's focus is clearly where it says: on better services to customers (but without any mention of customer safety as a priority) and operator commercial viability. These two priorities are also common for Melbourne but Melbourne has a more explicit focus on safety, emphasised by the existence of bus operator accreditation and Transport Safety Victoria, an entity that was discussed in the first report and is considered again in Section 6.2 of the current report.

The Strategy's discussion on route rationalization to improve operational efficiency of the FB system is good and reflects the way most PT authorities approach their task, Melbourne included, as is the consideration of how Green Mini Buses and non-franchised buses might be used to improve local services. Services of this nature are a challenge for all public transport authorities, especially so in low density settings such as Melbourne. Environmental improvement and use of technology are then considered in Chapter 12, but the focus of these sections is not about safety/health so much as cost and customer information respectively.

The commercial focus of the Hong Kong Strategy is emphasized in Paragraph 13.2 which notes two key factors for the success of Hong Kong's well-developed public transport system, the first being (THB 2017, p. 66):

> *... the highly cost-effective, efficient and reliable public transport services of Hong Kong are attributable to the fact that they have been operating on a commercial basis, essentially without any direct subsidy from the Government*

The Hong Kong focus on operator (commercial) sustainability is an important feature that is considered in more detail in Section 4.2.

Chapter 13 highlights again that the PTSS is about providing well-developed PT services that are highly efficient, comprehensive in coverage, diversified, convenient, environmentally friendly and available for all. This is in line with what most urban PT authorities and their authorizing governments would expect, but safety would also be a normal inclusion.

2.2 FBS safety indicators

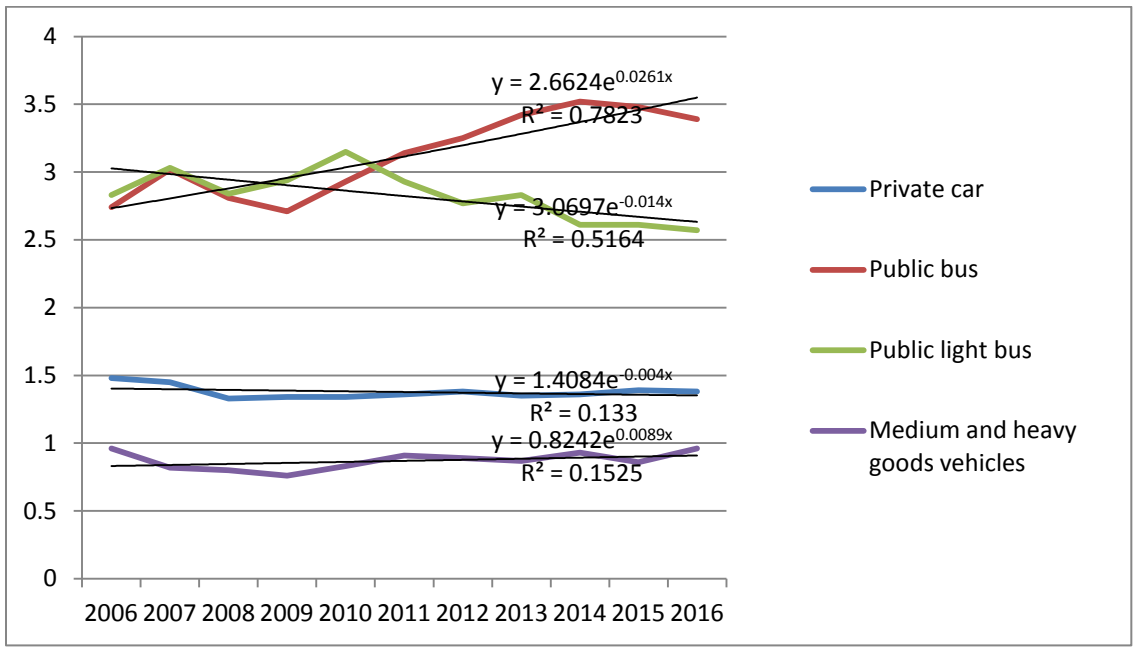
2.2.1 Non-fatal accident involvements

Given the purpose of the Committee's investigation, some assessment of FB safety outcomes is important. The Transport Department publishes data on motor vehicle involvement in accidents, and related matters, the availability of which is a positive comment on the data collection side of monitoring. Figure 2.1 shows data on **motor vehicle involvement rates**, where the definitions associated with the data source suggest that this indicates *vehicles whose drivers or passengers are injured, which hit a pedestrian or another vehicle whose driver or passenger are injured, or which contribute to the accident*. By

implication, this need not involve a collision and may include, for example, bus passengers being injured from falling over, as is a concern in Melbourne (slips, trips and falls). Unfortunately, however, this data is not comparable to any of the accident data presented for Melbourne in the first report; Melbourne's route bus safety data availability is not as good as that for Hong Kong.

Figure 2.1 suggests that public buses, which include both franchised and non-franchised buses, have a considerably higher involvement rate than private cars and medium/heavy goods vehicles, based on outcomes over 2006-16. Their involvement rate at 2016, for example, was over twice that for private cars and over three times that for medium and heavy goods vehicles. However, once passenger boarding rates are taken into account, compared to car and truck occupancy rates, public buses would be much safer than both cars and goods vehicles, on this indicator. The involvement rate of public buses was lower than for public light buses until 2010 but has been higher since.

Figure 2.1: Motor vehicle involvement rates by selected class of motor vehicles in Hong Kong, per million vehicle kilometres (2006-16)

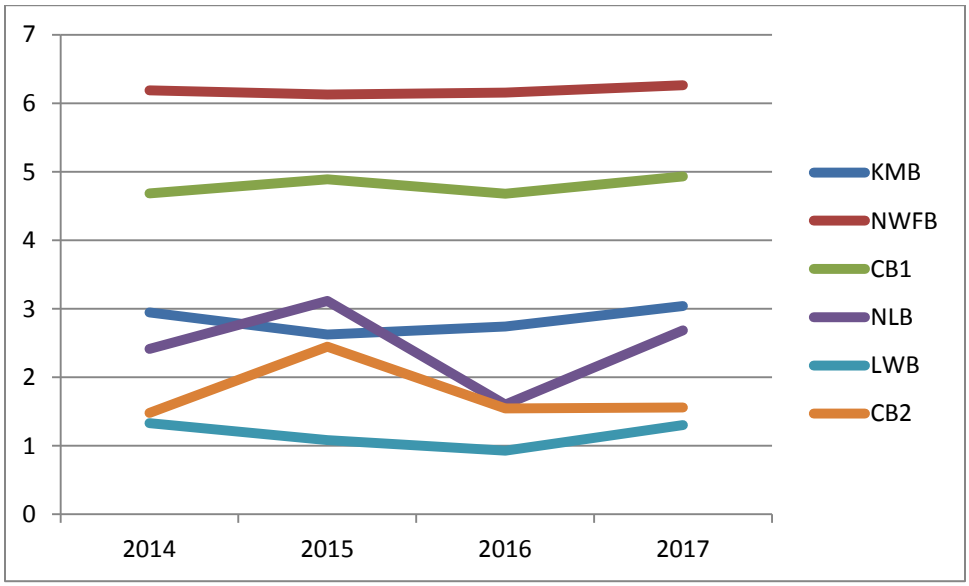


Source: http://www.td.gov.hk/en/road_safety/road_traffic_accident_statistics/2016/index.html. Group III - Vehicle Involvement and Driver Statistics. Figure 3.1 Motor vehicle involvements and involvement rates by selected class of motor vehicle (2006-2016). Viewed 9thJuly, 2018.

Figure 2.1 further suggests that, whereas involvement rates *declined* for public light buses (at an average annual rate of 1.4%, as shown by the co-efficient value of -0.014 in the equation for Public Bus in Figure 2.1) and for private cars over the period (at 0.4% p.a.), they *increased* slowly for medium and heavy goods vehicles (at 0.9% p.a.) and more quickly for public buses (at 2.6% p.a.).

Figure 2.2 uses data from the Annexes to the Transport Department Submission, at pages 1665-6, to show Franchised Bus involvement rates from 2014 to 2017, which should form part of the Public Bus component for the 2014-16 period shown within Figure 2.1. The 2014-16 period shown in Figure 2.1 was a period during which the Public Bus involvement rate fell and Figure 2.2 shows that the involvement rate was lower in 2016 than in 2014 for 5 of the 6 franchises. In 2017, however, all 6 franchises had higher involvements than in 2016 and 5/6 were higher than in 2014, which raises questions about what happened in 2017 to cause these involvement rates to increase. The author is not able to comment on this matter, which should be put to the Transport Department and franchisees for answer.

Figure 2.2: Accident involvements among Franchised Bus Operators, 2014-17.



Source: Annexes to the Transport Department Submission (pp., 1665-6), *Traffic Accident Situation Report*, prepared for the Road Safety Council 9 March 2018.

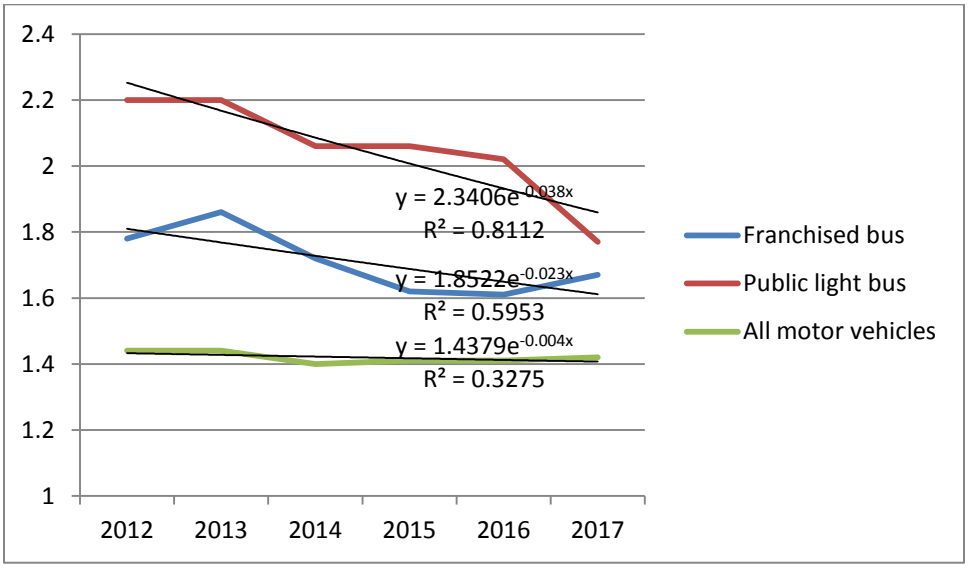
Using the data from Figure 2.2, over 2014-17, the average involvement rate for FBs was 3.205 involvements/mvkms. Figure 2.2 shows that two franchises had involvement rates well below this average level, these being CityBus2 (which averaged 1.758 over the four year period) and LWB (the lowest at 1.162). NWFB's involvement rate, however, was about twice the average for all 6 franchises for the period, CityBus 1 was well above average and KMB about 10% below the average rate over the period.

The Annex document from which this data was derived, which was a paper entitled *Traffic Accident Situation Report*, prepared for the Road Safety Council 9 March 2018, provided no commentary or explanation as to why the involvement rates over the four year period across the franchises might vary by a factor of over 5 from lowest to highest, or why two franchises delivered so much better results than the rest. The author does not know enough about the relative operating environments of the different franchises to comment on the disparity but it is surprising that there was no such commentary in the Annex paper about possible reasons for the variations, what could be done to reduce them and what

light they shed on the provision of a *proper and efficient* franchise bus service, the key legislative requirement for having a franchise (as discussed in Section 3 below). Such commentary may have been provided elsewhere but the author could not find any such discussion.

Figure 2.2 is about total FB involvements. Data included at page 1443 of the Annexes to the Transport Department's Submission to the Committee shows FB involvement in **collision accidents**, which (Confidential) Paper 9 of the TD Submission (at page 110 of that Submission) suggests account for between 35 and 41% of the total of collision and non-collision accidents. Figure 2.3 shows collision involvement rates for Franchised Buses below those for Public Light Buses but both being higher than the rate for all motor vehicles. It implies collision involvement rates for Franchise Buses declining at 2.3% p.a., on average, over the 2012-17 period, at 3.8% p.a. for Public Light Buses and very slightly for all motor vehicles (-0.4% p.a. on average). This faster rate of decline for PLBs than for FBs may simply be because PLBs are starting from a higher rate, which may make reductions easier to achieve. However, the relative directions in 2017, where PLBs declined sharply from 2016 but FB's increased, needs to be assessed. The author is not in a position to comment on this matter. As noted for total involvements, these data would show FB is safer than car if passenger loadings were included.

Figure 2.3: Involvement rates in collision type accidents in Hong Kong, per million vehicle kilometres (2012-17*)



Note: 2017 figures are provisional.
Source: From data set out on page 1443 of the Annexes to the Transport Department Submission to the Committee.

As noted above, non-collision accidents are more frequent than collision accidents. Our calculations suggest that non-collision accidents for FBs increased at an annual average rate of 1.4% over 2012-17. This quite possibly reflects the Melbourne pattern of an increasing frequency of slips, trips and falls.

In summary, then, it appears that the overall collision involvement rate of Franchised Buses is reducing and is a little better than that for Public Light Buses but FB non-collision accidents are becoming more frequent and there are large differences between some FB operators in terms of their involvement rates, which deserves assessment, in the context of the Transport Department assessing proper and efficient service provision by franchisees. For example, is the operating environment of some franchises more likely to have slips, trips and falls and, if so, what can be done to tackle this matter?

The Annexes to the Transport Department Submission, at page 1444, set out useful details of driver contributory factors in 2017 bus collision type accidents. The data in that document is noted as not being public so is not repeated in detail here. However, we do note that:

- driving inattentively, the single largest contributory factor noted, accounted for the same proportion of collision type accidents for Franchised Buses as for other motor vehicles (at one in five)
- overall, driver contribution to collision type accidents was substantially lower for FBs than for other motor vehicle collisions, in relative terms (43.2% compared to 52.2%)
- driving inattentively accounted for almost half the total proportion of collision type accidents where FB bus driver contribution was recorded and
- there was no single contributory factor listed where FB bus driver contribution was noticeably higher than for other vehicle drivers.

These numbers highlight the importance of driver attention to the driving task, including for FB drivers. While this factor may not account for a larger proportion of FB collisions than for collisions involving drivers of other vehicle types, bus passenger loadings suggest that the *consequences* of a bad bus collision could be far more serious than for other vehicles, even though buses overall will be far safer than cars per *passenger kilometre travelled*. The data draws attention to the importance of finding possible ways of reducing FB driver distraction, through appropriate assistive technologies and training. The Bus Safety sections of the five year Forward Planning Programs (FPPs) prepared by FB operators set out a range of measures operators are using to tackle these problems. These FPPs are considered further in Section 2.2.3 below. The data also suggests that, by and large, FB bus drivers do a pretty good job, compared to other drivers.

This latter opinion is more broadly supported by customer satisfaction survey results and customer complaints. For example, data from three FB operators included in the Annexes to the TD Submission (pp. 152 and 254) show 87.7-92.5% satisfied with driver performance. The number of complaints received by the Transport Complaints Unit was around 4 complaints per million FB passenger journeys in both 2015 and 2016, of which improper driving behaviour accounted for only 19% in 2016 (Annex to the TD Submission, p. 306).[2] Passenger complaints to the Public Transport Ombudsman Victoria about route bus operations in Melbourne vary annually but are typically around 2 to 3.5 per million

[2] Conduct and performance of (unspecified) staff accounted for a further 23%.

passenger journeys, a little less than the Hong Kong rate but with a higher proportion of these complaints staff related in Melbourne (PTOV 2017).

2.2.2 Fatalities

Fatalities are the most concerning type of road accident, in terms of personal and societal consequences. Data on **fatalities** associated with Franchise Bus operations from 2012 to March 2018 is set out in the Transport Department Submission Annexes at page 1457-1468 and the number of fatal accidents involving FBs, from 2012 to 2017, is summarised in tabular format on page 110 of the TD Submission. In some of these cases, the cause of the fatality was not attributed to the bus but a bus was involved. The number of fatalities sometimes exceeds the number of fatal accidents (i.e., when more than one person is killed in a fatal accident).

The fatalities data from the Submission Annexes suggests that 73 people were killed associated with FB operation between 2012 and March 2018 (Table 2.1), an annual average rate of 11.7. If March Qtr 2018 is ignored as an outlier, there were 53 fatalities between 2012 and 2017 inclusive, an average rate of 8.8 per annum. It is noteworthy that two-thirds of the bus-related fatalities over the 2012-17 period were pedestrians (35/53), underlining the importance of a focus on what is happening *around the bus* in the structuring of safety initiatives. In addition, two cyclist fatalities were recorded over the period. Technologies that enhance driver awareness of the environment (pedestrians and cyclists) around the bus and/or assist in vehicle braking in the event of a potential (pedestrian) accident are thus important candidates for consideration in terms of safety benefits but with associated potential risks of increased injuries to bus passengers from more slips, trips and falls, from faster/unexpected braking/manoeuvring needing to be taken into account in exploring such opportunities.

Table 2.1: Fatality rates per million vehicle kilometres of Franchised Bus service

Year	Fatalities	Distance travelled (million vehicle kilometres)	Fatality rate/mvkm
2012	10	?	?
2013	10	?	?
2014	3	446.35	0.0067
2015	12	445.28	0.0269
2016	9	447.12	0.0201
2017	9	448.34	0.0201
2018 (March Qtr)	20	?	?
Average p.a. 2014-17	8.25	446.77	0.0185

Sources: See Appendix 1 for data on vehicle kilometres of service. Fatality data is taken from Annexes to the Transport Department Submission pages 1457-1468.

This fatal accident data is used here because of the significance of fatalities and also because it permits some comparisons with Melbourne route bus performance. The first report for this brief (Section 2.4.1) suggested around 2 fatalities annually were associated with Melbourne route bus operation, within the State average for all buses of 3.5 fatalities per annum in the 8 years to 2016. Given that the Melbourne route bus service involves around 120 mvkms annually, this is a fatality rate of 0.016/mvkms.

Data was assembled, with assistance from Wilkinson and Grist, on vehicle kilometres of service provided by FBs, based on submissions made by the FB operators to the Committee. This data is included in Table 2.1. It should be noted that the data for Citybus Limited, New World First Bus Services Limited and New Lantao Bus Company (1973) Limited are for financial years, whereas that for Kowloon Motor Bus Company Limited and Long Win Bus Company Limited are for calendar years. This makes little difference because the total numbers of vehicle kilometres of bus service is stable across the four years for which data is available for all companies, as shown in Table 2.1 (where it averages 446.8mvkms).

Taking the four years for which data is available for both number of fatalities and distance travelled, an average annual fatality rate of 0.0185/mvkms results. This is 15.6% higher than the Melbourne rate of 0.016/mvkms but is also based on more precise fatality data than the Melbourne rate (for which credit is due to Transport Department monitoring). The difference is not substantial but, had Hong Kong achieved the same rate as Melbourne, there would have been a reduction in the average annual fatality rate over those four years in Hong Kong from 8.25 to 7.

As noted, the distance travelled by FBs is stable across the four years for which data is shown, such that a typical annual rate of 446m can reasonably be assumed for those years for which data is not shown in Table 2.1 (2012 and 2013). If one quarter of this rate is assumed for March Quarter 2018, the estimated fatality rate for 2012-March Qtr 2018 increases to 0.026 per mvkm. This is considerably higher (by 0.01) than the Melbourne rate, mainly due to the inclusion of the 2018 data. However, the Hong Kong rate would still have increased to 0.020/mvkm if the March Qtr 2018 had been excluded as an outlier.[3] If March Qtr 2018 is ignored as an outlier, the Hong Kong results imply an additional 1.8 fatalities a year than would have been expected if the estimated (and less reliable) Melbourne fatality rate had applied, for the Hong Kong distance travelled. If March Qtr 2018 is included, the Hong Kong results imply an additional 4.5 fatalities a year than had the Melbourne rate applied, for the same distance travelled.

Comparison with Melbourne thus suggests there may be room for improvement in the Hong Kong FB fatality result but it is acknowledged that the Hong Kong data is better than that for Melbourne on route bus fatalities, which suggests caution in drawing conclusions about differences, and operating circumstances between the two jurisdictions will be different, reinforcing the case for caution.

[3] 0.020 is the implicit fatality rate/mvkm for 2012-17 on the stated assumptions about vkms for 2012-13.

2.2.3 Forward Planning Program accident discussions

The five year Forward Planning Program documents prepared by FB operators contain some very useful analysis and discussion of safety outcomes and safety initiatives. The assessments, for example, of correlations between accident rates and factors such as Bus Captain age, Bus Captain years of experience, hours worked, route experience of Bus Captains, and such like are very useful. Different operators have different experience but two points stood out to the author:

- while not the case for all operators, there was a broad tendency for accident rates to decline with driver age, which also tends to correlate with increased years of experience. Companies were aware of this and had implemented monitoring and training programs to tackle it
- the accident rate seems to increase somewhat in the 6-8 hours working range, although some FB operators appeared to miss this apparent pattern in their data analysis. This possible correlation needs closer examination to test its validity and, if confirmed, reasons for its occurrence should be investigated and possible remedies explored.

The operator analyses of accident frequencies by type of accident, as set out in their FPPs, highlight the importance of passenger falls within the total accident mix, as is the case in Melbourne. Vehicle braking is noted as being a factor in many such events in Hong Kong. The installation of double hand rails, passenger awareness materials, driver training programs and use of real time driving indicators, plus speed limiters set at 70kph have been parts of the response.

Pedestrian accidents are not a high frequency accident type in the FPP analyses but the discussion of pedestrian fatalities earlier in this section of this report suggests their consequences are far more significant than their frequency implies and they deserve a major focus.

The safety analyses also highlight two accident types where vehicle collisions are involved: head-on/head to tail and vehicle changing lane. This draws attention to the potential value of ADAS technologies that detect the possibility of such accidents and warn the driver. Some technologies go further than this and apply some avoidance measures, e.g., if the driver does not respond (e.g. braking, lane keeping). In this regard, the Working Group on Enhancement of Safety of Franchise Bus, set up by the Transport Department following the10th February Tai Po Road fatal accident and involving all FB operators plus major bus manufacturers, has recommended the trialling of collision alert and lane keeping devices in FBs to assess their applicability and effectiveness (Transport Department 2018b). The wording suggests *lane keeping devices*, rather than *lane departure warning devices*. As reported in our first report, Melbourne Bus operators suggested lane keeping technologies are mainly for operation at higher speeds than route buses usually achieve. Lane Departure Warning devices were, however, seen as useful by the Melbourne operators and have been mandatory for buses in the EU for a few years (see Appendix 1 to our first report). CDC, the Melbourne operator noted for the quality of its fleet presented for annual vehicle

inspections, has installed the Mobileye system for collision prevention and lane departure warning on all its Melbourne route buses, having also introduced the system in its international home base (Singapore). The Hong Kong trial should consider including both the warning devices and more active systems. They should be helpful for pedestrian/cyclist accidents and other collisions.

The Forward Planning Program documents are understood to be confidential documents, as between the relevant FB operators and the Transport Department. The author believes that the data and analysis they contain is an important part of the process of an operator demonstrating their capacity to operate a *proper and efficient* service. The fatalities associated with these services are largely pedestrian fatalities, making them a significant *societal or external cost* of service operation. It is argued in Section 4 of this report that franchised/contracted route bus operators need to be subject to performance pressure to help ensure they provide a proper and efficient service. Being publicly accountable for their safety performance would help to sustain performance pressure. There are solid arguments favouring publication of the Bus Safety chapter of the FPPs, because of the wider societal costs of accidents.

2.2.4 Vehicle defects

The Transport Department Submission (page 92) suggests that TD annual vehicle inspections found an average of 0 to 0.08 safety-related defects per franchise bus inspected over the 2012-16 years, this data being at operator level. However, in the spot checks undertaken by the Transport Department, as reported in the Annexes to the TD Submission between pages 806 and 960, the defects per vehicle checked ranged between 0.49 and 1.3, which is much higher than the rate reported from annual inspections. This suggests, not surprisingly, that vehicles are presented in good order for their annual inspections but their condition is not so good between such checks. The spot checks, and the annual number undertaken in Hong Kong (14/day), seems a good way to ensure operators remain focussed on vehicle condition between annual inspections, since there is a fair probability of a vehicle being spot checked over the course of a year or two. The implications of the difference between the defect rates of FB buses at annual inspection and in spot checks needs to be examined to see if there are safety consequences (e.g., What are the sources of variation? Are they safety-critical?).

By way of comparison, our first report for this brief noted a total of 1892 defects identified by Victoria's largest bus inspector, Road Safety Inspections, over 5,500 buses inspected (not all route buses), or about one defect per three buses. There is no Melbourne equivalent to the Hong Kong spot check (although there are in-depot checks done on some route buses in response to reports about the condition of a particular operator's vehicles). The Hong Kong figures from the annual inspections thus sound very good, compared to the Melbourne annual inspection results, suggesting very good vehicle condition and/or a much easier definition of a safety defect than is used in Melbourne. The spot check results are poorer than the Melbourne annual inspection results, which is not unexpected.

The vehicle inspection forms included in the Annexes to the TD Submission, at pages 1425-1428, suggest that about 65 items are checked in the TD Hong Kong annual bus inspection. The equivalent test form in Melbourne includes over 120 items, suggesting a more comprehensive test. However, it may be that the Hong Kong test includes multiple items under some particular line items listed in the inspection, so it is premature to conclude anything about scope of the tests from simply comparing the forms.

Discussion with the Manager of the Melbourne inspection company, Road Safety Inspections, suggested that, of the 1892 defects RSI identified in the 12 month testing period, only 10-15 would be considered really serious safety-related defects (steering, brakes). That would be an average rate of 0.002-0.003, which is very low and lower than the Hong Kong defect rate in inspections. However, on the basis of the defect data available for this paper, it is not possible to make any definitive statements about the *relative condition* of the two vehicle fleets, since those results do not include sufficient information about the nature of the annual testing process and there is no Melbourne equivalent to the Hong Kong spot checks. The Hong Kong defect rate at annual inspection, however, does look good.

A further indicator of bus condition is provided by data that shows the average kilometres an FB operator's buses travel before they experience a breakdown on the road, while passengers are on-board, and the average number of trips operated before a bus has one mechanical breakdown, again while passengers are on board. The first indicator is called 'mechanical reliability' and the second is 'average trips per breakdown' in Hong Kong bus parlance.

Data for most operators on one or other, or both, of these indicators is available in the Annexes to the TD submission and the relevant figures are included in Appendix 2 to this report. Both indicators suggest the Kowloon Motor Bus Company performs relatively well. New Lantao Bus Company rates highly on mechanical reliability but the author could not find average trips per breakdown for NLBC. Long Win Bus Company has the lowest number of average trips/breakdown for those five companies for which this indicator was found but it is less than 10% below two of the others. It also has the lowest ranking on mechanical reliability of the three for which data was found. The author has no basis for understanding the numbers involved but LWBC could be asked to explain these relatively low ratings. Are they due to some extent to its operating environment relative to others? Conversely, however, in terms of accident involvements, this company had the lowest rate in Figure 2.2.

2.3 Conclusions from the data analysis

This section of the report has found the following:

- it appears that the overall collision involvement rate of Franchised Buses is reducing and is a little better than that for Public Light Buses
- FB non-collision accidents are becoming more frequent and there are large differences between some FB operators in terms of their involvement rates, which

deserves assessment in the context of the Transport Department assessing proper and efficient service provision by franchisees

- there are solid arguments favouring publication of the Bus Safety chapter of the five year Forward Planning Programs, because of the wider societal costs of accidents
- by and large, FB bus drivers do a pretty good job, compared to other drivers, in terms of safety outcomes
- the bus accident rate seems to increase somewhat in the 6-8 hours working range, which needs explanation
- data draws attention to the importance of finding possible ways of reducing FB driver distraction, through appropriate assistive technologies and training
- comparison with Melbourne suggests there may be room for improvement in the Hong Kong FB fatality result
- two-thirds of FB-related fatalities over the 2012-17 period were pedestrians (35/53), underlining the importance of a focus on what is happening *around the bus* in the structuring of safety initiatives
- operator analyses of accident frequencies by type of accident, as set out in their FPPs, highlight the importance of passenger falls within the total accident mix and of identifying ways to tackle this problem area and
- the implications of the difference between the defect rates of FB buses at annual inspection and in spot checks needs to be examined to see if there are safety consequences.

3. Governance

3.1 Main agencies and roles

This section of the report looks at governance arrangements, with a focus on comparing arrangements in Hong Kong with those in Melbourne. Following the work of van de Velde (1999), organizational arrangements in public transport service provision are frequently categorized as being primarily concerned with *Strategic* (or policy), *Tactical* (or system design) and *Operational* (or delivery) level matters. This structure describes role arrangements in Hong Kong very neatly.

An Annex to the Transport and Housing Bureau Submission of 24th April to the Committee provides an overview of agency roles and responsibilities, pointing out that (THB 2018, p. 8):[4]

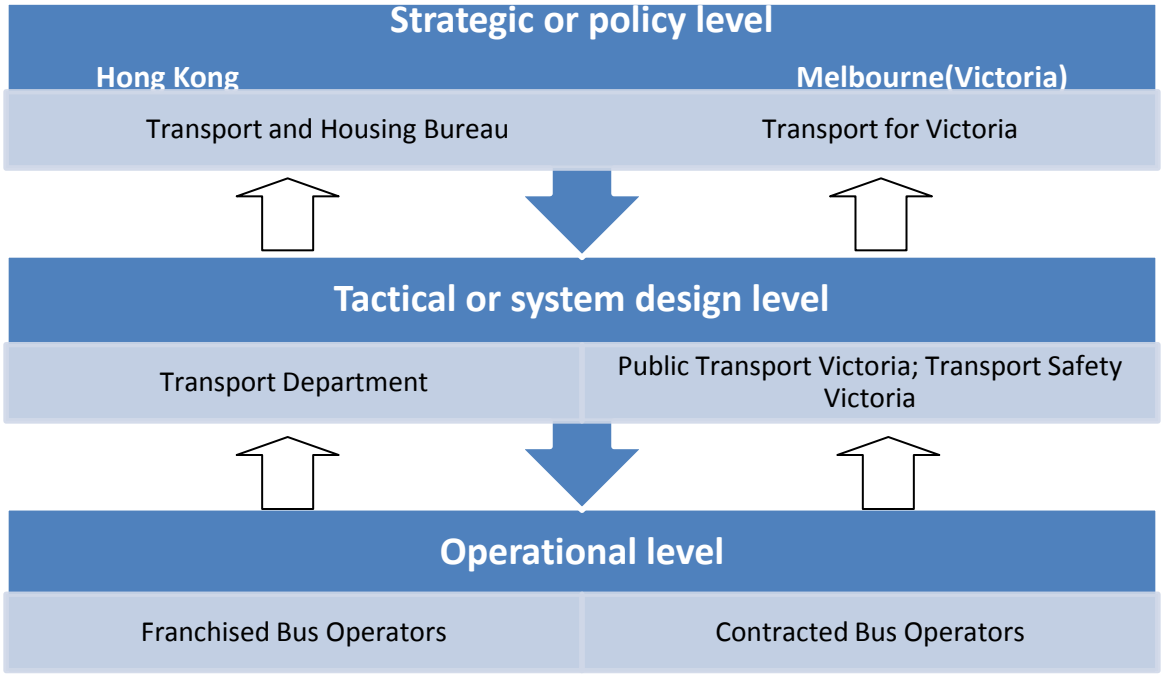
> *In relation to franchised bus service, the THB [Transport and Housing Bureau] is responsible for the formulation and coordination of policy and legislation concerning the provision of franchised bus services in Hong Kong, whereas the Transport Department is the regulator of franchised bus service, responsible for formulating and introducing measures to implement the policy concerning the provision of franchised bus services, as well as monitoring the day-to-day operation of the franchised bus services.*

THB thus performs the Strategic (S) or policy role, the TD undertakes the Tactical (T) role and franchised bus operators provide the Operational (O) or delivery role. This parallels the Melbourne arrangement, where Transport for Victoria undertakes the Strategic role and the Public Transport Development Authority (Public Transport Victoria) has responsibility for the Tactical level. As shown in Figure 3.1, however, a notable difference between arrangements in the two jurisdictions is that Melbourne also has a separate independent Safety Regulator operating at the Tactical level. Transport Safety Victoria was first established under the State's Transport Integration Act 2010, as discussed in Section 3.3.1 of the first report under this brief, a role that has no equivalent independent safety entity in Hong Kong. The TD monitors safety performance of FB operators and is involved in promoting safety initiatives. However, the absence of an independent safety regulator in Hong Kong seems likely to lessen the relative focus on safety matters.

Figure 3.1 shows arrows going both down and up between the respective layers, to indicate an interactive process between the agencies involved, and with service providers, is recognized as important in both jurisdictions. THB (2018) points out that, in the policy formulation process, stakeholder participation and discussion is important, extending well beyond the agencies and bus operators shown in Figure 3.1. It specifically mentions engagement with the Transport Advisory Committee and the Panel for Transport of the Legislative Council.

[4] In this paper, I have decided to cite references by the page number in the relevant submission, rather than the page number of the particular document within the submission, for ease of identification and recovery.

Figure 3.1: Key roles in route bus policy, planning and service delivery in Hong Kong and Melbourne



Source: Author.

Agency roles are framed by the goals or objectives of the government they serve. In terms of overall policy for provision of franchised bus services in Hong Kong, THB emphasizes the government's policy objectives as follows (THB 2018 p. 9):

> *Ensuring the provision of safe, efficient, reliable and environmentally-friendly public transport services to meet the community needs has always been one of the key transport policy objectives of the government.*

Also, the language of a *proper and efficient* franchised bus service continually crops up in the THB and TD submissions as a policy objective (e.g., in TD 2018a, pp. 72-5).

THB's submission goes on to re-iterate the point made in the *Public Transport Strategy Study* that (THB 2018, p. 10):

> *... public transport services should be run under the Government's regulatory framework by the private sector in accordance with prudent commercial principles to increase operating efficiency.*

The Submission notes that Hong Kong is one of few jurisdictions internationally where franchised bus services provided by private operators are not directly subsidized by government (an outcome that most other jurisdictions would love to achieve!).

3.2 Main legislation

The key legislation governing operation of Hong Kong's franchised route buses is the Public Bus Services Ordinance (Chapter 230) and the associated Public Bus Services Regulation (Chapter 230A). The Road Traffic Ordinance (Chapter 374), Road Traffic (Construction and Maintenance of Vehicles) Regulations (Chapter 374A), Road Traffic (Driving Licences) Regulations (Chapter 374B) and Road Traffic (Safety Equipment) Regulations (Chapter 374F) are also relevant to Franchised Bus safety, mainly in terms of vehicle standards, both new and in-service, and maintenance or driver requirements.

Matters such as vehicle standards and vehicle maintenance are similar to the Melbourne setting, since both jurisdictions tend to rely on EC standards and manufacturer guidelines. For example, the Transport Department Submission (p. 81) notes that about 99% of Licensed FBs in Hong Kong have been designed and built by European bus manufacturers.Timing of adoption of European standards may differ between the two jurisdictions but these are second order issues in the scheme of things. Because of this commonality, this report focuses mainly on matters other than vehicles, apart from some discussion in Section 5.3.

Working/Rest Hours are not a matter for regulation in Hong Kong but are handled through *Guidelines*. In Australia, however, they are subject to a regulation (the Heavy Vehicles (Fatigue Management) National Regulations 2013), reinforced through Chain of Responsibility provisions, which extend the ambit of those likely to be investigated in the event of an accident that is associated with a breach of working/driving/rest provisions. The author believes that the Melbourne legislative approach will elevate the significance of safety as a policy and planning issue in bus service provision beyond what will flow from Guidelines that lack such underpinning. This is a matter to which we return in Section 5.1.

In terms of comparisons between Hong Kong and Melbourne, where the Melbourne legislative framework was discussed in our first report, the most striking legislative differences are seen to be:

1. Melbourne's requirement that bus operators be accredited before they can hold a route service contract - no such requirement exists in Hong Kong
2. the inclusion of safety duties in the Melbourne legislation - no such inclusion exists in Hong Kong legislation
3. the extension of those safety duties in the Melbourne legislation to people in the chain of responsibility and
4. the establishment of an independent transport safety regulator/auditor in Victoria, to administer the safety of transport systems, including Melbourne's route bus services.

We return to these differences in Section 6. It is noted here, however, that while FB operator accreditation is not required in Hong Kong, the description of processes used by Kowloon Motor Bus Company to run its business, as elaborated in various Annexes to the Transport Department Submission, suggest that this operator adopts similar practices as

are required under Melbourne bus operator accreditation. For example, KMB reports that it has gained OHSAS 18001 certification from the Hong Kong Quality Assurance Agency, noting that it is the first FB operator to achieve such certification.[5] The author has not seen accounts of other Hong Kong FB operators going this far.

3.3 The Franchises

3.3.1 Method of allocating the rights for service provision

The umbrella legislation for operation of Hong Kong's Franchised Bus services is the Public Bus Services Ordinance (Cap. 230). PART II (4) (1) says that *A public bus service shall not be operated except under a franchise granted under this Ordinance or another document.* Section (5)(2) indicates that *A franchise may confer on the grantee the exclusive right to operate a service on any route* and (5)(3)(a) says that a franchise *may be granted following a public tender or in such other manner as the Chief Executive in Council thinks fit*.

THB (2018, p. 7) indicates that the Bureau *oversees the granting of a new franchise for a bus operator* and that *TD is the chief negotiator with the bus operators to ensure that the services to be provided by the bus operator are operationally feasible and financially sound*. The TD Submission to the Committee suggests that tendering is not the norm (TD 2018a, pp. 72-3):

> *Normally, an incumbent grantee may indicate interest in applying for a new franchise upon the expiry of its existing one. According to the established practice, an incumbent grantee that has proven to be capable of providing a proper and efficient service and is willing to further invest in franchised bus operation may be granted a new franchise for a period not exceeding 10 years under sections 5 and 6(1) of the [Public Services Bus] Ordinance commencing upon the expiry of its existing franchise.*

Later in the Transport Department's Paper 6, it notes that four tenders have been conducted since 1975, all between April 1991 and February 1998, but none since 1998. By implication, then, Hong Kong's franchised bus system today effectively allocates the rights to provide services by negotiation, which is how about two-thirds of the Melbourne route bus system allocates service rights. This is a notable similarity in manner of operation.

However, Melbourne also tenders about one-third of its route bus services, which adds an element of performance pressure to the whole route bus system, both tendered and negotiated. The tendering element has the effect of creating a lingering concern among incumbent operators with negotiated contracts that their services are not guaranteed: there is always a risk that their services *might* be tendered if they do not perform. The absence of tendering in Hong Kong for the last two decades suggests that this risk is likely to be lower in Hong Kong than in Melbourne.

In terms of the way franchised route service rights are allocated, we conclude that Hong Kong and Melbourne both place high reliance on negotiating with incumbent operators, who can expect a roll-over if they can demonstrate good performance, but Melbourne also

[5] Annexes to the TD Submission p. 843.

uses competitive tendering, which seems likely to also increase performance pressure on operators who hold negotiated contracts. This particular source of performance pressure may not be present to the same extent in Hong Kong.

The Transport Department Submission Paper 6 (TD 2018a) outlines the process that is used to consider franchise extensions. In summary, this involves new franchises (new networks or new providers on an existing network) being for 5-6 years, so operator performance can be appraised, before consideration is given to a longer contract being granted. The *proper and efficient public bus service* and *willingness to invest in their franchised operations* tests are applied and may result in a subsequent 10 year franchise.

Existing franchises are also subject to these two tests before being granted a new franchise. TD (2018) sets out the criteria the Department uses to judge whether a public bus service is *proper and efficient* (TD 2018a, pp. 74-5):

> *To assess whether an existing franchised bus operator is providing proper and efficient public bus services, the Transport Department ("TD") will take into account the findings of the regular review of its performance through the passenger satisfaction surveys, site visits, vehicle inspections, examination of regular returns and feedbacks (sic) from the public.*

The TD submission then elaborates on the major matters it takes into account in deciding whether an operator has provided a proper and efficient public bus service, listing the following service and safety matters:

- trend and changes of patronage, and efforts made for enhancing operational and network efficiency
- number of service improvement measures and service rationalisation measures
- lost trip rate and, if it is high, the improvement measures taken
- complaints per million passengers carried received by the Transport Complaints Unit, relative to the industry average
- vehicle accessibility and environmental performance, and some particular aspects related thereto
- bus accident rate per mvkm, compared to the industry average.

These are the kinds of performance indicators that should be expected but, given the focus on *efficient service*, it is surprising that cost per service hour and/or per service kilometre and cost per passenger carried are not explicitly mentioned, benchmarked against industry norms. This may be done but it is not stated as such. Such benchmarking would normally be done in terms of the most appropriate cost drivers, encompassing cost categories that are (for example)

- mainly service hour related (e.g. drivers' pay)
- mainly distance related (e.g. fuel costs, maintenance) and
- fleet size related (e.g. depot costs).

Any such analysis needs to take account of the operating environment (e.g., operating speeds, terrain, road condition), fleet age and particular service innovations, since such things will affect operating costs and may be, to varying extents, beyond the control of the operator. Melbourne uses cost benchmarking to assess what might be called *efficient costs*, which form a key input into negotiations about operator remuneration in the negotiated contracting regime. This is a notable difference between the two operating environments. The discussion in the Transport Department Submission does not suggest that any such operator comparative cost benchmarking forms part of the franchise renewal process. Section 4.3 below sets out a preliminary assessment of relative cost performance of the FB operators, to make the case that a more exhaustive cost efficiency benchmarking analysis should be undertaken as normal part of FB operator monitoring, to assist government to form a view on whether operators are providing a proper and efficient FB service.

3.3.2 Scope of the franchise document, including safety monitoring

The individual Hong Kong franchise agreements have the benefit of being relatively short in length, compared to Melbourne's route bus contracts. For example, the Citybus Franchise is 30 pages long, including 2 pages of definitions and 5 pages in two Schedules at the end. Of the 23 pages between, 10 are concerned with financial/commercial provisions (PART III: FINANCIAL), the remaining pages being concerned with various aspects of service delivery, including safety, customer information, passenger liaison groups, passenger satisfaction surveys, establishing a control centre and contingency planning.

In contrast, Melbourne's new route bus contract is 165 pages long, comprising about 100 pages in the body of the contract, followed by 10 schedules. There are also 6 separate (additional length) Annexes. The major components of the Melbourne contracts that are particularly safety-relevant but are not apparent to the same extent in the Hong Kong franchise are:

- a default and cure regime, step-in arrangements for an operator breach and termination arrangements, which account for 18 pages of the contract. Loss of accreditation is an immediate termination event under the contract. The focus on these elements in the contract sends a strong message to operators that their services are not assured *throughout the contract period* unless they perform
- performance monitoring, which is only one page in the new Melbourne contract but is linked with a 13 page Schedule (Schedule 4: Performance Monitoring Regime). The Performance Monitoring Regime consists of three components: the Patronage Incentive Regime (**PIR**); the Operational Performance Regime (**OPR**); and the Passenger Experience Regime (**PER**). The PER requires further development but the PIR and OPR are operative, albeit with only a relatively small part of the total contract payment at risk or with a small upside opportunity (a few percent). On-time/early running is the focus of the OPR.

The Melbourne contract also refers to Flexible Performance Measures, which will be selected during the course of the contract and failure against 2 of 3 of these measures in a two year period would constitute a non-compliance event under the contract and trigger

the provisions in the first dot point above. Safety could become one such measure but this is still for decision.

Safety is not an explicit part of the Melbourne Performance Monitoring Regime for route bus contracts but the requirement to continue holding operator accreditation during the course of the contract makes safety a continuing focus. Similarly in Hong Kong, there are no specific KPIs included in the Franchise Agreement but Hong Kong also lacks a safety provision such as operator accreditation, which could lead to loss of a franchise (with the on-going presence of an independent safety auditor). Also the Hong Kong Franchise document is distinctly more provider-friendly than the Melbourne contract, which has a substantial focus on what may happen to an operator who breaches a condition of the contract.

Schedule II of the Hong Kong Citybus Limited Franchise, as an example of a franchise document, is titled *Information and Records Relating to the Bus Service to be Kept and Provided by the Grantee under Clause 28(1).* This monitoring information is of interest as a possible place where safety data may be identified, that might have some parallels to the requirements of the Management Information System or Maintenance Management System under Melbourne's operator accreditation arrangements. Some 16 specific items are listed under this Schedule, covering the following matters:

- the first three ((a) to (c)) focus on various aspects of passenger boardings/alightings and vehicle occupancy levels, by particular reporting periods, and these should connect to item (o), which requires reporting of daily passenger receipts by route
- item (d) focuses on buses in use under the franchise and their carrying capacities
- (e) to (g) are concerned with aspects of route journey times, daily scheduled and actual departure times and daily scheduled/actual journeys operated
- services not operated and reasons why (h)
- carrying capacities/vehicle specifications and buses and other vehicles by type in use and on order, for each calendar month (items (i) and (j))
- journeys and total kms travelled, classified as revenue generating or not (k)
- importantly, item (l) requires reporting of drivers scheduled on all routes and, from a sampling process, the percentage who are in compliance with working/rest hours *Guideline* provisions
- (m) requires reporting of driver numbers required and available to operate all specified routes, identifying any surplus or shortage
- item (p) is about the bus maintenance schedules and (q) about maintenance schedules of other vehicles plus an inventory of stores and
- driver turnover, in terms of resignations, retirements, separations, new recruitments and re-employments is item (N).

This is a comprehensive listing, with a major focus on various operational aspects of service provision and passenger boardings. In terms of safety, the working/rest hours item (l) is really the only relevant one among this list. Driver numbers and shortage information may also have safety implications but this is most likely to have its effect through drivers

working longer hours, which is item (l). This should be picked up by the sampling process if it leads to exceeding working hour guidelines or falling short on rest, neither of which should really be allowed by the scheduling/rostering systems which operators would use. Maintenance schedules should be expected to meet manufacturer guideline requirements and meet annual testing expectations. Schedule II of the Franchise thus appears relatively soft on safety. This same conclusion would apply with respect to the specific reporting requirements in Melbourne route bus contracts. Safety-related matters are absent, for example, in Melbourne's Performance Monitoring Regime. Melbourne, however, has detailed and extensive expectations under its accreditation regime in both the Management Information System and Maintenance Management System requirements that relate to safety risk management matters, which do not appear to have any parallel in Hong Kong's franchises or legislation.

A paper on Hong Kong's Road Safety Management System (TD 2018c) provides further details on safety matters monitored with respect to FB operation. TD (2018c, p. 1649) notes that the TD

> *... keeps monitoring the accident trend, statistics and cases [and that it] conducts systematic review and analysis of the statistics including their trend, severity, collision types, vehicle types involved, and the contributory factors, with a view to examining if there are any distinct accident patterns and identifying common factors contributing to the accidents so that corresponding standards and measures can be formulated in order to reduce and prevent the happening of traffic accidents.*

Relevant statistics are reported to the Road Safety Council. Based on the author's examination of some Hong Kong FB accident data, as outlined in Section 2 of the current report, in comparison to data that is available from Transport Safety Victoria, this process of data assembly in Hong Kong seems to be good practice but the monitoring in question could involve a more analytical approach to differences between FB operators in performance, as was discussed in section 2 of the current paper. This may in fact be undertaken but is not evident from the material inspected by the author in preparing this paper.

The requirement that FB operators provide a *proper and efficient service* is fundamental to the operation of the franchise system in Hong Kong. The TD paper on the Road Safety Management System (TD 2018c) says that there are two key safety-related indicators that are part of its annual assessment of whether an FB operator has been providing a proper and efficient service: (1) safety-related defects per bus examination; and (2) number of buses involved in accidents per million vehicle kilometres. These seem to be reasonable high-level safety performance indicators, with the adjustment for scale of task in the second measure appropriate.

TD (2018b, pp. 1654-55)) goes on to say that *the nature of accidents is analysed and the measures to enhance safety of bus operations taken by the FB operators are reviewed.* This sounds similar to the way Transport Safety Victoria operates, although TSV also conducts bus operator safety audits, as part of the operator accreditation program, which (so far as

the author can tell) has no parallel in Hong Kong (unless an audit is triggered by a reported concern or accident, which is after the event, unlike the on-going TSV safety audits).

TD (2018c) further notes that, since January 2018, FB operators have been asked to provide monthly reports on matters that include (TD 2018c. p. 1655):

> *(a) the results of random check [sic] on the operational data recorded in black boxes and corresponding follow-up actions; (b) the records of on-board monitoring by plain-clothed staff and the corresponding follow-up actions; (c) the records of bus captains traffic offences and the corresponding follow-up actions; and (d) the records of breath tests conducted on bus drivers and the corresponding follow-up actions.*

In Melbourne, this is the kind of data that an operator would be expected to collect, hold and analyse, inter alia, as part of their Management Information System but there is no reporting requirement as such in Melbourne.

Finally, TD (2018b) refers to ISO 39001 – Road Traffic Safety Management System, pointing out that this has been adopted by some fleet management companies and logistics companies but is not commonly adopted by the Transport Authority. It is noted in the first report on the current project that Victoria's operator accreditation system mirrors ISO 39001, and all route bus operators must achieve accreditation, but does not involve formal certification under that standard.

3.3.3 Bus Captain training

Training is an important input in preparation for task performance for all people in the bus industry. It is a particularly important matter for bus drivers (Bus Captains), because of the potential consequences of accidents. In evidence given to the Committee (Transcript Day 1; 7 May 2018, p.107), the Commissioner for Transport said: *... training is not a requirement that flows from the franchise or that flows from the ordinance.* This is in contrast to the Melbourne route bus contract, which includes specific requirements for driver training. In particular, Clause 21.1 in the Melbourne contract reads as follows:

> ***21.1 All Staff***
>
> *(a) The Operator must, and must ensure that the Associated Operators, ensure that all Staff are properly trained, experienced and otherwise fit and proper, in relation to the duties to be performed by them as part of the Operator's performance of its obligations under this document.*
> *(b) The Operator must use its best endeavours to ensure that all Staff comply with applicable Laws and are properly Authorised and Accredited.*
> *(c) The Operator must ensure that all Staff are provided with training in accordance with Best Industry Practice including in the following areas:*
> *(i) with regard to service requirements of passengers with disabilities;*
> *(ii) with regard to the management of confrontational or difficult passengers and personal safety;*
> *(iii) with regard to occupational health and safety issues; and*

(iv) with regard to passenger service standards and requirements.

(d) The Operator must ensure that all Staff meet the service requirements of passengers with disabilities, in a manner consistent with their training and the requirements of the Disability Discrimination Act and the Transport Disability Standards.

(e) If the Operator becomes aware that any member of Staff is not fit and proper for any of the reasons referred to in clauses 21.1(a) to (c), the Operator must take appropriate action to ensure that its ability to perform its obligations under this document is not at risk in any material way.

In terms of occupational health and safety issues, for example, operators would include some training in fatigue management for bus drivers. Nationally available support materials have been around since 2007 to assist in this regard, in the form of *Guidelines for managing heavy vehicle driver fatigue* (NTC 2007). A route bus operator's Management Information System, as required under operator accreditation, would then be expected to indicate that training that has been provided and note its scope. The inclusion of the training requirement in the contract, together with safety duties, chain of responsibility provisions and operator accreditation provides several safety layers behind the bus service.

3.4 Conclusions on governance

In terms of governance comparisons between Hong Kong and Melbourne, the most striking legislative differences are seen to be:

1. Melbourne's requirement that bus operators be accredited before they can hold a route service contract - no such requirement exists in Hong Kong
2. the inclusion of safety duties in the Melbourne legislation - no such inclusion exists in Hong Kong legislation
3. the extension of those safety duties in the Melbourne legislation to people in the chain of responsibility
4. the establishment of an independent transport safety regulator/auditor in Victoria, to administer the safety of transport systems, including Melbourne's route bus services and
5. the inclusion of specific contractual obligations regarding training in the Melbourne contract.

We conclude that both Hong Kong and Melbourne treat safety as an important policy requirement for their route bus services but neither gives the matter great emphasis in their respective route service franchise/contract documents, including with respect to performance incentives or penalties. However, Melbourne's training requirements are an important safety inclusion in the route service contract, without parallel in Hong Kong. Also, Melbourne's legal framework includes the key requirement that a contracted operator must be accredited before they can hold a route service contract and this brings into play the associated safety duties and expectations, beyond what exists in Hong Kong, including chain of responsibility provisions. Melbourne then has expectations under its accreditation

regime, in terms of both Management Information System requirements and Maintenance Management System requirements about safety risk management matters, which do not appear to have any parallel in Hong Kong's legislation or franchises, backed in Melbourne (Victoria) by an independent transport safety auditor. The safety of the Hong Kong FB system is highly likely to be enhanced if these Melbourne measures were adopted.

4. Incentives, penalties and performance pressure

4.1 Scope

This report has considered some of the conditions that govern the operation of Hong Kong's FB system and included some comparisons with Melbourne arrangements. This section considers some of the various incentives and penalties that appear likely to be active influencers of bus operator behaviour, relative to the goals government might be seeking from operator service provision, particularly with respect to safety. It thus considers likely governmental and operator goals for service provision and ways of aligning these. This necessarily involves generalizations but this does not diminish the value of the exercise in terms of seeking to highlight some possible areas for attention, with respect to improving safety outcomes.

4.2 Government and operator goals from route bus service provision

Governments in settings like Hong Kong and Melbourne typically have a number of common goals from their route bus (public transport) services. These are typically elaborated in sources such as public transport strategies, the legal framework for service provision, policy statements and such like. Government goals typically include:

1. **good customer service levels**, both for the direct benefits this creates for users but also for the wider societal benefits it generates. The very high mode share achieved by public transport in Hong Kong suggests that user benefits realization is high. The relevant wider societal benefits from public transport services are mainly increased agglomeration economies (higher urban productivity from greater clustering, facilitated by PT services), lower road congestion costs, cleaner air, lower greenhouse gas emissions, a lower road toll and greater social inclusion of individuals and households in the community.[6] Economists call these 'external benefits'. Franchise/contract KPIs should encourage and reward good customer service levels but penalize poor performance. Melbourne's route bus contracts set clear, but limited, parameters around these matters but customer (or other party) safety is not one of the incentive/penalty elements in the Melbourne route bus contract performance-related KPIs. Hong Kong franchises do not include specific incentive/penalty provisions but there is an operator incentive to good customer service performance implicitly embedded through the commercial remuneration arrangements, which see the operator retain profit increases subject to a capped rate of 9.7% return on assets, beyond which they are shared with passengers through fare discounts
2. **efficient service provision**. *Proper and efficient* service provision is central to the granting and extension of a franchise for route bus service in Hong Kong, under the PBSO (Cap. 230, e.g., Section 6(3) (b)). Some jurisdictions use competitive tendering as a means to pursue efficient cost levels but this does carry a potential risk of an

[6] Targeted fare concessions are commonly used to support the inclusion goal, with the Annexes to the THB Submission indicating at page 270 that there are 2.24 million monthly beneficiaries under the Fare Subsidy Scheme.

operator under-bidding to win the contract, particularly when there are multiple bidders, then cutting costs to support returns, often subsequently seeking a favourable re-negotiation of remuneration levels from government. Deferred maintenance spending, for example, might result from this set of circumstances, with attendant safety risks. Melbourne PT has experience of such outcomes. These risks can be handled in ways outlined in the following point. Some jurisdictions that allocate the rights to service provision by negotiation, rather than competitive tendering, benchmark operators to form judgements about efficient cost levels and use the results of this benchmarking in setting contract remuneration levels. This is the Melbourne practice, as outlined in Section 3.3.1 above. In terms of service efficiency, it is surprising to the author that cost/vehicle km, cost/vehicle hr and cost per passenger km do not appear to be routinely measured and reported by TD as performance indicators, with costs disaggregated by major cost type within this analysis into (for example) costs that are mainly distance dependent, costs that are mainly time dependent and costs that are vehicle dependent. Section 4.3 sets out some relevant data in this regard, gleaned from the Annexes to the TD Submission

3. **safe services**, for bus (public transport) users and other road users. Vehicle inspections, suitable working/driving/rest hour provisions, driver training and safety KPIs in franchise agreements/contracts, for example, can help to reduce safety risks, as can (more powerfully in the author's opinion) the creation of safety duties, chain of responsibility provisions and the associated requirement for operator accreditation, as used in Melbourne. The legal consequences of negligent behaviour or of behaviour that does not actively seek to identify and mitigate safety risks should be a powerful incentive to operator performance with respect to safety
4. **environmentally clean services**. This is a matter of increasing concern in high-density urban settings, where there is growing recognition of the health impacts of NO_X and PM emissions from diesel vehicles. Requiring operators to source buses that meet modern EURO emission standards is the usual response by government, with Hong Kong and Melbourne both currently having EURO V requirements but with increasing numbers of EURO VI vehicles in place and Hong Kong requiring all new buses to meet EURO VI from October 2018 (Annexes to the TD Submission, p. 309)
5. **commercially viable operators**. If an operator becomes commercially unviable, this is usually disruptive in terms of continuity of service provision, a result that no government wants to see (it is also a safety risk). Setting franchise/contract terms and conditions in a way that supports continuity of commercially viable service operation but not excessive profits, in return for good service delivery (including safe services), should represent a service sweet spot for government. The Hong Kong profit cap arrangement is useful in this regard, provided there is sufficient performance incentive in the franchise
6. **minimum call on the public purse**. All governments are strapped for cash and seek to minimise the costs of service provision, which goes to the above points about services being efficient and of good quality for customers. Hong Kong's approach of full commercial viability of FB services is a rarity, supported by flexible fare setting arrangements. Melbourne's route bus services require significant financial support but service benefits are considerably higher than the subsidy cost,

particularly in terms of social inclusion benefits and lower road congestion costs (Stanley and Hensher 2011).

In seeking to achieve these goals from route bus (public transport) service delivery, government needs to be cognizant of the goals that are likely to motivate operators. Operator goals are likely to include:

1. **sufficient freedom to meet customer travel demands.** Private route bus operators understand that their long-term viability depends on providing services that attract a sufficient flow of customers. Good operators should understand their markets better than the government that provides their rights to operate a service and should be responsive to changes in those markets. In both Hong Kong and Melbourne, the respective governments exercise considerable control over service requirements. This control should be such as still provides the operator scope to change service offerings, if better customer servicing (and loadings) would result. Such changes can be by agreement with government but, when franchise agreements require commerciality, as in Hong Kong, or provide a patronage incentive, as in Melbourne, operators need some opportunity to be responsive to their markets to pursue relevant opportunities
2. **a good return on capital invested and effort devoted to the service**. A starting assumption would be that operators would have higher profit aspirations for their shareholders from their franchise/contract than government would prefer and some negotiation will be needed to find an agreed profit rate. Operators can be expected to find ways to reduce costs, since this provides a potential reward for effort by going straight to the bottom line during the course of most franchise agreements/contracts. The Hong Kong profit cap acts as a safety valve here, while also providing some operator incentive for innovation. Safety should not be put at risk by operator cost-minimizing behaviour, which brings in the need for safety incentives and penalties
3. **continuity of service provision**. Operators usually see their business extending beyond their current franchise/contract life and would be expected to seek extensions/rollover at the end of an existing franchise/contract. Hong Kong's 10 year franchises are the right length in the author's opinion and the option of an extension is reasonable practice, provided operator performance is up to expectations. However, there also needs to be performance pressure in the form of a credible threat that poor performance will lead to refusal of an extension and even termination during the course of a franchise, or at least a significant penalty. This suggests that specific on-going performance targets should be embedded in franchise agreements/contracts, with clear consequences (risk/reward). Neither the Hong Kong franchise agreements nor the Melbourne contracts go this far on safety KPIs, although they do include generic show cause provisions, termination arrangements and such like. The Melbourne operator accreditation system, however, provides a mechanism that can be used at any time if warranted by poor safety performance and presumably poor safety performance in Hong Kong could lead to the conclusion that an operator is not providing a *proper and efficient*

service. Neither Hong Kong nor Melbourne has done anything drastic on this front in terms of removing operating rights for a long time

4. **safe operations.** FB operators are highly visible members of their communities and will want to be seen as good corporate citizens and good employers. Safety is usually an important indicator here, both with respect to the safety of route bus services and also employee safety (e.g., driver abuse and assaults). Good operators simply see improving safety as the right way to behave and some indicate in their five year Forward Planning Program 2018-2022 that safety is their highest priority (e.g., KMB and LWBC). Encouraging a focus on safety is the fact that franchise extensions should be easier to achieve for a company that is held in high regard by the community, including having a good safety record. However, safety can sometimes be seen as a business cost that weakens the bottom line, so incentive/penalty mechanisms need to 'encourage' operators to retain a safety focus. Melbourne's safety duties, chain of responsibility and operator accreditation are strong mechanisms in this regard
5. **environmentally responsible.** The various submissions the author has perused in preparing this report leaves an impression that good environmental outcomes may be rated as highly, or more so, than safety in Hong Kong. This may be because safety performance is already seen by many as good, while producing a low environmental footprint is always a challenge in a high density urban setting. Hong Kong and Melbourne seem on a par in terms of the environmental performance of their route bus operations (e.g., EURO V standards are current in both places at present).

Goals thus generally align pretty well between government and operators. Differences will relate not so much to the presence/absence of a particular goal but to the relative emphasis governments and operators might place on particular goal areas. In terms of incentives that are likely to impact behaviour with respect to the main focus of the Committee's investigations, operators can probably be expected to be somewhat more oriented towards profitability than government and government more towards safety than operators (even though, as noted above, some FB operators assert in their Forward Planning Programs that safety is their top priority).

The legal framework and franchise incentives provide mechanisms to achieve the balance that government desires. Operators need to feel a certain amount of performance pressure, particularly when they are essentially operating under a renewable negotiated franchise/contract regime, rather than being exposed to competitive tendering risks. The author supports the negotiated approach to allocating the rights for route service provision, provided this includes a set of mechanisms to ensure that operators are under pressure to perform across a range of outcome areas. This needs opportunities for a bonus for good performance but penalties for poor performance and a plausible risk of loss of franchise/contract in the event of particularly poor performance, definitions of which should be embedded in the franchise agreement or contract, as applicable (see, for example, Stanley (2010) and Hensher and Stanley (2010)).

The discussion at page 153 in the Transport Department Submission about powers to impose sanctions for lost trips reads as rather cumbersome, with little risk to the operator.

The Melbourne approach, and an approach that is widely used internationally, is to include an incentive/penalty clause in relation to cancelled trips and trips run early/late. Hong Kong should consider such incentive/penalty provisions, to increase operator performance pressure.

The discussion on safety of FB operations in Section 2 of this report argued that the very useful Bus Safety section of the FB Forward Planning Program reports should be public documents, because accidents (particularly fatalities) are a significant transport externality. Operators should be publicly accountable for their safety performance and passengers should have the right to know how well their operators are performing in this regard, since they put their lives in the operator's hands each time they use their services. This operator level detail is not published in Melbourne by Transport Safety Victoria but BusVic, the industry association, can see merit in it being available.

Overall, Melbourne's route bus operators seem likely to be under relatively greater performance pressure than Hong Kong's FB operators because of: (1) the ever-present threat of competitive tendering in Melbourne, in the event of unsatisfactory operator performance (remembering that 1/3 of the Melbourne network is currently subject to CT); (2) the inclusion of specific (albeit small) incentive/penalty provisions in contract remuneration arrangements, albeit that these are modest; and, most importantly from a safety perspective, (3) the existence of safety duties, chain of responsibility and operator accreditation in Melbourne. The cost-benchmarking exercise that is part of Melbourne's contract renewal procedure is also a spur to efficient operator performance and should be considered for Hong Kong.

4.3 Efficient operation

Provision of *proper and efficient* service is a key criterion for franchise award and extension in Hong Kong. For someone whose background is in the Australian bus sector and who is familiar with North American data collection, it is usual to see data on operating costs per service kilometre, per service hour and/or per passenger used to shed light on efficiency matters. It is acknowledged that operating circumstances affect outcomes on such indicators but they are a useful basis for discussion about relative operator efficiency. For example in an Australian setting, Professor David Hensher has shown how to adjust unit costs for operating circumstances beyond operator control, including average operating speeds, in-service kms per peak bus and proportion of hours run on weekends and after 7pm (or whenever penalty rates apply) (Hensher 2015).

The author sought out data from the Annexes to the TD Submission to provide indicators of operating efficiency of the FB operators. Appendix 2 sets out the indicators for which data was assembled. The years involved vary between 2016, 2016/17 and 2017 but that is not significant in terms of the broad comparisons that are shown in the table. Operating costs per kilometre by franchise vary between $HK13.63 and $25.70. The author does not know enough about the operating environments of the different companies to critically comment on these numbers but the range is substantial but not necessarily surprising. For example, the author has performance data on a number of Australian, US and Canadian urban route

bus systems and the operating cost/km range is usually a little less than a factor of 2 from lowest to highest in any particular country for urban route bus operations.

Four Hong Kong franchises had operating costs/km figures higher than $HK18/km and two were about $HK4/km lower than this. The two lowest operating costs/km were achieved by LWB and CityBus 2, which also had the highest operating cost per passenger and the highest staff cost per passenger, lowest fuel and oil cost per passenger and lowest boarding rates per kilometre (of 1.12 for CityBus 2 and 1.17 for LWB, whereas the other four operators all exceed 3.1). These operating cost and boarding rate characteristics suggest an operating environment for LWB and CityBus 2 of relatively higher speeds and fewer stops/starts per service kilometre than for the other four operators.

Interestingly, the two lowest unit cost operators also had the newest fleets (youngest average ages of vehicles), which would reduce maintenance costs compared to the other four operators, but the highest defect rates per spot check and lowest numbers of trips per breakdown (of the five for which the latter data could be found). It is to be hoped that the low costs are not in any way associated with short cuts on vehicle condition and safety. If the author's inference of higher average operating speeds for these two operators is correct, then a higher defect rate and more frequent breakdowns is potentially concerning and deserves some consideration from a safety perspective. The accident analysis in Section 2, however, suggested that the two operators with the lowest accident involvements identified in that section are the same two with the lowest unit operating costs, easing safety concerns.

This short cost efficiency overview has identified relatively large differences in indicator performance between some individual FB operators, also noting differences in bus defect rates and average trips per breakdown between operators. These variations need to be considered in the context of all FB operators needing to provide a proper and efficient service to hold a service franchise. Current monitoring and reporting does not seem to include a detailed critique of operator cost efficiency. The author's knowledge and understanding of the Hong Kong operating environment and of detailed cost causation in Hong Kong is not sufficient to go any further on cost efficiency but this quick analysis suggests there may be merit in the TD undertaking a more detailed cost benchmarking and examination of the potential safety question raised in this paragraph.

4.4 Conclusions on incentives, penalties and performance pressure

Route bus operators need to feel a certain amount of performance pressure when they are essentially operating under a renewable negotiated franchise/contract regime. The author supports the negotiated approach to allocating the rights for route service provision, provided this includes mechanisms to ensure that operators are under pressure to perform across a range of outcome areas. This needs opportunities for a bonus for good performance but penalties for poor performance and a plausible risk of loss of franchise in the event of particularly poor performance, definitions of which should be embedded in the franchise agreement.

Melbourne's route bus operators seem likely to be under relatively greater performance pressure than Hong Kong's FB operators because of: (1) the ever-present threat of competitive tendering in Melbourne, in the event of unsatisfactory operator performance; (2) the inclusion of specific (albeit small) incentive/penalty provisions in contract remuneration arrangements; and, most importantly from a safety perspective, (3) the existence of safety duties, chain of responsibility provisions and operator accreditation in Melbourne, with an independent safety auditor.

A short cost efficiency overview has identified relatively large differences in indicator performance between some individual FB operators, also noting differences in bus defect rates and average trips per breakdown between operators. These variations should be considered in the context of all FB operators needing to provide a proper and efficient service to hold a service franchise. The written material perused in preparing this paper suggests that current monitoring and reporting in Hong Kong may not include a detailed critique of operator relative cost or safety efficiency, recognising the difficulties in such an assessment. Reflecting on whether operators are providing a *proper and efficient* service would be assisted by such a critique.

5. Other Matters

5.1 Working/driving hours

5.1.1 Comparisons with Melbourne

Driver (Bus captain) working, driving and rest hours have been an important bus industry safety issue in many countries, including Hong Kong, for many years and have been the subject of much debate in Hong Kong over the past year. Annexes to the Transport Department Submission, for example, include much commentary on the Sham Shui Po accident in which 3 people were killed and 30 injured. Some of that commentary expressed concerns about drivers working longer than 12 hours and linked these hours of work to relatively low driver pay levels. Similar concerns have long been expressed in Australia, for example, in relation to long distance trucking in particular.

In Australia, concern about driver working/driving and rest hours was central to the introduction of Chain of Responsibility provisions in road transport law for heavy vehicles in the 1990s. This situation primarily arose because of concerns that heavy vehicle drivers involved in fatigue-related road crashes were often working under conditions imposed by others. It was partly a belief that identifiable others should also carry some of the blame for the accidents in question that led to Chain of Responsibility provisions being introduced into heavy vehicle road law by the (then) National Road Transport Commission in the 1990s, when the present author was Deputy Chair of that Commission.

Hong Kong's *Guidelines on Bus Captain Working Hours, Rest Times and Meal Breaks* (Revised in 2018) were compared to Australia's *Standard hours for Solo drivers in the bus and coach sector only*[7], to see if there are any major differences. Both jurisdictions need to balance commercial with safety considerations in setting working/driving and rest hour arrangements. The expertise in *fatigue* that has long played a key role in establishing Australia's arrangements prompts this comparison.[8] If working/driving and rest hours arrangements are similar between the two jurisdictions, of if Hong Kong's regime is tighter than that in Melbourne, then the fatigue considerations that apply to the Melbourne arrangements may be supportive of the Hong Kong arrangements too.

In the first 6 hours of route bus work, a person could work (drive) for 5 ¾ hours in Melbourne and 5 minutes less in Hong Kong. In an 8-hour period, 7 ½ hours work/driving is possible in Melbourne but only 7 in Hong Kong. The maximum working time in Melbourne over a 24 hour period is 14 hours, with 12 hours maximum driving time. 14 hours duty is also possible in Hong Kong over 24 hours but with a maximum of 11 hours driving time, an hour less than in Australia. Over a 24-hour period, Hong Kong has a requirement for at least a 10 hour off-duty break between successive shifts, whereas a Melbourne route bus driver must only have 7 continuous hours stationary rest time,

[7] https://www.nhvr.gov.au/safety-accreditation-compliance/fatigue-management/work-and-rest-requirements/standard-hours

[8] Similar expertise may well be behind the Hong Kong arrangements but that is not readily apparent from the author's reading of Hong Kong papers on the *Guidelines*.

according to the applicable National regulation. However, the applicable industrial award requires 10 hours rest in Melbourne, as in Hong Kong. These comparisons suggest that Hong Kong's current working/driving and rest regime is a little more safety oriented than that in Melbourne. However, it also depends on what operators do with the times that are available.

The Annexes to the Transport Department Submission around page 1013 include two operator monthly summaries of working time distributions and driving hour distributions. Adding up the hours in the various time ranges over the month shows that one operator had 17% of drivers working more than a 12 hour day during the month, including 5 who worked more than 14 hours on one day, whereas the second operator had 35% of drivers in the 12-14 hours worked range but none exceeding 14 hours. These hours are not all driving and the driving hours did not exceed 11 hours/day for either of the two operators on any day of the month.

Discussions were held with two major Melbourne route bus operators to explore rostering patterns. That discussion indicated that one did not have any drivers working longer than 12 hour days. For the other operator, 90-95% of the company's route bus drivers will do one, or at most two, days of up to 13.5 hours work (12 hours maximum allowable driving time), within the allowable 14 hours work, to meet their take-home pay expectations. The average number of hours worked by that operator's drivers is 44-46 per driver per week. One 13.5 hour shift a week for 95% of drivers, within a total 44-46 hour working week, implies that almost 30% of drivers will be working 12 hours or more on any day, which is upper mid-range between the two sample Hong Kong results. Including the operator who does not have any drivers working longer than 12 hour days, a larger operator than the other, would pull the combined proportion to below the lower of the two Hong Kong sample proportions (which was 17%).

Two such shifts a week in one of the two Melbourne operators businesses would lift the combined Melbourne proportion working over 12 hour days towards, but still below, the higher of the two Hong Kong results. For the operator who operated some shifts above 12 hours (but none exceeding 13.5 hours), the extra hours were seen as essential to be able to recruit sufficient drivers. Average Melbourne route bus driver salaries in that company for the 44-46 hours/working week are around $A60,000-$A70,000 a year. This compares to average Australian full-time adult weekly total earnings of around $A84,000 in November 2017.[9]

Hong Kong Bus Captains are understood to earn around $HK15000+ per month, including overtime and bonuses (base salaries around $HK12,000+). The average monthly salary of all drivers (not just bus Captains), as listed by the HK Census and Statistics Department (2018a), was $HK17463 in March 2018[10] and the 50th percentile monthly wage in land transport was $HK17500 in mid-2017, also according to the Census and Statistics Department (2018b). An Annex to the TD Submission (page 1550-33) suggests 10 hours

[9] http://www.abs.gov.au/ausstats/abs@.nsf/mf/6302.0
[10] https://www.censtatd.gov.hk/hkstat/sub/sp210.jsp?ID=0&productType=8&tableID=028

work by a Bus Captain would deliver an income a little above the 'all drivers' level and a further Annex to that Submission (p. 1596) reports average daily duty hours ranging between 10.01 hours and 10.60 hours. Section 5.1.2 considers a possible policy implication of Bus Captain remuneration.

Thus, Hong Kong's working/driving/rest hours provisions appear to be a little tighter than those in Melbourne, whereas the worked experience of route bus operators seems to favour Melbourne from a safety perspective. The sample data from each jurisdiction that was analyzed suggests a higher proportion of drivers working longer than 12 hour days in Hong Kong than in Melbourne. However, the differences are not large. Both jurisdictions allow longer driving hours than Europe, where the daily driving time is not to exceed 9 hours, with an exemption of twice a week when it can be extended to 10 hours. Total weekly driving time in Europe may not exceed 56 hours and the total fortnightly driving time may not exceed 90 hours. The European daily rest period is at least 11 hours but can go down to 9 hours on a maximum of three times a week.[11]

Working for 13-14 hours in Melbourne or Hong Kong puts a major focus on the question of how drivers use their remaining hours, whether they are getting sufficient rest/sleep to avoid fatigue and on the importance of including fatigue management training in driver training programs. Within the various Bus Captain training materials included in the Annexes to the Transport Department Submission at pages 1448 and following, and also in the briefing paper to the Legislative Council Panel on Transport on *Enhancement of Safety of Franchised Buses* (TD 2018b), the author did not see any mention of training in *fatigue management*. This is an important part of bus driver training in Melbourne, including attention to related matters such as diet and exercise. The training also extends to supervisors, to try to ensure that they do not roster drivers who may be fatigued. More broadly, the idea of the TD developing a Practice Note on the training framework for FB captains is a good idea, as outlined in the paper to the Legislative Council Panel. This will help to ensure that all operators are aware of desired standards and have a means of conveying these standards to their Bus Captains. The training framework that is developed needs to include a specific component on fatigue management, which could form part of an Occupational Health and safety module and should extend to supervisors.

It should be noted that that driving/working hours are not a major safety concern for Australian/Melbourne route bus operations. The author believes that this is primarily because route bus operators are highly conscious of the working/driving/rest regulations and their need for compliance, particularly recognizing the risks of being in default should a fatal accident occur due to a breach of the regulation, with chain of responsibility provisions seeing multiple parties potentially at risk of legal consequences (as discussed in section 3.2 of our first report). Fatigue management is one element normally included in Melbourne route bus driver training, reflecting safety concerns. Breaches of working/rest provisions in Australia tend to be in long distance trucking, not urban route bus operation.

[11] https://ec.europa.eu/transport/modes/road/social_provisions/driving_time_en

The sampling and reporting approach being used in Hong Kong to test compliance with the *Guidelines* is a good idea. It shows an overall compliance rate of over 96%[12], but not 100%, over the past 3 years, with traffic congestion and traffic accidents suggested as the main reasons for the shortfall. This suggests possibly adding an extra margin into rosters to allow for such delays. Melbourne relies on rostering/scheduling practices and independent system audits by Transport Safety Victoria under the accreditation system for assurance, with a requirement for annual operator internal audits being one part of the accreditation system. Operators commonly include a safety margin in their rosters to allow for traffic congestion/accidents.

The discussion in Section 2 of this report included some consideration of bus safety analyses in FB operator Forward Planning Programs. The author's inspection of the Bus Safety sections of those FPPs suggested that there may be a lift in accident rates in the 6-8 hour working time period. It was suggested at that point that this possible correlation needs closer examination to test its validity and, if confirmed, reasons for its occurrence should be investigated and possible remedies explored.

Two notable differences between Hong Kong and Melbourne with respect to working/rest hours are that (1) the Melbourne (Victorian) requirements on work/driving/rest are set down in a regulation (the National Heavy Vehicles (Fatigue Management) National Regulations 2013), with (2) a safety duties/chain of responsibility link, whereas in Hong Kong they are the subject matter of a *Guidelines* document (*Guidelines on Bus Captain Working Hours, Rest Times and Meal Breaks*, as revised in 2018), without specific legislative reference to safety duties or chain of responsibility. The Hong Kong Public Bus Services Ordinance (Cap. 230) provides for regulation of working/driving/rest hours but this has not been taken up. This difference in mode of establishing working/rest hour requirements between the two jurisdictions seems likely to mean that there will be a stricter focus by operators on compliance in Melbourne, since the consequences of non-compliance involve a breach of the law, which could have legal consequences for a number of people in the business, and others (possibly also including the government service procurer), because of chain of responsibility.

5.1.2 A case for subsidy?

The discussion in Section 5.1.1 above briefly considered pay levels of Bus Captains and it is understood that implementation of the 2018 *Guidelines* is estimated to require an additional 250 drivers (Transcript Day 1: 7 May 2018, p. 60). The author is not able to assess whether the indicated Hong Kong remuneration level is sufficient to ensure an adequate flow of people into positions of Bus Captain. However, given the expected additional recruitment required, this may be a concern. Also, in terms of the future, if working longer than 12 hour days is regarded as a safety concern, which it would be by some, then the imposition of a possible 12 hour limit would be expected to make it even harder for FB operators to attract Bus Captains. FB Operators, THB and the TD are then in a position of making some tough choices, which might involve, for example:

[12] TD Submission p. 66.

- cutting services and/or
- increasing remuneration levels and paying for this by increasing fares, which would discourage use, increase road congestion, air pollution, other emissions and accidents, and also increase risks of social exclusion and/or
- approaching government for some funding assistance, to retain service levels without fare increases.

There is an important public policy issue involved here, which goes to one fundamental policy intent in Hong Kong public transport: that of acting commercially, which seems to be interpreted as 'being financially viable without direct public subsidy', recognizing that there are some indirect forms of operator financial support (e.g., exemption from registration tax) and occasional financial support for particular initiatives (e.g., electric bus trials).

Hong Kong's PT system would generate large societal external benefits each year, some of which may be captured by the PT provider through land value increase, where the PT operator is a land owner. This would apply to rail more than bus. Franchised Bus services will certainly produce more value to society than operators can collect in fares, particularly through easing road congestion levels, increasing social inclusion and improving road safety outcomes. If fares need to increase to find money for staffing needs, then there will be some loss of these societal benefits. This loss may be sufficient to justify government providing some financial support to operators, such as would enable them to retain/attract sufficient Bus Captains. FB operations can still operate commercially but on the basis that government is now remunerating the operator a sum for the societal benefits their service provides, benefits that the operator is not able to capture through the fare box.

THB and TD should assess in economic terms the societal benefits of Hong Kong's FB services, to enable them to evaluate the case for some financial support to those services, should such an issue be raised. It is noted that the matter of possible subsidy in respect of added remuneration was raised by Counsel in discussion on the first day of Committee hearings (Transcript Day 1,; 7 May 2018, pages 68-9). The safety consequences of Bus Captain working/driving/rest provisions are a classic example of where this public policy trade-off may need to be faced, given difficulties of attracting bus drivers and particularly if this was to be compounded, in future, by working hours greater than 12/day being ruled out or limited more than at present. The author is not arguing for a 12 hour limit, Melbourne experience suggesting that 12-14 hours can be safe, provided the institutional setting has a strict focus on safety. However, without such a strict safety regime, there should be some nervousness about working days exceeding 12 hours.

5.2 Technological improvements

The first report for this brief, inter alia, responded to a Committee request for the views of Melbourne route bus operators on particular technologies that may improve the safety of route bus services. Those technologies included tachograph/black box systems, speed control with geo-fencing using GPS, active speed retardation systems, speed display unit(s) in the passenger compartment, collision prevention and lane-keeping devices, driver

alertness monitoring devices (including anti-dozing devices), autonomous emergency braking, seat belt retrofits and driver protection devices (e.g., protective screening, CCTV). The first report noted that (Stanley & Co 2018, p. 45-6):

> *Australian new vehicle standards tend to lag Europe by a few years, partly because authorities see smaller benefits from some of those standards in low density/low traffic volume Australian settings than in Europe. However, in terms of safety innovations, the dominance of European chassis suppliers in the Australian market means that European standard vehicles often arrive ahead of the date they are mandated in Australia. After-market safety solutions provide opportunities for safety improvement and are increasingly being adopted by route bus operators. Telematics linked to collision-avoidance/lane departure warning technologies seem to be the most common area of voluntary uptake in route bus operation, expected to result in safety enhancement, lower operator costs and an improved customer travel experience. Such ADAS tools are likely to roll out quickly as manufacturers embed them in new vehicles, in response to European (or US) standards. Australia lags in application times in this area, which needs attention, but after-market solutions help fill the gap.*

Earlier this year, the Hong Kong Transport Department established a Working Group on Enhancement of Safety of Franchised Bus, which included members from franchised bus operators and major bus manufacturers. A letter from the Commissioner for Transport to the Committee, dated 19th July 2018, included a paper prepared for the Legislative Council Panel on Transport, *Enhancement of Safety of Franchised Buses,* which outlined the progress of the Working Group (Transport Department 2018b). With respect to technological initiatives, that paper indicates that all FB operators have committed that all new double-deck buses procured from July 2018 onwards will be incorporated with the following two safety devices:

- Electronic Stability Control (ESC), which incorporates Roll Stability Control (RSC) and
- Retarders for capping the maximum speed of speed limiters on downhill operation.

A number of trials of new safety technology have also been agreed, including:

- Bus Monitoring and Control System (BMCS), which will enable vehicle location capabilities to be used to control speeds by location, depending on the applicable speed limit and will provide useful management information to operators for purposes of cost management, driver training and, if necessary, to take action for inappropriate driving behaviour
- Collision Alert and Lane Keeping Devices, where it is not clear in the paper whether the trials will include only warning level technologies, whether more interventionist technologies will be involved (e.g., that bring a vehicle back into a lane if drifting from the lane), or both. Given that trials are being proposed, the author can see value in testing both and

- Driver monitoring device – Melbourne route bus operators have found difficulties with this technology but trials are a good idea.

Also, all new buses ordered from July 2018 onwards will have seat belts fitted and the possibility of retrofitting upper deck seats with seat belts will be further explored, for buses deployed on specific bus routes.

These initiatives are a positive development from a safety perspective and well framed. They demonstrate the value of close dialogue between government, operators and bus manufacturers on technological innovation. Small operators sometimes find it hard to keep abreast of the latest advances in technology, as illustrated by some evidence submitted to the Committee. Initiatives such as the Working Group can be a helpful way of updating their awareness, while enabling dialogue about, and evaluation of, initiatives for possible introduction by government and/or operators. This Working Group should form the basis for an on-going Advisory Committee to THB and TD on bus technology.

5.3 Conclusions on other matters

In light of this discussion, the main areas that the author proposes that Hong Kong should consider in terms of possibly improving working/driving/rest provisions for, and technology used in, route bus operation are to:

1. embed the *Guidelines* in regulation, to emphasise their importance and strengthen the importance of compliance
2. reinforce this by supporting them with legislated safety duties and chain of responsibility provisions, which should also apply to other route bus safety-related matters (discussed further in Section 6)
3. examine the 6-8 hours and 12-14 hour working periods to see what safety enhancements can be supported in these times, which may mean reducing the 14 hour limit
4. provide training in fatigue management as an integral part of Bus Captain training
5. establish a Standing Committee on Bus Working/Driving/Rest Hours, consisting of (at least) government representatives/nominees, FB operators and fatigue experts, to meet at least twice a year, to inter alia, (1) review compliance with the relevant Guidelines (which have been proposed to become regulatory requirements), (2) review international experience in the field and (3) review emerging understanding of the causes of driver fatigue and ways of better managing fatigue and
6. establish a Standing Committee on Bus Safety, meeting at least twice yearly to review and evaluate the latest technology that may impact on bus safety, particularly for route bus operation, and advise government on desirable safety inclusions in the FB fleet and other bus systems. The newly formed Working Group on Enhancement of Franchised Bus Safety could form the basis for this Committee but membership should be broadened to include other bus operators.

The initiatives and trials that have come from the Working Group on Enhancement of Safety of Franchised Bus are positive and show that this mechanism can play an effective advisory role, with capacity to improve the safety performance of the fleet in operation.

The author has also proposed that THB and TD should assess in economic terms the societal benefits of Hong Kong's FB services, to enable them to evaluate the case for some financial support to those services, should such an issue be raised at some point in the future, particularly with respect to enhancing bus safety. Economic knowledge of this type is fundamental to the operation of an effective 21st century PT system.

6. The main game

6.1 Approach: start with societal/governmental goals

Hong Kong's public transport system is highly regarded internationally as both efficient and effective, with the very high mode share that is achieved and level of commerciality the envy of many elsewhere. The limited amount of safety data that has been considered in this report and the preceding report on Melbourne's route bus services suggests that Hong Kong's services are a little less safe than Melbourne's, particularly with respect to fatality rates, which may possibly be a reflection of more congested operating conditions in Hong Kong's high density setting. This seems likely to mean more pedestrian exposure risks and pedestrians account for over 60% of fatalities associated with FB operation in Hong Kong.

In terms of thinking about conclusions relating to ways in which FB safety might be improved in Hong Kong, the logic flow as set out in Figure 6.1 has been used. This starts with identification of governmental goals from route bus service provision, which ultimately align with high level outcome goals that apply to most sectors of the economy: economic productivity, social inclusion; a low environmental footprint; and safe services. Section 4 of this report has included some discussion about governmental route bus service goals, which readily align with such higher order societal/governmental goals.

Figure 6.1: Logic flow for this report

Against the background of societal goals, government identifies key opportunities for, and challenges to, enhancing goal achievement. The Committee's investigations are the relevant matter in this respect for the current report.

6.2 Identify key enablers

The next circle is labelled **enablers**, which are the mechanisms that are available to government to influence outcomes in the directions it desires, working through technology and influencers on behaviour. This and the preceding report have considered the legal framework, franchise agreements (and, by implication, commitments made during the agreement tenure), technology and culture/values (particularly with respect to the idea of a safety culture discussed in the first report on Melbourne and, for example, the attitude expressed by Melbourne operator CDC, but also in section 4 of this report, where operator goals were considered). Marketing and awareness raising initiatives are also relevant but have not been a focus of this report.

In terms of **technology**, the way route bus services are provided in both Hong Kong and Melbourne suggests that vehicle technological standards, and associated maintenance regimes and vehicle inspections, are not likely to vary much. EC standards are used in both settings and OEMs have a major influence on associated maintenance routines. Variations in terms of the operative EURO standards will appear from time to time but the trend in both Hong Kong and Melbourne appears to be aligning with European practice on vehicle standards, albeit with small lags in implementation.

The main safety innovations in technology will usually be embedded in new vehicles acquired for the route bus service. However, after-market solutions can also be used to improve safety, including until such time as (some of) those solutions become part of the industry norm for new vehicles. The first report on this brief responded to a number of questions from the Committee on technology. The responses to those questions suggested opportunities in Hong Kong FB operation for Lane Departure Warning (rather than the more active Lane Keeping systems in dense urban operation) and Collision Avoidance systems (including pedestrians and cyclists), black-box systems that provide driver advice/warnings about driving behaviour and CCTV systems, that support driver/passenger safety (e.g., slips, trips and falls). These initiatives seem likely to produce solid benefit-cost ratios, should a regulatory impact statement be undertaken about making them compulsory (retrofits) for FBs. Monitoring of driver eye movement may be less suited to urban route bus operation at this point in time.

Section 5 of the current report summarized progress of the Hong Kong TD Working Group on Enhancement of Franchised Bus Safety, through which FB operators have agreed to implement Electronic Stability Control and speed retarders on new double deck buses and trial initiatives , and to trial others, such as Bus Monitoring and Control Systems (BMCS), Collision Alert and Lane Keeping Devices and Driver monitoring devices and to also install seat belts on the upper deck of new Double Deck buses. Section 5.2 noted these good initiatives.

Infrastructure used by bus services (e.g., bus lanes, intersection treatments, queue jump lanes), its users (e.g., bus stops, interchanges) and those with whom bus services interact (e.g., pedestrians, other motor vehicles, cyclists), just like vehicle technology, can support improved safety outcomes. For example, separation of buses from other road users, via means such as bus lanes, will reduce accident likelihood, albeit that this separation is often very difficult to achieve in a dense urban setting. The current report does not delve into bus-relaterd infrastructure, seeing this as somewhat removed from the main scope of work under this brief, but it is clearly part of the wider bus safety question.

The quality and condition of **vehicles (buses)** used in route bus operation is important to the safety outcomes from use of those services. Both Melbourne and Hong Kong route bus operations exist in legal/governmental settings that rely on modern European vehicle standards, which have widespread international application and vehicle ages are relatively young (Appendix 2 suggests the oldest average FB fleet age in Hong Kong is 8.2 years). Also, operators can generally be expected to adhere to manufacturer maintenance regimes to assure in-service condition (and retain warranty protection). This means that vehicle condition is unlikely to be a major concern in terms of Hong Kong bus safety. The annual inspection regime is an important assurance mechanism in this regard and so is the Hong Kong spot checking regime, which has no Melbourne equivalent. However, the concept of chain of responsibility is not part of the Hong Kong legislative/regulatory framework for FB operation, could be applied to those involved in the bus manufacturing, maintenance and vehicle testing arenas, to add a stronger layer of safety assurance. This point opens up the wider topic of the legislative setting for bus operation.

In the author's opinion, the single biggest point of difference between Hong Kong and Melbourne in terms of route bus safety enablers, and the best potential opportunity for safety improvement in Hong Kong, relates to the legislative setting. This point of difference is the Victorian/Melbourne legislative focus on safety duties, linked to the idea of chain of responsibility and associated bus operator accreditation, together with the creation of an independent Transport Safety Director. These arrangements were discussed in the first report and key points are summarized here.

Victoria's Bus Safety Act 2009 imposes *safety duties* on all persons who have the capacity to affect bus safety, identifying the operator of a bus service, the procurer of a bus service, bus safety workers and those who are involved in bus stops and bus stop infrastructure. The identification of these parties, in accord with the idea of shared responsibility, reinforces the idea of chain of responsibility. The main focus of (national) heavy vehicle chain of responsibility action is in the areas of fatigue management, speeding and overloading (essentially trucks in the latter case). In terms of route bus services, bus safety workers would include bus drivers, schedulers who set the timetables, mechanics and testers who repair or assess the vehicle. Our first report included an example where the bus safety worker/chain of responsibility provisions led directly to the largest Victorian independent bus tester advising the Victorian Transport Safety Director of concerns with the condition of a particular route bus operator's fleet.

Those people who are subject to safety duties have an enforceable responsibility to eliminate risks to health and safety *where reasonably practicable* or to work to reduce those risks *so far as is reasonably practicable* (SFAIRP). The Australian National Heavy Vehicle Regulator argues that[13]

> *... the best way to do this is to have safety management systems and controls in place, such as business practices, training, procedures and review processes that:*
> - *identify, assess, evaluate, and control risk*
> - *manage compliance with speed, fatigue, mass, dimension, loading and vehicle standards requirements through identified best practice*
> - *involve regular reporting, including to executive officers*
> - *document or record actions taken to manage safety.*

The Bus Safety Act and its associated regulations do not say how safety duty obligations are to be met, this being left to those on whom such duties are imposed. Bus operator accreditation provides mechanisms that support achievement. All route bus operators must be accredited to hold a route service contract, accreditation requiring three main components:

1. a person of responsibility within the operation having passed the Monash University Bus Operator Accreditation course
2. the operator having a Management Information System that meets the Transport Safety Director's requirements
3. the operator having a Maintenance Management System that meets the Transport Safety Director's requirements.

Operator support is available from BusVic, the industry association, if desired, across all three areas. For example, BusVic has developed templates for MISs and MMSs which are available to its members, these templates having been developed in collaboration with the Transport Safety Director. The Transport Safety Director has a strong focus on the development and improvement of safety culture in a bus business and safety risk management, working with operators and the industry to improve practice. Guidance material is available, such as *Guidance - Safety Culture, September 2016* (TSV 2016) and the Director has indicated his willingness to share materials and ideas with Hong Kong, if desired.

The independence of the Transport Safety Director both elevates safety as a desirable policy outcome and provides an independent source of accountability and transparency on safety processes and outcomes that exceed what is likely to result if (route) bus safety was left solely to the public transport regulatory agency and/or a governmental department to manage.[14] The Transport Safety Director's audit processes and industry engagement has

[13] https://www.nhvr.gov.au/safety-accreditation-compliance/chain-of-responsibility/change-to-chain-of-responsibility

[14] Victoria Police and VicRoads are also involved in compliance and enforcement of road law in relation to bus operation (e.g., VicRoads on vehicle standards; both agencies could be involved in driving hours breaches).

led the agency to the conclusion that Melbourne's route bus services and practices are safe and that the safety focus should be on developing a *proactive* and forward-looking **safety risk management culture**, as distinct from practices that *react* to safety concerns after they happen.

Safety duties could be created without the addition of operator accreditation but the inclusion of such accreditation, supported by an independent Transport Safety Director, adds another safety layer and, in particular, helps to support the creation of a safety risk management culture, which should help to reduce the incidence of poor safety outcomes (which goes to the point of including culture and values in the Enablers circle in Figure 6.1).

If Hong Kong was to adopt such a system, safety duties, including chain of responsibility provisions, and bus operator accreditation would prima facie be applied to all bus operations, not just Franchised Bus services, but FB operators would be a good starting point, because of their dominant transport function. It would take a few years to develop and implement a suitable system from scratch, given the necessary consultation programs around scope and extent of sector coverage. Enforceable safety duties and chain of responsibility provisions could be introduced into the legal framework as the first step, with the support of a new independent Transport Safety Director. Following this up with operator accreditation is worth detailed evaluation.

The major recommendation from this study is that the Committee should give consideration to, within the legislative framework, recommending:

- **introducing enforceable safety duties on all parties in the chain of responsibility for route bus service delivery (e.g., operators, service procurers, bus safety workers, bus stop designers)**
- **the creation of the independent position of Transport Safety Director, whose role is to be responsible for administering matters related to safety duties, ensuring compliance and enforcement**
- **requiring that all Franchised Bus operators be accredited by the Transport Safety Director as a pre-condition for holding a route service franchise, this accreditation being dependent on their capacity to demonstrate a capacity to meet safety duties through use of systems that are consistent with ISO 39001 with a safety risk management focus**
- **extending this accreditation requirement to all commercial bus services.**

The extension of accreditation to all commercial bus operators is warranted, for example, by the practice of FB operators contracting in other operators from time to time to assist in their service provision. More broadly, bus users have the right to expect the same safety standards from all bus operators, wherever they operate.

Such legislative and administrative changes would need to be developed in close consultation with affected stakeholders and other interested parties and would take a few years to deliver. However, given the international orientation of many key elements of Hong Kong's FB service delivery task, this legislative change is seen by the author as the

single biggest opportunity to improve safety outcomes over the long term. This is about building a strong and pervasive safety risk management culture among all those whose behaviours can affect safety outcomes from bus operations. This is not a costly exercise but the potential returns are significant.

6.3 Identify targets for the enablers

Following Enablers, Figure 6.1 flags policy/program **targets,** as the stakeholder focal points at which the enablers are directed. Bus operators, their staff, other road users and the wider community are indicated as prospective targets. Much of the discussion on enablers in Section 6.2 was about bus operators and others in the chain of responsibility as the targets for initiatives. Section 5.1 included discussion about bus drivers as targets. The focus here is on pedestrians and bus passengers.

Notwithstanding the horrendous bus passenger fatality numbers from the Tai Po Road accident on 10th February, 2018, the analysis in Section 2 indicated that **pedestrians** are the major source of fatalities in Franchise Bus-related fatal accidents. Pedestrian safety measures should thus be a major part of any strategy to improve the safety of FB operation. This argues for use of technologies that improve the driver's view around the vehicle, as are being considered in Hong Kong at present, infrastructure improvements to increase separation of pedestrians from traffic flows and awareness raising initiatives, to inform pedestrians of the dangers around heavy vehicles, such as buses. Such campaigns need to target the whole community, since most people are pedestrians, or wheel chair users, at many times.

Rising numbers of injuries to bus passengers were also noted in Section 2, as was also found in our first report on Melbourne. In the Melbourne case this was slips, trips and falls, particularly amongst older females. FB bus safety programs should target those passenger groups most frequently injured on-board, to arrest the rising incidence rate.

6.4 Concluding comment

This report has taken a strategic, or high level, approach to reviewing factors affecting Franchise Bus safety in Hong Kong. The horrific fatal accident that led to the appointment of the Committee is unusual, having been the only accident in the last five years that has involved more than 3 fatalities. The more common setting over the last few years has been a fatality rate of around 8, which appears to be a little higher than in Melbourne on a distance travelled basis. The accident rate for collision type accidents is declining in Hong Kong but non-collision accidents are increasing, which also appears to be the case in Melbourne (especially an increasing number of slips, trips and falls).

The report has examined legislative, driver, vehicle and other influences on route bus safety outcomes, mainly by comparing Hong Kong and Melbourne. The major conclusion is that, to improve what looks like a pretty good safety setting, Hong Kong's legislative framework should increase its focus on safety, particularly by the creation of safety duties for all who are involved in the chain of responsibility for Franchised Bus services and the introduction of bus operator accreditation and an independent Transport Safety Director

as, in effect, the system supervisor on safety and entity to accredit bus operators. This approach has worked well in Melbourne, where the Safety Director's focus is primarily on building and strengthening a safety risk management culture, rather than on ticking boxes in a compliance-oriented approach. In systems that start with good safety practices, this is a low cost/low risk way of delivering even better safety outcomes for the community. A number of supporting proposals are set out in the concluding parts of sections 2, 3, 4 and 5 of this paper.

An Annex towards the end of the extensive Annexes to the Transport Department Submission, entitled *Road Safety Management System*, closes as follows (Annexes to TD Submission p. 1657):

> *The TD will keep in view the development of international practices and standards on road safety, including the implementation experience and effectiveness of ISO 39001, and will explore with the FB operators the possibility of their adoption of the standards with a view to further improving the operators' safety management systems.*

Melbourne's experience is that such an approach, set within a supportive legislative framework, can assist development of a safety risk management culture that improves route bus safety outcomes.

Appendix 1: Vehicle kilometres of Franchised Bus service provision

	Franchised Bus Company	Figure (in million kilometres)	Bundle Reference [*bundle / page no.*]
(1)	The Kowloon Motor Bus Company (1933) Limited (KMB)	2017: 282	**[KMB-(2 to 10)/p.1966]**
		2016: 282.5	**[KMB-(2 to 10)/p.1766]**
		2015: 285.6	**[KMB-(2 to 10)/p.1567]**
		2014: 284.7	**[KMB-(2 to 10)/p.1373]**
		2013: 300.7	**[KMB-(2 to 10)/p.1165]**
		2012: 307.6	**[KMB-(2 to 10)/p.957]**
(2)	Long Win Bus Company Limited (LWB)	2017: 36.5	**[KMB-(2 to 10)/p.1967]**
		2016: 32.0	**[KMB-(2 to 10)/p.1767]**
		2015: 28.0	**[KMB-(2 to 10)/p.1568]**
		2014: 26.1	**[KMB-(2 to 10)/p.1374]**
		2013: 25.8	**[KMB-(2 to 10)/p.1166]**
		2012: 25.4	**[KMB-(2 to 10)/p.958]**
(3)	Citybus Limited (CTB) ** as defined on page 50 of Bundle CTB-(2 to 3)*	2016/2017:- 51.86 (Franchised One*) 26.88 (Franchised Two*)	**[CTB-(2 to 3)/p.49]**
		2015/2016:- 53.11 (Franchised One*) 27.07 (Franchised Two*)	
		2014/2015:- 52.65 (Franchised One*) 26.69 (Franchised Two*)	
		2013/2014:- 54.59 (Franchised One*) 26.81 (Franchised Two*)	
(4)	The New World First Bus Services Limited (NWFB)	2016/2017: 42.40	**[CTB-(2 to 3)/p.35]**
		2015/2016: 43.73	
		2014/2015: 43.84	
		2013/2014: 46.25	
(5)	The New Lantao Bus Company (1973) Limited (NLB)	2016/2017: 8.678	**[NLB-2/p.181]**
		2015/2016: 8.506	**[NLB-2/p.156]**
		2014/2015: 8.628	**[NLB-2/p.131]**
		2013/2014: 7.857	**[NLB-2/p.106]**
		2012/2013: 7.409	**[NLB-2/p.81]**
		2011/2012: 7.210	**[NLB-2/p.58]**

Appendix 2: Some Franchise Bus Performance Indicators

Hong Kong FB Performance Indicators

Indicator	KMB	LWB	City Bus 1	City Bus 2	NWFB	NLBC
	2016	2016	2017	2017	2017	2016/17
Passengers carried (m)	990.1	37.3	190.2	30	166.1	27.2
Fare revenue ($HKm)	6649.4	460.4	1284.7	519.6	1059.4	161.9
Av. revenue/pax ($HK)	6.72	12.34	6.75	17.32	6.38	5.95
Bus Kms (m)	282.5	32	51.9	26.9	42.4	8.7
Operating costs* ($HKm)	6151.5	436.2	1290.7	380.4	1089.8	159.1
Optg costs/km ($HK)	21.78	13.63	24.87	14.14	25.70	18.29
Optg costs/pax ($HK/pax)	6.21	11.69	6.79	12.68	6.56	5.85
Passenger boardings/km	3.50	1.17	3.66	1.12	3.92	3.13
Staff costs ($HKm)	3562.8	181.3	698	199.4	604.8	70.2
Fuel and oil ($HKm)	623.8	46.1	134.5	49	130.9	19.1
Staff costs/km ($HK/km)	12.61	5.67	13.45	7.41	14.26	8.07
Staff costs/pax ($HK/pax)	3.60	4.86	3.67	6.65	3.64	2.58
Fuel and Oil costs/km ($HK/km)	2.21	1.44	2.59	1.82	3.09	2.20
Fuel and oil costs/pax ($HK/pax)	0.63	1.24	0.71	1.63	0.79	0.70
Defects per spot check	0.67	1.3	0.49	1.12	0.69	0.97
Av fleet age (years)	8.2	3.3	4.5	2.4	7	7.3
Mechanical reliability (kms)	57592	48137	?	?	?	77749
Av. Trips/breakdown	3774	1251	2025	1364	1373	?

Notes: * = includes finance costs

Sources: KMB, More about KMB 2016; LWB, More about LWB 2016; Long Win Bus, Corporate social responsibility report, 2016; CityBus, Fuller disclosure 2017; NWFB, Fuller disclosure 2017;

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Professor John Stanley B.Com, (Hons), M. Phil., MCILT

Short Employment History

1969: Commonwealth Treasury Canberra – economic research roles.
1969-77: Commonwealth Bureau of Roads. John held various positions, up to Chief, Transport Planning Division. Developed and applied tools for assessing the economic value of road policies and programs.
1977-80: Chief Economist, Victorian Premier's Department. Advised the State Government on economic development initiatives.
1980s –mid 90s: Chaired the Victorian Government's waste minimization/recycling programs through the Recycling and Litter Advisory Committee (RALAC - 5 years) and then the Recycling and Resource Recovery Council (5 years).
1980-1999: Principal John Stanley and Associates Pty Ltd, consultants in transport policy and planning.
1991-99: Deputy Chairman, National Road Transport Commission. Contributed to the national micro-economic reform program in land transport, which began the process of introducing nationally consistent road laws in Australia
1999-2008: Executive Director, Bus Association Victoria. John represented the Association's members' interests on a wide range of matters, including negotiation of bus contracts with the State Government. Extensive work was also undertaken on policies and programs to increase bus patronage.
2008 -: Adjunct Professor and Bus Industry Confederation Senior Research Fellow in Sustainable Land Transport, Institute of Transport and Logistics Studies, The University of Sydney. Post graduate teaching and research roles, with a policy development focus on public transport.
Also, Director, Stanley & Co, transport and land use planning consultants.
2012-16: Member of the Ministerial Advisory Council advising Victoria's Planning Ministers in two governments on the long term Melbourne Metropolitan Planning Strategy.

Directorships

John has been a Director of Places Victoria (the Victorian Government's urban renewal authority), a Board member of VicUrban (the predecessor of Places Victoria), a Commissioner of Victoria's State Services Authority, board member of Metlink (Melbourne's then public transport marketing body), the Public Transport Ombudsman and of Victoria's Alpine Resorts Co-ordinating Council, Chair of Victoria's Recycling and Resource Recovery Council and Chair of the ADC Forum (an Australian leadership organization). He is currently Chair of the People and Parks Foundation and is a board member of Road Safety Inspections, a heavy vehicle safety inspection company.

Awards:

John has been awarded an Australian Centenary Medal for services to public transport and conservation.

Publications by Professor John Stanley

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Authorised Version No. 010

Bus Safety Act 2009

No. 13 of 2009

Authorised Version incorporating amendments as at
1 January 2011

TABLE OF PROVISIONS

Authorised Version No. 010

Bus Safety Act 2009

No. 13 of 2009

Authorised Version incorporating amendments as at
1 January 2011

The Parliament of Victoria enacts:

PART 1—PRELIMINARY

1 Purpose

The purpose of this Act is to—

(a) provide for the safe operation of bus services in Victoria;

(b) make related amendments to the **Public Transport Competition Act 1995**, the **Rail Safety Act 2006**, the **Road Safety Act 1986**, the **Transport (Compliance and Miscellaneous) Act 1983** and certain other Acts;

S. 1(b) amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.1) (as amended by No. 45/2010 s. 22).

(c) change the title of the **Public Transport Competition Act 1995** to the **Bus Services Act 1995**.

2 Commencement

(1) This section and sections 1 and 80 come into operation on the day after the day on which this Act receives the Royal Assent.

(2) Subject to subsection (3), the remaining provisions of this Act come into operation on a day or days to be proclaimed.

(3) If a provision of this Act does not come into operation before 31 December 2010, it comes into operation on that day.

3 Definitions

(1) In this Act—

accreditation fee means the fee to be paid in respect of an application for accreditation under Part 4 or any annual accreditation fee—

(a) set by the Safety Director under section 67; or

(b) if a fee has not been set by the Safety Director, the prescribed fee;

accredited bus operator means a bus operator accredited under Part 4;

approved training course means a course of training provided in this State or another State or Territory that—

(a) is prescribed; or

(b) is approved by the Safety Director;

Australian Design Rules means the Australian Design Rules for Motor Vehicles and Trailers, endorsed by the Australian Transport Advisory Council and published pursuant to section 7 of the Motor Vehicle Standards Act 1989 of the Commonwealth;

S. 3(1) def. of *bus* amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.2(a)) (as amended by No. 45/2010 s. 22).

bus means—

(a) a motor vehicle that has been built—

(i) with seating positions for 10 or more adults (including the driver); and

(ii) to comply with the requirements specified in the Australian Design Rules for a passenger omnibus (within the meaning of those Rules);

(b) a motor vehicle prescribed to be a bus;

(c) a motor vehicle which the Safety Director has declared to be a bus under section 7(1)—

but does not include—

(d) subject to section 23, a vehicle which is a taxi-cab in respect of which a taxi-cab licence is granted under the **Transport (Compliance and Miscellaneous) Act 1983**;

(e) a motor vehicle prescribed not to be a bus;

(f) a motor vehicle which the Safety Director has declared not to be a bus;

(g) a vehicle known as a Hummer;

Examples

1 A passenger car modified to have more than 9 seats (for example, a stretch limousine) is not a bus.

2 A motor vehicle that is built as a bus but which has had seats removed so that it seats less than 10 adults is still a bus.

3 A motor vehicle built overseas as a bus is a bus unless it is a motor vehicle built to be a Hummer.

bus safety work means an activity that may affect the safety of bus services including—

(a) driving a bus or activities associated with driving a bus;

(b) designing, constructing, supplying, repairing, modifying, maintaining, monitoring, examining or testing a bus;

(c) designing, constructing, supplying, installing, repairing, modifying, maintaining, monitoring, examining or testing equipment in or on a bus;

(d) setting or altering a schedule or timetable for a bus service;

(e) a prescribed activity;

bus safety worker means a person who has carried out, is carrying out or is about to carry out, bus safety work including a person who is—

(a) employed or engaged by a bus operator to carry out bus safety work;

(b) engaged by any other person to carry out bus safety work;

(c) a trainee;

(d) a volunteer;

bus service means the operation of one or more buses to provide a service for the transport of passengers by road;

bus stop infrastructure has the same meaning as it has in section 48H of the **Road Management Act 2004**;

bus stopping point has the same meaning as it has in section 48H of the **Road Management Act 2004**;

S. 3(1) def. of *commercial bus service* substituted by No. 19/2010 s. 47(1)(a).

commercial bus service means—

(a) a route bus service, if that bus service operates a bus built with seating positions for 13 or more adults (including the driver) to provide that service;

(b) a demand responsive bus service, if that bus service operates a bus built with seating positions for 13 or more adults (including the driver) to provide that service;

(c) a tour and charter bus service, if that bus service operates a bus built with seating positions for 13 or more adults (including the driver) to provide that service;

(d) a courtesy bus service (other than a non-commercial courtesy bus service), if that bus service operates a bus built with seating positions for 13 or more adults (including the driver) to provide that service;

(e) a bus service which is a prescribed class of commercial bus service;

(f) a bus service which is declared by the Safety Director to be a commercial bus service—

but does not include—

(g) a bus service in a class of bus service which is prescribed not to be a class of commercial bus service;

(h) a bus service which is declared by the Safety Director not to be a commercial bus service;

community and private bus service means a service—

(a) consisting of the carriage of passengers by a bus for or in connection with the activities of a religious, educational, health, welfare, philanthropic, sporting or social body; and

(b) which is provided for no consideration or for consideration which is limited to the costs or part of the costs incurred in making the journey;

co-operative has the same meaning as in the **Co-operatives Act 1996**;

corresponding Bus Safety Regulator means—

(a) the person who, or body that, has functions or powers under a corresponding law that substantially correspond to the functions and powers of the Safety Director under this Act; or

(b) a person prescribed by the regulations as the corresponding Bus Safety Regulator for another State or Territory of the Commonwealth for the purposes of this Act;

corresponding law means—

(a) the law of another State or a Territory of the Commonwealth corresponding, or substantially corresponding, to this Act; or

(b) a law of another State or Territory of the Commonwealth that is declared under the regulations to be a corresponding law, whether or not the law corresponds, or substantially corresponds, to this Act;

courtesy bus service means a service consisting of the carriage of passengers by a bus for any consideration or in the course of any trade or business;

demand responsive bus service means a service consisting of the carriage of passengers by a bus for hire or reward within a specified area on a regular basis along a route which varies in accordance with the demand of prospective passengers and for which passengers are each charged a separate fare;

Department means the Department of Transport;

disqualifying offence means a tier 1 offence, a tier 2 offence or a tier 3 offence;

drug means a substance that is a drug for the purposes of this Act by virtue of a declaration under section 8 or any other substance (other than alcohol) which, when consumed or used by a person, deprives that person (temporarily or permanently) of any of his or her normal mental or physical faculties;

hire and drive bus service means a service consisting of the provision of a bus for hiring (otherwise than under a hire-purchase agreement within the meaning of the **Fair Trading Act 1999**) by a person for a certain period for valuable consideration on the condition that it will be driven during that period by the hirer or another person on behalf of the hirer;

incorporated association has the same meaning as in the **Associations Incorporation Act 1981**;

local bus service means a service consisting of the carriage of passengers by a bus built with seating positions for 13 or more adults (including the driver) and that—

S. 3(1) def. of *local bus service* amended by No. 19/2010 s. 47(1)(c).

(a) is operated on a regular basis or subject to demand; and

(b) is available for use by the general public; and

(c) is not operated for hire or reward;

Example

A bus service provided by a Council (within the meaning of the **Local Government Act 1989**) or a housing authority for the benefit of residents in a locality or members of the general public is a local bus service.

non-commercial courtesy bus service means a bus service declared by the Safety Director under section 7(1)(c) to be a non-commercial courtesy bus service;

officer, in relation to a body corporate other than a company, co-operative or incorporated association, means a member of the committee of management of the body corporate;

officer, in relation to a company, means—

(a) a director or secretary of the company; or

(b) a person—

(i) who makes, or participates in making, decisions that affect the whole, or a substantial part, of the business of the company; or

(ii) who has the capacity to affect significantly the company's financial standing; or

(iii) in accordance with whose instructions or wishes the directors of the company are accustomed to act (excluding advice given by the person in the proper performance of functions

attaching to the person's professional capacity or their business relationship with the directors of the company);

officer, in relation to a co-operative, means—

(a) a director or secretary of the co-operative; or

(b) a person who is concerned, or takes part, in the management of the co-operative, whether or not as a director;

officer, in relation to an incorporated association means—

(a) the public officer or secretary (within the meaning of the **Associations Incorporation Act 1981**) of the incorporated association; or

(b) a member of the committee (within the meaning of the **Associations Incorporation Act 1981**) of the incorporated association; or

(c) a person who is concerned, or takes part, in the management of the incorporated association;

S. 3(1) def. of *operator* amended by No. 19/2010 s. 47(1)(d).

operator, in relation to a bus service, means the person who is responsible for controlling or directing the operations of a bus service in connection with a business or activity for, or involving, the transport of passengers by road by that bus service, but does not include a person who merely—

(a) arranges for the registration of a bus; or

(b) maintains or arranges for the maintenance of a bus;

S. 3(1) def. of *person* inserted by No. 19/2010 s. 47(2).

person includes a body corporate, unincorporated body or association and a partnership;

prescribed means prescribed by the regulations;

procurer means a person who charters a bus service or otherwise engages with an operator for the purposes of using the bus service, whether or not the provision of the bus service is on a commercial basis;

registered bus operator means an operator registered to operate a bus service under section 22;

regulations means regulations made under this Act;

S. 3(1) def. of *relevant person* inserted by No. 19/2010 s. 47(2).

relevant person, in relation to an applicant for accreditation to operate a commercial bus service or local bus service or an accredited bus operator, means—

(a) if the applicant or accredited bus operator is a natural person, the applicant or operator; or

(b) if the applicant or accredited bus operator is a partnership, a partner who is concerned, or takes part, in the management of the activities to which the application or accreditation relates; or

(c) if the applicant or accredited bus operator is an unincorporated body or association other than a partnership, a member of the committee of

management of the body or association who is concerned, or takes part, in the management of the activities to which the application or accreditation relates; or

(d) if the applicant or accredited bus operator is a company, a co-operative or an incorporated association, an officer of the company, co-operative or incorporated association; or

(e) if the applicant or accredited bus operator is a body corporate other than a company, co-operative or incorporated association, an officer of the body who is concerned, or takes part, in the management of the activities to which the application or accreditation relates;

S. 3(1) def. of *responsible person* substituted by No. 19/2010 s. 47(1)(b).

responsible person, in relation to an applicant for accreditation or an accredited bus operator, means—

(a) if the applicant or accredited bus operator is an individual, the applicant or accredited bus operator; or

(b) in any other case, a relevant person nominated by the applicant or accredited bus operator as the responsible person;

route bus service means a bus service consisting of the carriage of passengers by a bus for hire or reward operated along a fixed route on a regular basis;

S. 3(1) def. of *Safety Director* substituted by No. 6/2010 s. 203(1)(Sch. 6 item 4.2(b)) (as amended by No. 45/2010 s. 22).

Safety Director means the Director, Transport Safety within the meaning of section 3 of the **Transport Integration Act 2010**;

Secretary means the Secretary to the Department;

S. 3(1) def. of *tier 1 offence* amended by No. 93/2009 s. 49(3)(a).

tier 1 offence means—

(a) an offence against the **Crimes Act 1958** that involves sexual penetration (within the meaning given by section 35(1) of that Act); or

(b) an offence against a provision of the **Crimes Act 1958** amended or repealed before the commencement of Part 2 of the **Transport (Taxi-cab Accreditation and Other Amendments) Act 2006** of which the necessary elements at the time it was committed consisted of elements that constitute an offence referred to in paragraph (a); or

(c) an offence specified in clause 1 of Schedule 1 to the **Sentencing Act 1991**, if the victim of the offence was a child or a person with a cognitive impairment, that is not an offence referred to in paragraph (a) or (b); or

(d) an offence against section 271.4 (trafficking in children), or section 271.7 (domestic trafficking in children), of the Criminal Code of the Commonwealth; or

(e) an offence against section 5A of the **Crimes Act 1958**; or

(f) an offence against section 318 of the **Crimes Act 1958** (whether in relation to a motor vehicle or a vessel); or

(g) a child pornography offence within the meaning of the **Working with Children Act 2005**; or

(h) an offence within the meaning of Division 101 of the Criminal Code of the Commonwealth; or

(i) an offence specified in clause 3 of Schedule 1 to the **Sentencing Act 1991**; or

(j) an indictable offence involving fraud or dishonesty; or

(k) an offence specified in clause 4 of Schedule 1 to the **Sentencing Act 1991**; or

(l) an offence under a law of a jurisdiction other than Victoria (including jurisdictions outside Australia) that, if it had been committed in Victoria, would have constituted an offence of a kind listed in this definition;

tier 2 offence means—

S. 3(1) def. of *tier 2 offence* amended by No. 93/2009 s. 49(3)(b).

(a) an offence specified in clause 1 of Schedule 1 to the **Sentencing Act 1991** that is not an offence referred to in paragraph (a), (b), (c), (d), (e) or (f) of the definition of ***tier 1 offence***; or

(b) an offence specified in clause 2 of Schedule 1 to the **Sentencing Act 1991** that is not an offence specified in clause 3 of that Schedule; or

(c) an offence against section 24 of the **Crimes Act 1958** arising out of the driving of a motor vehicle by the offender; or

(d) an offence against section 319(1) of the **Crimes Act 1958** (whether in relation to a motor vehicle or a vessel); or

(e) an offence against section 319(1A) of the **Crimes Act 1958** (whether in relation to a motor vehicle or a vessel); or

(f) an offence against section 271.3 (aggravated offence of trafficking in persons), or section 271.6 (aggravated offence of domestic trafficking in persons), of the Criminal Code of the Commonwealth; or

(g) an offence against section 61 of the **Road Safety Act 1986** resulting in a person being killed or suffering serious injury; or

(h) a summary offence involving fraud or dishonesty; or

(i) an offence against this Act; or

(j) an offence against the **Bus Services Act 1995**; or

(k) an offence under a law of a jurisdiction other than Victoria (including jurisdictions outside Australia) that, if it had been committed in Victoria, would have constituted an offence of a kind listed in this definition;

tier 3 offence means—

(a) a criminal offence that is not a tier 1 offence or a tier 2 offence; or

(b) an offence under a law of a jurisdiction other than Victoria (including jurisdictions outside Australia) that, if it had been committed in Victoria, would have constituted an offence of a kind listed in this definition;

tour and charter bus service means—

(a) a bus service operated for the carriage of tourists by a bus for hire or reward to a common destination; or

(b) a bus service operated for the carriage of a group of persons by bus for hire or reward by being previously booked or ordered by that group or by another person on behalf of that group and in respect of which the members of that group are not each charged a separate fare;

volunteer means a person who is acting on a voluntary basis (irrespective of whether the person receives out-of-pocket expenses).

(2) For the purposes of the definition of ***route bus service*** in subsection (1)—

(a) a route is a fixed route even if—

(i) a stop on the route is not used on every journey, or ceases to be used altogether; or

(ii) different routes are used on different journeys of the bus service to get from one stop on the route to another stop on the route;

(b) a bus service operates on a regular basis even if—

(i) it only operates on any particular occasion if there is a sufficient level of demand for it; or

(ii) it requires a person using it to book or reserve a place before using it.

(3) A reference to a person who has been found guilty of an offence is a reference to a person—

(a) against whom a court has made a formal finding that he or she is guilty of the offence; or

(b) from whom a court has accepted a plea that he or she is guilty of the offence; or

(c) from whom a court has accepted an admission under section 100 of the **Sentencing Act 1991** that he or she has committed the offence, or from whom a similar admission has been accepted under equivalent provisions of the laws of a jurisdiction other than Victoria; or

(d) against whom a finding has been made under—

(i) section 17(1)(b) of the **Crimes (Mental Impairment and Unfitness to be Tried) Act 1997** that he or she was not guilty of the offence or an offence available as an alternative because of mental impairment; or

(ii) the **Crimes (Mental Impairment and Unfitness to be Tried) Act 1997** of not guilty because of mental impairment; or

(iii) section 17(1)(c) of the **Crimes (Mental Impairment and Unfitness to be Tried) Act 1997** that he or she committed the offence—

or against whom a similar finding has been made under equivalent provisions of the laws of a jurisdiction other than Victoria (including jurisdictions outside Australia)—

being an admission, plea or finding that has not been subsequently quashed or set aside by a court.

(4) A reference to a person who has been charged with an offence is a reference to a person—

(a) against whom an indictment has been filed for the offence; or

S. 3(4)(a) amended by No. 68/2009 s. 97(Sch. item 14.1).

(b) against whom a charge-sheet charging the offence has been filed, whether or not—

S. 3(4)(b) amended by No. 68/2009 s. 97(Sch. item 14.2).

(i) a summons to answer the charge; or

(ii) a warrant to arrest the person—

has been issued or served.

(5) A reference to a charge that has not been finally disposed of is a reference to a charge that has not been finally disposed of by—

(a) being withdrawn or by the discontinuance of the prosecution; or

S. 3(5)(a) amended by No. 68/2009 s. 97(Sch. item 14.3).

(b) the charge having been dismissed by a court; or

(c) the person charged having been discharged by a court following a committal hearing; or

S. 3(5)(c) amended by No. 68/2009 s. 97(Sch. item 14.4).

S. 3(5)(d) amended by No. 68/2009 s. 97(Sch. item 14.5).

(d) the person charged having been acquitted or found guilty of the offence by a court; or

(e) any other prescribed means.

S. 3A inserted by No. 6/2010 s. 24(5)(Sch. 1 item 4) (as amended by No. 45/2010 s. 5).

3A Transport Integration Act 2010

This Act is transport legislation within the meaning of the **Transport Integration Act 2010**.

4 Objects of bus safety

(1) The objects of this Act are to promote—

(a) the safety of bus services;

(b) the effective management of safety risks in bus services;

(c) continuous improvement in bus safety management;

(d) public confidence in the safety of the transport of passengers by bus;

(e) the involvement of relevant stakeholders in bus safety;

(f) a safety culture among persons who participate in the provision of bus services.

(2) The Parliament does not intend by Part 2 to create in any person any legal right or give rise to any civil cause of action.

5 Crown to be bound

(1) This Act binds the Crown—

(a) in right of the State of Victoria;

(b) to the extent that the legislative power of the Parliament permits, the Crown in all its other capacities.

(2) To avoid doubt, the Crown is a body corporate for the purposes of this Act or the regulations.

6 Interaction with Occupational Health and Safety Act

(1) If a provision of the **Occupational Health and Safety Act 2004** or the regulations made under that Act applies to an activity in respect of which a duty is imposed under Division 2 of Part 3, that provision continues to apply, and must be observed in addition to that Division and any regulations made under this Act for the purposes of that Division.

Note

See also section 51 of the **Interpretation of Legislation Act 1984**.

(2) If a provision of this Act or the regulations made under this Act is inconsistent with a provision of the **Occupational Health and Safety Act 2004** or the regulations made under that Act, the **Occupational Health and Safety Act 2004** or the regulations made under it prevail to the extent of the inconsistency.

(3) Compliance with this Act or the regulations made under this Act, or with any requirements imposed under this Act or the regulations, is not in itself a defence in any proceedings for an offence against the **Occupational Health and Safety Act 2004** or the regulations made under that Act.

(4) Evidence of a relevant contravention of this Act or the regulations made under this Act is admissible in any proceedings for an offence against the **Occupational Health and Safety Act 2004** or the regulations made under that Act.

7 Declaration powers of Safety Director

(1) Subject to subsection (2), the Safety Director may declare by notice published in the Government Gazette that—

(a) a motor vehicle or class of motor vehicle that is a bus specified in paragraph (a) of the definition of ***bus*** in section 3(1) is not a motor vehicle or class of motor vehicle that is a bus within the meaning of that definition;

(b) a motor vehicle or class of motor vehicle that is not a bus specified in paragraph (a) of the definition of ***bus*** in section 3(1) is to be a motor vehicle or class of motor vehicle that is a bus within the meaning of that definition;

(c) a courtesy bus service within the meaning of the definition of ***courtesy bus service*** in section 3(1) is to be a ***non-commercial courtesy bus service*** for the purposes of section 3(1) if the Safety Director is satisfied that the operator of the service does not derive any profit from the provision of the service;

(d) a bus service that is not defined to be a ***commercial bus service***, a ***community and private bus service***, a ***courtesy bus service***, a ***hire and drive bus service*** or a ***local bus service*** within the meaning of section 3(1), is a—

(i) ***commercial bus service***; or

(ii) ***community and private bus service***; or

(iii) ***courtesy bus service***; or

(iv) ***hire and drive bus service***; or

(v) ***local bus service***—

within the meaning of that definition (as appropriate);

(e) a bus service that is defined to be a ***commercial bus service***, a ***community and private bus service***, a ***courtesy bus service***, a ***hire and drive bus service*** or a ***local bus service*** within the meaning of section 3(1) is not a—

(i) ***commercial bus service***; or

(ii) ***community and private bus service***; or

(iii) ***courtesy bus service***; or

(iv) ***hire and drive bus service***; or

(v) ***local bus service***—

within the meaning of that definition (as appropriate) despite the bus service meeting the specifications in that definition.

(2) If the Safety Director intends to make a declaration under subsection (1), the Safety Director must—

(a) advise operators and sectors of the industry that will be affected by the declaration, if declared, of the proposed declaration; and

(b) provide those operators and sectors with an opportunity to make a submission in relation to the proposed declaration.

(3) The Safety Director must have regard to any submissions received under subsection (2) before making the declaration.

8 Declaration of substances to be a drug

The Minister, by Order published in the Government Gazette, may declare any substance to be a drug for the purposes of Part 5.

PART 2—PRINCIPLES OF BUS SAFETY

9 Principle of shared responsibility

(1) The safe operation of bus services is the shared responsibility of—

(a) the operator; and

(b) bus safety workers; and

(c) procurers; and

(d) persons who determine the location of bus stopping points, or who design, construct, install, modify or maintain a bus stopping point or bus stop infrastructure; and

(e) the Safety Director; and

(f) members of the public.

(2) The level and nature of responsibility that a person referred to in subsection (1), or a person within a class of persons referred to in subsection (1), has for bus safety is dependent on—

(a) the nature of the risk to bus safety that the person creates from the carrying out of an activity or the making of a decision; and

(b) the capacity that that person has to control, eliminate or mitigate that risk or any other risk to bus safety.

10 Principle of accountability for managing safety risks

Managing risks associated with the provision of bus services is the responsibility of the person best able to control the risk.

11 Principle of enforcement

Enforcement of this Act and the regulations should be undertaken for the purpose of—

(a) protecting public safety;

(b) promoting improvement in bus safety;

(c) removing any incentive for unfair commercial advantage that might be derived from contravening the bus safety requirements under this Act or the regulations;

(d) influencing the attitude and behaviour of persons whose actions may have adverse impacts on bus safety.

12 Principle of transparency and consistency

Bus regulatory decision-making processes should be timely, transparent and nationally consistent.

13 Principle of participation, consultation and involvement of all affected persons

The persons and classes of persons referred to in sections 9(1)(a), 9(1)(b), 9(1)(c) and 9(1)(d) should—

(a) participate in or be able to participate in; and

(b) be consulted on; and

(c) be involved in—

the formulation and implementation of measures to manage risks to safety associated with the provision of bus services.

PART 3—BUS SAFETY DUTIES

Division 1—The concept of ensuring safety

14 The concept of ensuring safety

(1) To avoid doubt, a duty imposed on a person under this Act or the regulations to ensure, so far as is reasonably practicable, safety requires the person to—

(a) eliminate risks to safety so far as is reasonably practicable; and

(b) if it is not reasonably practicable to eliminate risks to safety, to reduce those risks so far as is reasonably practicable.

(2) To avoid doubt, for the purposes of this Act or the regulations, regard must be had to the following matters in determining what is (or was at a particular time) reasonably practicable in relation to ensuring safety—

(a) the likelihood of the hazard or risk concerned eventuating;

(b) the degree of harm that would result if the hazard or risk eventuated;

(c) what the person concerned knows, or ought reasonably to know, about the hazard or risk and any ways of eliminating or reducing the hazard or risk;

(d) the availability and suitability of ways to eliminate or reduce the hazard or risk;

(e) the cost of eliminating or reducing the hazard or risk.

Division 2—Safety duties

15 Duty of operator

(1) An operator of a bus service must, so far as is reasonably practicable, ensure the safety of the bus service.

Penalty: In the case of a natural person, 1800 penalty units;

In the case of a body corporate, 9000 penalty units.

(2) An offence against subsection (1) is an indictable offence.

Note to s. 15(2) amended by No. 68/2009 s. 97(Sch. item 14.6).

Note

However, the offence may be heard and determined summarily (see section 28 of the **Criminal Procedure Act 2009**).

16 Duty of procurer

(1) A procurer of a bus service must, so far as is reasonably practicable, ensure the safety of the bus service.

Penalty: In the case of a natural person, 1800 penalty units;

In the case of a body corporate, 9000 penalty units.

(2) Without limiting subsection (1), a procurer of a bus service contravenes that subsection if the bus service is procured on terms that impose conditions or obligations which prevent or threaten, or are reasonably likely to prevent or threaten, the safe operation of the bus service.

(3) A person is not a procurer of a bus service only because the person provides funding to the operator of the bus service.

(4) An offence against subsection (1) is an indictable offence.

Note

However, the offence may be heard and determined summarily (see section 28 of the **Criminal Procedure Act 2009**).

Note to s. 16(4) amended by No. 68/2009 s. 97(Sch. item 14.7).

17 Duty of bus safety worker

(1) A bus safety worker must take reasonable measures to ensure the safety of persons who may be affected by the acts or omissions of the bus safety worker.

Penalty: In the case of a natural person, 1800 penalty units;

In the case of a body corporate, 9000 penalty units.

(2) An offence against subsection (1) is an indictable offence.

Note

However, the offence may be heard and determined summarily (see section 28 of the **Criminal Procedure Act 2009**).

Note to s. 17(2) amended by No. 68/2009 s. 97(Sch. item 14.8).

18 Duties in relation to bus stopping points and bus stop infrastructure

(1) A person who determines the location of, designs, constructs, installs, modifies or maintains a bus stopping point or any bus stop infrastructure, or who engages a person to do any of those things, must ensure, so far as is reasonably practicable, that the location, design, construction or condition

of the bus stopping point or bus stop infrastructure is safe.

Penalty: In the case of a natural person, 1800 penalty units;

In the case of a body corporate, 9000 penalty units.

(2) An offence against subsection (1) is an indictable offence.

Note to s. 18(2) amended by No. 68/2009 s. 97(Sch. item 14.9).

Note

However, the offence may be heard and determined summarily (see section 28 of the **Criminal Procedure Act 2009**).

Division 3—Bus inspections and safety audits

19 Bus safety inspections

(1) An accredited bus operator must ensure that each bus used to provide the commercial bus service or local bus service undergoes a safety inspection in accordance with the regulations—

(a) annually; or

(b) at prescribed intervals.

Penalty: In the case of a natural person, 20 penalty units;

In the case of a body corporate, 100 penalty units.

(2) A registered bus operator must ensure that each bus used to provide the bus service undergoes a safety inspection in accordance with the regulations.

Penalty: In the case of a natural person, 5 penalty units;

In the case of a body corporate, 25 penalty units.

(3) An accredited bus operator or registered bus operator must arrange a safety inspection of each bus used to provide the bus service operated by the operator if the Safety Director directs that a safety inspection be conducted in respect of the bus service operated by the operator.

Penalty: In the case of a natural person, 20 penalty units;

In the case of a body corporate, 100 penalty units.

20 Safety audits

The Safety Director may conduct, or cause to be conducted, a safety audit, to determine whether or not the requirements of this Act and the regulations are satisfactorily complied with.

PART 4—ACCREDITATION AND REGISTRATION

Division 1—Preliminary matters

21 Purpose of accreditation

(1) The purpose of accreditation under this Part is to attest that a person who operates a commercial bus service or a local bus service has demonstrated to the satisfaction of the Safety Director, and can continue to demonstrate to the satisfaction of the Safety Director, that the person has the competence and capacity to manage the risks to safety associated with operating the commercial bus service or local bus service.

(2) For the purposes of subsection (1), if an operator of a commercial bus service or a local bus service is not a natural person, the responsible person, in relation to the commercial bus service or local bus service, is to demonstrate the competence and capacity specified in that subsection.

22 Registration of operator of bus services that are not commercial bus services or local bus services

(1) This section applies to an operator of a bus service which is not a commercial bus service or a local bus service.

(2) If this section applies, an operator of a bus service must apply to the Safety Director for registration.

(3) An application must—

(a) be made in a manner and form determined by the Safety Director;

(b) contain any prescribed information.

(4) An operator of a bus service to which this section applies must provide the Safety Director with any additional information requested by the Safety Director.

(5) The Safety Director may register an operator to operate the bus service if the Safety Director is satisfied that the operator is not accredited to operate that bus service.

(6) The registration of an operator to operate a bus service is subject to the following conditions—

(a) the operator of the bus service must—

(i) keep the certificate of registration issued by the Safety Director; and

(ii) if the operator ceases to operate the bus service, return the certificate of registration to the Safety Director;

(b) the operator of the bus service must, if the Safety Director requests, produce the certificate of registration to the Safety Director;

(c) the operator of the bus service must notify the Safety Director if—

(i) the nature of the bus service changes;

(ii) the details specified in the application for registration change;

(iii) the operator of the bus service ceases to operate the bus service.

(7) An operator of a bus service to which this section applies must not operate the bus service unless the operator is registered.

Penalty: In the case of a natural person, 60 penalty units;

In the case of a body corporate, 300 penalty units.

(8) A registered bus operator must comply with the conditions specified in subsection (6).

Penalty: In the case of a natural person, 60 penalty units;

In the case of a body corporate, 300 penalty units.

S. 22(9) inserted by No. 19/2010 s. 48.

(9) A registered bus operator must ensure that a person driving a motor vehicle that is a bus for the bus service in respect of which the operator is registered—

(a) holds a full driver licence for the category of motor vehicle that person is driving for the registered bus operator; or

(b) holds a driver licence issued in another jurisdiction that is equivalent to the licence specified in paragraph (a).

Penalty: 60 penalty units.

S. 22(10) inserted by No. 19/2010 s. 48.

(10) In subsection (9)—

full driver licence has the same meaning as it has in the **Road Safety Act 1986**.

23 Registration or accreditation of taxi-cab that is a bus

(1) This section applies to a taxi-cab which—

(a) is licensed to operate as a taxi-cab; and

(b) is a bus specified in paragraph (a) of the definition of ***bus***; and

(c) the operator proposes to use the taxi-cab to provide a bus service.

(2) The operator of a taxi-cab must, depending on the kind of bus service proposed, apply for registration or accreditation.

(3) In considering an application to which this section applies, the Safety Director may have regard to the conditions of the licence to operate as a taxi-cab under the **Transport (Compliance and Miscellaneous) Act 1983** and may—

S. 23(3) amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.3) (as amended by No. 45/2010 s. 22).

(a) impose different conditions in respect of the registration or accreditation as the Safety Director considers appropriate in the circumstances;

(b) exempt the operator from some or all conditions that would otherwise be imposed for the purposes of accreditation under this Part.

(4) In determining conditions which are to apply under subsection (3), the Safety Director must consult with the licensing authority under the **Transport (Compliance and Miscellaneous) Act 1983**.

S. 23(4) amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.3) (as amended by No. 45/2010 s. 22).

Division 2—Accreditation

24 Offence for operator to operate commercial bus service or local bus service unless accredited

An operator of a commercial bus service or a local bus service must not operate the commercial bus service or local bus service unless the operator is accredited under this Part.

Penalty: In the case of a natural person, 240 penalty units;

In the case of a body corporate, 1200 penalty units.

25 Application for accreditation

(1) An operator may apply to the Safety Director for accreditation to operate a commercial bus service or local bus service specified in the application.

S. 25(2) substituted by No. 19/2010 s. 49.

(2) An application must—

(a) be made in a manner and form determined by the Safety Director;

(b) be accompanied by—

(i) the application fee;

(ii) evidence, as required by the regulations, that each relevant person satisfies the requirements for accreditation;

(c) in the case of an application by a person that is not a natural person, nominate at least one relevant person as the responsible person;

(d) be accompanied by any other matter that is required by the regulations.

(3) The Safety Director may require an applicant to—

(a) supply further information specified by the Safety Director;

(b) verify, by statutory declaration, information supplied for the purposes of the application.

(4) The application, and any further information supplied by the applicant under subsection (3), must be signed in accordance with subsection (5) and declared by each signatory to be true and correct.

(5) The application must be signed—

(a) if the applicant is a body corporate—

(i) being a company within the meaning of the Corporations Act, in accordance with section 127 of that Act;

(ii) in any other case, by each director, or each member of the committee of management, of the body corporate;

(b) if the applicant is an unincorporated association or body, by each member of the committee of management of the association or body;

(c) if the applicant is a partnership, by each partner;

(d) if the applicant is a natural person, by that person.

(6) In addition, each signatory referred to in subsection (5) must declare that he or she is not a person who, under Part 2D.6 of the Corporations Act, is disqualified from managing corporations.

(7) In the case of an application by a person that is not a natural person, the Safety Director is entitled to communicate with the responsible person in relation to the application.

26 Criteria on which accreditation application to be assessed

(1) Subject to Division 3, the Safety Director must accredit the operator of a commercial bus service or local bus service if the Safety Director is satisfied that the applicant has, and will continue to have, the competence and capacity to operate a commercial bus service or local bus service safely.

(2) In determining whether an applicant has, and will continue to have, the competence and capacity to operate a commercial bus service or local bus service safely, the Safety Director must have regard to—

(a) whether the applicant or the responsible person has completed an approved training course;

(b) any matters prescribed for the purposes of this section;

(c) any matters declared by the Safety Director and published in the Government Gazette.

Note

See Division 6 for criteria in respect of applications made by operators with accreditation under a corresponding law.

(3) The Safety Director may approve training courses for the purposes of this Act.

Division 3—Accreditation refusal

S. 27 amended by No. 19/2010 s. 50(2) (ILA s. 39B(1)).

27 Accreditation application to be refused in certain circumstances

(1) The Safety Director must refuse to accredit an operator of a commercial bus service or a local bus service if the Safety Director believes on reasonable grounds that—

S. 27(a) amended by No. 19/2010 s. 50(1).

(a) the applicant or a relevant person—

(i) has been found guilty of a tier 1 offence; or

(ii) is a person who is subject to—

(A) reporting obligations referred to in section 12(1)(a) of the **Working with Children Act 2005**; or

(B) an order referred to in section 12(1)(b) of the **Working with Children Act 2005**; or

(b) the applicant has previously been accredited to operate a bus service but the accreditation was cancelled and the applicant is disqualified from obtaining accreditation for a commercial bus service or local bus service; or

(c) if the applicant is a natural person, the applicant is an insolvent under administration within the meaning of the Corporations Act; or

(d) if the applicant is a corporation—

(i) a receiver or receiver and manager, within the meaning of the Corporations Act, has been appointed in relation to the applicant; or

(ii) the applicant has been placed in administration under the Corporations Act or under the law of any place outside Australia; or

(iii) a court has made an order under the Corporations Act for the winding up of the applicant.

S. 27(2) inserted by No. 19/2010 s. 50(2).

(2) The Safety Director must not refuse to accredit an operator of a commercial bus service or local bus service on a ground referred to in subsection (1)(a) if a decision to refuse accreditation in respect of that operator has previously been overturned by VCAT.

28 Accreditation may be refused in certain circumstances

S. 28(1) amended by No. 19/2010 s. 51.

(1) If the Safety Director believes on reasonable grounds that an applicant or a relevant person has been found guilty of a tier 2 offence, the Safety Director must refuse to accredit the operator of the commercial bus service or local bus service unless the applicant for accreditation to operate a commercial bus service or local bus service can demonstrate to the Safety Director that accreditation is appropriate in the circumstances.

(2) The Safety Director may refuse to accredit an operator of a commercial bus service or local bus service if the Safety Director believes on reasonable grounds that—

S. 28(2)(a) amended by No. 19/2010 s. 51.

(a) the applicant or a relevant person has been found guilty of a tier 3 offence; or

(b) the applicant for accreditation to operate the commercial bus service or local bus service has contravened a condition of accreditation held, or previously held, by the applicant to operate a commercial bus service or local bus service.

29 Decision on application may be postponed

The Safety Director may postpone his or her decision on whether to accredit the operator of a commercial bus service or local bus service if—

(a) the applicant or a relevant person has been charged with a disqualifying offence; and

S. 29(a) amended by No. 19/2010 s. 52.

(b) the charge has not been finally disposed of; and

(c) the Safety Director believes that a finding of guilt would be relevant to his or her decision.

30 Disqualification from ability to apply for accreditation

(1) If the Safety Director has refused an application for accreditation, the Safety Director may determine that the applicant is disqualified from applying for accreditation for the period determined by the Safety Director.

(2) The period determined by the Safety Director under subsection (1) must not exceed 5 years.

31 Notification and reasons to be given if accreditation refused

(1) If the Safety Director refuses to accredit the operator of a commercial bus service or local bus service, the Safety Director must—

(a) notify the applicant—

(i) of that refusal; and

(ii) if the Safety Director has made a determination under section 30, of the disqualification; and

(iii) that the applicant has a right to seek review of the Safety Director's decision under Part 6; and

(b) give the applicant a statement of reasons for the refusal, and if section 30 applies, for the disqualification.

(2) A notification under subsection (1)(a) and a statement of reasons under subsection (1)(b) must be—

(a) in writing; and

(b) given to the applicant as soon as practicable after the Safety Director makes his or her decision.

Division 4—Provisions relating to accreditation

32 Classes of accreditation

The Safety Director may determine different classes of accreditation which are to apply in respect of different types of commercial bus service or local bus service.

33 Issue of certificate of accreditation

(1) If the Safety Director grants an application for accreditation, the Safety Director must allocate an accreditation number to the accredited bus operator and issue a certificate of accreditation to the accredited bus operator which—

(a) is in the form approved by the Safety Director; and

(b) specifies—

(i) the accreditation number allocated to the accredited bus operator;

(ii) the name and contact details of the accredited bus operator;

S. 33(1)(b)(iii) amended by No. 19/2010 s. 53.

(iii) the name and contact details of the responsible person;

(iv) the class of accreditation;

(v) any conditions to which the accreditation is subject;

(vi) if the accreditation is for a fixed period, the date of expiry;

(vii) any additional information that the Safety Director considers appropriate.

(2) The Safety Director may, on the application of an accredited bus operator accompanied by any reasonable fee determined by the Safety Director, issue a replacement certificate of accreditation if the Safety Director is satisfied, whether on the production of a statutory declaration or otherwise, that the certificate last issued to the accredited bus operator has been lost, stolen or destroyed.

(3) An accredited bus operator who has made an application under subsection (2) on the ground that a certificate has been lost or stolen and who subsequently recovers the lost or stolen certificate must, within 14 days after the day on which the certificate is recovered—

(a) notify the Safety Director of the recovery; and

(b) return the recovered certificate to the Safety Director unless informed by the Safety Director that it is not necessary to do so.

Penalty: In the case of a natural person, 20 penalty units;

In the case of a body corporate, 100 penalty units.

34 Accreditation granted subject to conditions

(1) An accreditation granted to the operator of a commercial bus service or local bus service is subject to—

(a) the conditions specified in section 35;

(b) any prescribed conditions;

(c) any other conditions imposed by the Safety Director.

(2) The Safety Director may, if the Safety Director considers it necessary or desirable to ensure safety, impose conditions on accreditation that are—

(a) general conditions declared by the Safety Director; or

(b) applicable to the operation of certain classes of commercial bus service or local bus service; or

(c) imposed on a case by case basis.

(3) If the Safety Director intends to impose general conditions of accreditation under subsection (2)(a) or (2)(b), the Safety Director must—

(a) advise operators and sectors of the industry that will be affected by the conditions, if declared, of the proposed conditions; and

(b) provide those operators and sectors with an opportunity to make a submission in relation to the proposed conditions.

(4) The Safety Director must have regard to any submissions received under subsection (3) before declaring the general conditions.

(5) The Safety Director must publish any general conditions that he or she has declared in the Government Gazette.

35 Mandatory conditions of accreditation

An accreditation granted under this Part is subject to the following conditions—

(a) a person must not be permitted to drive a bus for a commercial bus service or local bus service unless that person holds a driver accreditation under Division 6 of Part VI of the **Transport (Compliance and Miscellaneous) Act 1983**;

S. 35(a) amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.4) (as amended by No. 45/2010 s. 22).

(b) an accredited bus operator must use buses that—

(i) comply with the vehicle standards applicable to buses under the **Road Safety Act 1986**; and

(ii) comply with prescribed requirements;

(c) an accredited bus operator must—

(i) keep the certificate of accreditation given to the operator; and

(ii) produce that certificate if the Safety Director requests that the certificate be produced;

(d) if the responsible person ceases to be an employee or officer of the accredited bus operator, the accredited bus operator must ensure that—

(i) another employee or officer of the operator completes an approved training course and that the Safety Director is advised of who this employee or officer is; or

(ii) if it is not practicable for another employee or officer of the accredited bus operator to complete an approved training course before the responsible person ceases to be an employee or officer of the accredited bus operator, the accredited bus operator may seek the approval of the Safety Director to allow another person to complete an approved training course at a later date.

36 Offence to fail to comply with conditions

An accredited bus operator must comply with the conditions to which the accreditation is subject.

Penalty: In the case of a natural person, 240 penalty units;

In the case of a body corporate, 1200 penalty units.

37 Time within which Safety Director must make decision whether to accredit

(1) Subject to this section, the Safety Director must decide whether to accredit the operator of a commercial bus service or local bus service within 3 months after receiving an application from the operator.

(2) The Safety Director may, before the expiry of the period specified in subsection (1), decide to extend the period within which he or she may decide whether to accredit the operator.

(3) If the Safety Director decides to extend the period under subsection (2), the Safety Director must notify the operator of that decision and the new period within which the Safety Director intends to make his or her decision.

(4) A notification under subsection (3) must be in writing.

38 How long accreditation lasts

(1) An accreditation remains in force until it—

(a) is cancelled or surrendered; or

(b) expires.

(2) The Safety Director may grant a temporary accreditation for a period of less than 12 months.

39 Accreditation cannot be transferred

(1) An accreditation—

(a) is personal to the accredited bus operator;

(b) is not capable of being transferred or assigned to any other person or otherwise dealt with by the accredited bus operator;

(c) does not vest by operation of law in any other person.

(2) A purported transfer, assignment or lease of an accreditation and any other purported dealing with an accreditation by the accredited bus operator who holds it is of no effect.

(3) This section has effect despite anything in any Act (other than the Charter of Human Rights and Responsibilities) or rule of law to the contrary.

Division 5—Variation and surrender of accreditation

40 Accredited bus operator may apply for variation

(1) An accredited bus operator may apply to the Safety Director to—

(a) vary—

(i) a condition of an accreditation;

(ii) the class of bus service for which the operator is accredited to operate;

(iii) the scope of the accreditation by adding a bus service or class of bus service to the accreditation;

(iv) the expiry date that may apply to the accreditation by changing that date or omitting that date;

(b) revoke a condition of an accreditation.

(2) An application must—

(a) be in writing; and

(b) set out the reasons for the variation or revocation of the condition.

(3) The Safety Director must consider an application he or she receives under this section within 3 months of receiving the application.

(4) The Safety Director may, as the case requires—

(a) grant or refuse to grant the variation;

(b) agree or refuse to agree to the revocation;

(c) make any variation to the accreditation that the Safety Director considers appropriate.

(5) If the Safety Director refuses to grant a variation or refuses to agree to a revocation, the Safety Director must—

(a) notify the accredited bus operator—

(i) of that refusal; and

(ii) that the accredited bus operator has a right to seek review of the Safety Director's decision under Part 6; and

(b) give the accredited bus operator a statement of reasons for the refusal.

(6) A notification under subsection (5)(a) and a statement of reasons under subsection (5)(b) must be—

(a) in writing; and

(b) given to the accredited bus operator as soon as practicable after the Safety Director makes his or her decision to refuse to grant the variation or to agree to the revocation (as the case requires).

41 Accredited bus operator to notify of relevant changes in circumstances

(1) If a relevant change in circumstances occurs with respect to an accreditation or an accredited bus operator, the accredited bus operator must notify the Safety Director of the change in writing within 7 days after becoming aware of the change.

Penalty: In the case of a natural person, 240 penalty units;

In the case of a body corporate, 1200 penalty units.

(2) For the purposes of subsection (1), a relevant change in circumstances is a change in circumstances—

(a) that has resulted or will result in any particular set out in—

(i) the application for the accreditation or in any document that accompanied that application or was supplied in connection with it; or

(ii) the certificate of accreditation—

becoming inaccurate or inapplicable; or

(b) with respect to the manner of operating the commercial bus service or local bus service that has resulted or will or may result in the accredited bus operator not being able to comply with a requirement under this Act; or

(c) that has resulted or will or may result in a ground for refusal of accreditation referred to in section 27 or 28 becoming applicable to the accredited bus operator; or

(d) with respect to the number of buses or bus services being operated by the accredited bus operator.

(3) If the relevant change in circumstances has resulted or will result in any particular set out in the certificate of accreditation becoming inaccurate or inapplicable, the accredited bus operator must surrender the certificate to the Safety Director when the accredited operator notifies the Safety Director of the change under subsection (1).

Penalty: In the case of a natural person, 240 penalty units;

In the case of a body corporate, 1200 penalty units.

(4) If a certificate of accreditation is surrendered to the Safety Director in accordance with subsection (3), the Safety Director may amend the certificate or issue a replacement certificate for the remainder of the period of the accreditation.

S. 41(5) amended by No. 19/2010 s. 54.

(5) The Safety Director may require a relevant person to provide any other information or comply with any other requirement (including a criminal records check) that the Safety Director reasonably requires to decide whether or not, because of a relevant change of circumstances, the accredited

bus operator is a suitable person to continue to be accredited.

(6) A person must not fail to comply with a requirement under subsection (5).

Penalty: 1200 penalty units.

42 Variation of accreditation on Safety Director's own initiative

(1) The Safety Director may at any time on his or her own initiative—

(a) vary or revoke a condition of an accreditation; or

(b) impose a new condition; or

(c) vary the class of an accreditation; or

(d) vary the scope of an accreditation by adding a bus service or class of bus service to the accreditation.

(2) Before taking action under this section, the Safety Director must—

(a) give the accredited bus operator written notice of the action that the Safety Director proposes to take; and

(b) allow the accredited bus operator to make written representations about the intended action within 10 business days (or any other period that the Safety Director and the accredited bus operator agree to).

(3) Subsection (2) does not apply if the Safety Director considers it necessary to take immediate action in the interest of public safety.

(4) If the Safety Director takes immediate action under this section, the Safety Director must notify the accredited bus operator within 48 hours of making the decision.

(5) The Safety Director must—

(a) give the accredited bus operator—

(i) details of any action taken under subsection (1); and

(ii) details of any change to the conditions of the accreditation that are required as a result of any amendment to the regulations; and

(iii) a statement of reasons for any action taken under subsection (1); and

(b) notify the accredited bus operator that the operator has a right to seek review of the Safety Director's decision under Part 6.

(6) The Safety Director must give the details, the statement of reasons and notice under subsection (5) in writing.

43 Surrender of accreditation

(1) An accredited bus operator may request the Safety Director to consent to the surrender of the accreditation to operate a commercial bus service or local bus service.

(2) A request must be in writing.

(3) On receipt of a request, the Safety Director may consent to the surrender of the accreditation.

(4) If the Safety Director refuses to consent to the surrender of an accreditation, the Safety Director must—

(a) notify the accredited bus operator—

(i) of that refusal; and

(ii) that they have a right to seek review of the Safety Director's decision under Part 6; and

(b) give the accredited bus operator a statement of reasons for the refusal.

(5) A notification under subsection (4)(a) and statement of reasons under subsection (4)(b) must be—

(a) in writing; and

(b) given to the accredited bus operator as soon as practicable after the Safety Director makes his or her decision to refuse consent to the surrender of the accreditation.

Division 6—Bus services under corresponding law

44 Unregistered and unaccredited operators from outside Victoria

A vehicle that is permitted under the laws of another State or Territory to be operated to provide the equivalent of a bus service may operate on a highway, if, in accordance with those laws—

(a) it is used to pick up a passenger in that other State or Territory and take the passenger to a destination in Victoria, and it operates on the highway solely for that purpose; or

(b) having been pre-booked to do so, it is used to pick up a passenger in Victoria for the purpose of taking the passenger to a destination in that other State or Territory, and it operates on the highway solely for that purpose; or

(c) it is used to pick up a passenger in a State or Territory other than Victoria and to take the passenger to a destination in a State or Territory other than Victoria, and it operates on the highway solely for that purpose.

45 Criteria on which accreditation application of operator accredited under corresponding law to be assessed

(1) This section applies if the Safety Director receives an application for accreditation under Division 2 from an operator that is accredited to operate bus services in another State or Territory of the Commonwealth under a corresponding law.

(2) If this section applies, the Safety Director may accredit the operator of a commercial bus service or local bus service if the Safety Director is satisfied that the applicant is accredited in another State or Territory of the Commonwealth under a corresponding law to operate bus services of a kind similar to a commercial bus service or local bus service in that State or Territory.

(3) If the Safety Director accredits an operator specified in subsection (2) to operate a commercial bus service or local bus service—

(a) any conditions imposed on the accreditation of the operator under the corresponding law are taken to be conditions imposed by the Safety Director under Division 4 for the purposes of accreditation under this Part;

(b) any mandatory conditions that would normally apply to the accreditation under Division 4, apply only to the extent that they are consistent with the conditions imposed on the accreditation of the operator under the corresponding law.

(4) Despite subsection (3), the Safety Director may—

(a) determine that conditions imposed on the accreditation of the operator under the corresponding law do not apply for the purposes of accreditation under this Act;

(b) determine that the mandatory conditions specified under Division 4 apply to the operator regardless of whether those conditions are consistent with the conditions imposed on the accreditation of the operator under the corresponding law;

(c) make any other determination in respect of the conditions that are to apply to the accreditation.

46 Notification of changes in circumstances in respect of accreditation under corresponding law

(1) This section applies to an accredited bus operator that is also accredited in another State or Territory of the Commonwealth under a corresponding law to operate bus services of a similar kind to a commercial bus service or local bus service in that State or Territory.

(2) If a relevant change in circumstances occurs with respect to the accreditation of an accredited bus operator under a corresponding law, the accredited bus operator must notify the Safety Director of the change in writing within 7 days after becoming aware of the change.

(3) For the purposes of subsection (2), a relevant change in circumstances is—

(a) if the accredited bus operator has become subject to disciplinary action in respect of the accreditation under the corresponding law, including the suspension or cancellation of the accreditation under the corresponding law; or

(b) if additional conditions are imposed on the accreditation of the accredited bus operator under the corresponding law.

47 Co-ordination between Safety Director and corresponding Bus Safety Regulator

(1) This section applies if the Safety Director receives an application for accreditation under Division 2, or for variation of accreditation or the conditions of accreditation under Division 5, that indicates that the applicant is accredited, or is seeking accreditation, in another State or a Territory of the Commonwealth under a corresponding law to operate bus services of a similar kind to those the subject of the application under Division 2 or Division 5.

(2) The Safety Director must, as soon as possible and before deciding whether or not to grant the application, consult with the relevant corresponding Bus Safety Regulator, or Regulators, in relation to the application with a view to the outcome of the application being consistent with the outcome of applications made in the other jurisdiction or jurisdictions.

(3) The Safety Director, in complying with subsection (2), must take into account any guidelines prepared under subsection (5).

(4) If the Safety Director does not, in relation to an application, act consistently with the provisions of any guidelines prepared under subsection (5), the Safety Director must give the applicant reasons for not so acting.

(5) The Minister may prepare guidelines about the manner of the consultation the Safety Director is required to undertake under subsection (2).

Division 7—Suspension, cancellation and other disciplinary action

48 Power of immediate suspension

(1) The Safety Director may, subject to and in accordance with the regulations (if any), immediately suspend an accreditation if the Safety Director considers it necessary to do so.

(2) The Safety Director may immediately suspend an accreditation under this section without holding an inquiry under section 50.

(3) A suspension under this section may be—

(a) for a specified period;

(b) until a specified event;

(c) if the accredited bus operator or a relevant person has been charged with a disqualifying offence and has been suspended because of that charge, until the charge has been finally disposed of;

S. 48(3)(c) amended by No. 19/2010 s. 55.

(d) if the accredited bus operator has an accreditation under a corresponding law that has been suspended or cancelled, until the interstate accreditation is reinstated;

(e) until a further determination is made by the Safety Director.

(4) If the accreditation of an accredited bus operator has been suspended, the operator may, by notice served on the Safety Director, require the Safety Director to hold an inquiry under section 50.

(5) The Safety Director must commence an inquiry under section 50 within 7 days after the service on him or her of a notice under subsection (4).

(6) If an inquiry is to be held under section 50, the Safety Director may determine that a suspension of an accreditation continues to have effect until the completion of that inquiry.

(7) If an inquiry is held under section 50, a suspension under this section, if then still in effect, ceases to have effect on the completion of that inquiry.

(8) Nothing in this section limits any power of the Safety Director under section 50.

S. 49 amended by No. 19/2010 s. 56 (ILA s. 39B(1)).

49 Mandatory cancellation

(1) The Safety Director must cancel the accreditation of an accredited bus operator if the accredited bus operator or a relevant person in relation to that accredited bus operator has been found guilty of a tier 1 offence or becomes subject to the reporting obligations, or an order, referred to in section 27(a)(ii).

S. 49(2) inserted by No. 19/2010 s. 56(2).

(2) The Safety Director must not cancel an accreditation of an accredited bus operator on a ground referred to in subsection (1) if a decision to refuse accreditation or a decision to cancel an accreditation in respect of that accredited bus operator on that ground has previously been overturned by VCAT.

50 Disciplinary action against an accredited bus operator

(1) The Safety Director may hold an inquiry for the purpose of determining whether proper cause exists for taking disciplinary action against an accredited bus operator.

S. 50(2) amended by No. 19/2010 s. 57(a).

(2) There is proper cause for taking disciplinary action against the accredited bus operator if the operator or a relevant person in relation to that accredited bus operator (as the case requires)—

(a) has contravened this Act or the regulations;

(b) has not complied with a condition of accreditation;

(c) is found guilty or convicted of a tier 2 or tier 3 offence;

(d) has obtained the accreditation improperly;

(e) has not paid any accreditation fee.

(3) If, following an inquiry, the Safety Director is satisfied proper cause for taking disciplinary action against the accredited bus operator exists, the Safety Director may do one or more of the following—

(a) reprimand the accredited bus operator;

(b) impose one or more new conditions of accreditation;

(c) suspend the accreditation for a specified period or until a specified event or until a further determination is made by the Safety Director;

(d) impose or vary an expiry date on the accreditation;

(e) vary the conditions of, or scope of the accreditation;

(f) cancel the accreditation and, if reasonable cause exists, disqualify the operator from applying for accreditation—

(i) permanently; or

(ii) for a specified period or until a specified event.

S. 50(4) amended by No. 19/2010 s. 57(b).

(4) If the cause for taking disciplinary action is that the accredited bus operator or a relevant person has been found guilty of a tier 2 offence, the accredited bus operator must show cause why the accreditation should not be cancelled.

51 Procedure and powers concerning disciplinary inquiries

(1) In exercising his or her powers under section 50, the Safety Director—

(a) must act fairly and according to equity and good conscience without regard to technicalities or legal forms; and

(b) is not required to conduct himself or herself in a formal manner; and

(c) is not bound by rules or practice as to evidence but may inform himself or herself in relation to any matter in any manner that he or she thinks fit.

S. 51(2) amended by No. 69/2009 s. 54(Sch. Pt 2 item 8).

(2) For the purpose of, and in connection with, any inquiry under section 50, the Safety Director has the powers conferred by sections 14, 15, 16, 20, 20A and 21A of the **Evidence (Miscellaneous Provisions) Act 1958** on a board appointed by the Governor in Council and those sections apply as if the Safety Director was the sole member of the board.

(3) The procedure of the Safety Director on or in connection with an inquiry under section 50 is in his or her discretion.

52 Effect of suspension

A person whose accreditation is suspended—

(a) is not accredited during the period of suspension; and

(b) is disqualified from applying for an accreditation of a kind for which the person was suspended.

Division 8—Miscellaneous

53 Operator to return certificate and plates when accreditation cancelled or surrendered

An operator must return to the Safety Director the certificate of accreditation and the number plates issued to the operator on accreditation, if the accreditation of the operator is cancelled or surrendered under this Act.

Penalty: In the case of a natural person, 60 penalty units;

In the case of a body corporate, 300 penalty units.

54 Safety Director may request information

(1) The Safety Director may, within a period of time specified by the Safety Director, request an accredited bus operator or registered bus operator to give the Safety Director information relating to the safety of the bus service operated by the accredited bus operator or registered bus operator.

Example

Information relating to the safety of a bus service may include details relating to any incidents that may have occurred, any hazards that may have been identified or the type of risk management activities undertaken by an accredited bus operator or registered bus operator.

(2) An accredited bus operator or registered bus operator must comply with a request made by the Safety Director under subsection (1).

Penalty: 1200 penalty units.

55 Communication with responsible person

If an accredited bus operator is not a natural person, the Safety Director may communicate at any time in relation to the accreditation with the responsible person.

PART 5—ALCOHOL AND DRUG MANAGEMENT POLICY

56 Alcohol and drug management policy

(1) This section applies to accredited bus operators and registered bus operators.

(2) An operator to whom this section applies must develop, maintain and implement an alcohol and drug management policy that—

(a) is developed in consultation with bus safety workers who are employees, or contractors, of the operator for the purposes of operating the bus service; and

(b) provides for the matters specified in section 57.

Penalty: In the case of a natural person, 240 penalty units;

In the case of a body corporate, 1200 penalty units.

57 Form and content of alcohol and drug management policy

(1) An alcohol and drug management policy must—

(a) be in writing; and

(b) specify that a driver of a bus must not have alcohol or drugs present in his or her blood or breath immediately before, or while, driving a bus; and

(c) comply with any guidelines regarding the form and content of alcohol and drug management policies issued by the Safety Director.

(2) If an alcohol and drug management policy provides for testing of the presence of alcohol or drugs in the blood or breath of a bus safety worker employed or contracted by the accredited bus operator or registered bus operator, the policy must—

(a) specify circumstances in which a bus safety worker may be tested for the presence of alcohol or drugs in his or her blood or breath;

(b) specify the testing procedures for detecting alcohol or drugs in a person's blood or breath;

(c) specify the persons who may conduct the tests;

(d) specify how and where the tests are to be stored, handled or destroyed;

(e) specify that a test for the presence of alcohol or drugs may not be conducted more frequently than—

(i) an hour before the bus safety worker is to carry out bus safety work or while the bus safety worker is carrying out bus safety work; or

(ii) if there is reasonable cause to test the bus safety worker at another time including—

(A) that the bus safety worker has been involved in an accident or incident;

(B) that there is reason to believe the bus safety worker is impaired by alcohol or drugs;

(C) that in the interests of safety, the bus safety worker ought to be tested;

(f) recognise the purpose of testing for presence of alcohol or drugs;

(g) specify measures to ensure that the results of any tests conducted pursuant to the policy are treated confidentially.

PART 6—REVIEW OF DECISIONS

58 Review by VCAT

(1) A person may apply to VCAT for review of a decision by the Safety Director to—

(a) refuse accreditation to an operator to operate a commercial bus service or local bus service, including a refusal made by the Safety Director under section 27;

(b) impose a condition on the accreditation of an accredited bus operator;

(c) not vary the accreditation following a request for variation by the accredited bus operator;

(d) vary the accreditation of an accredited bus operator;

(e) suspend or cancel the accreditation of an accredited bus operator;

(f) disqualify the operator from applying for accreditation.

(2) An application for review must be made within 28 days after the later of—

(a) the day on which the person is notified of the decision; or

(b) if, under the **Victorian Civil and Administrative Tribunal Act 1998**, the person requests a statement of reasons for the decision, the day on which the statement of reasons is given to the person or the person is informed under section 46(5) of that Act that a statement of reasons will not be given.

(3) In reviewing a decision of the Safety Director made under section 27 or 49, VCAT may—

(a) consider in detail the disqualifying offence that required the Safety Director to make the decision being reviewed; and

(b) vary, uphold or dismiss the decision.

PART 7—CODES OF PRACTICE

59 Codes of practice

(1) For the purposes of providing practical guidance to accredited bus operators and any other person who may be placed under an obligation by or under this Act, the Minister may, subject to section 63, approve one or more codes of practice.

(2) A code of practice—

(a) may consist of any code, standard, rule, specification or provision relating to any aspect of the bus service; and

(b) may apply, incorporate or refer to any document formulated or published by any body or authority as in force at the time the code of practice is approved, or as amended, formulated or published from time to time.

(3) The approval of a code of practice takes effect on the day on which notice of the approval is published in the Government Gazette, or any later day specified in the notice.

Note

A code of practice approved under this section is disallowable by either House of Parliament: see section 71.

60 Revisions to approved codes of practice

(1) Subject to section 63, the Minister may—

(a) approve any revision of the whole, or any part, of an approved code of practice;

(b) revoke the approval of a code of practice.

(2) The approval of a revision to an approved code of practice takes effect on the day on which notice the approval of the revision is published in the Government Gazette, or on any later day specified in the notice.

61 Revocation of approvals of codes of practice

The approval of an approved code of practice ceases to be of effect at the end of the day on which notice of the revocation of the approval is published in the Government Gazette, or on any later day specified in the notice.

62 Availability of approved codes of practice

The Minister must cause—

(a) a current copy of every approved code of practice; and

(b) a copy of every document applied, incorporated or referred to in an approved code of practice (in the form in which that document has effect in the approved code of practice)—

to be made available for inspection by members of the public without charge at the office of the Safety Director during normal office hours.

63 Minister must consult before approving code of practice or revision to code of practice

Before the Minister approves a code of practice or any revision of the whole, or any part, of an approved code of practice under section 59 or 60, the Minister must consult with persons or bodies that may be affected by the code of practice, or revision of an approved code of practice, to be approved.

64 Effect of approved code of practice

A person is not liable to any civil or criminal proceedings by reason only that he, she or it has failed to observe any provision of an approved code of practice.

Note

A person who complies with a compliance code may however, be taken to have complied with this Act (see section 70).

PART 8—GENERAL

Division 1—General

65 Notification of incidents

An accredited bus operator or registered bus operator (as the case requires) must notify the Safety Director of prescribed incidents in accordance with the regulations.

Penalty: 50 penalty units.

66 Offence to provide false or misleading information

(1) A person must not either deliberately or recklessly—

(a) provide any information under this Act that is false or misleading in a material detail; or

(b) provide under this Act any document that is false or misleading in a material detail; or

(c) make any representation under this Act that provides a false or misleading impression of a material detail; or

(d) fail to include any material matter in any information or document provided under this Act if the failure causes the information or document to be false or misleading; or

(e) engage in conduct, or a course of conduct, for a purpose that is relevant to this Act, if that conduct is misleading or deceptive, or is likely to mislead or deceive.

Penalty: 600 penalty units, in the case of a body corporate;

Level 9 imprisonment (6 months maximum) or 120 penalty units or both, in any other case.

(2) Subsection (1)(b) does not apply if, at the time the person provided the document to the person or body to whom the document was provided, the person either—

(a) informed that person or body that the record contained a material detail that was false or misleading and specified in what respect it was false or misleading; or

(b) took all reasonable steps to provide that person or body with that information.

(3) A reference in this section to "under this Act" or "relevant to this Act" is to be read as including a reference to any purpose associated with this Act or the regulations, and regardless of whether the information, document, representation or conduct was required to be provided or was provided voluntarily.

67 Safety Director may set accreditation fees

(1) The Safety Director may, by notice published in the Government Gazette, set—

S. 67(1)(a) amended by No. 19/2010 s. 58.

(a) application fees;

(b) annual accreditation fees;

(c) inspection fees.

(2) In setting fees, the Safety Director may provide for all or any of the following matters—

(a) specific fees;

(b) maximum or minimum fees;

(c) maximum and minimum fees;

(d) scales of fees;

(e) the payment of fees either generally or under specified conditions or in specified circumstances, including conditions or circumstances relating to the late lodgement of an application, or the late payment of fees under the Act;

(f) impose different fees on accredited bus operators, having regard to the nature, size and service being provided by the accredited bus operator.

(3) The Safety Director may provide for the reduction or waiver of fees set under subsection (1) in a particular case or a particular class of case if the Safety Director is satisfied that there are reasonable grounds to provide for the reduction, or the waiver, of fees.

(4) A fee set by the Safety Director is not limited to an amount that is related to the cost of providing a service.

(5) If the Safety Director intends to set fees under this section, the Safety Director must—

(a) advise operators and sectors of the industry that will be affected by the fees, if set, of the proposed fees; and

(b) provide those operators and sectors with an opportunity to make a submission in relation to the proposed fees.

(6) The Safety Director must have regard to any submissions received under subsection (5) before setting the proposed fees.

68 Imputing conduct to bodies corporate

For the purposes of this Act and the regulations, any conduct engaged in or on behalf of a body corporate by an employee, agent or officer (within the meaning given by section 9 of the Corporations Act) of the body corporate acting within the actual or apparent scope of his or her employment, or within his or her actual or apparent authority, is conduct also engaged in by the body corporate.

69 Liability of officers of bodies corporate

(1) If a body corporate (including a body corporate representing the Crown) contravenes a provision of this Act or the regulations and the contravention is attributable to an officer of the body corporate failing to take reasonable care, the officer is guilty of an offence and liable to a fine not exceeding the maximum fine for an offence constituted by a contravention by a natural person of the provision contravened by the body corporate.

(2) An offence against subsection (1) is summary or indictable in nature according to whether the offence constituted by the contravention by the body corporate is summary or indictable.

(3) In determining whether an officer of a body corporate is guilty of an offence, regard must be had to—

(a) what the officer knew about the matter concerned; and

(b) the extent of the officer's ability to make, or participate in the making of, decisions that affect the body corporate in relation to the matter concerned; and

(c) whether the contravention by the body corporate is also attributable to an act or omission of any other person; and

(d) any other relevant matter.

(4) An officer of a body corporate may be convicted or found guilty of an offence in accordance with subsection (1) whether or not the body corporate has been convicted or found guilty of the offence committed by it.

(5) An officer of a body corporate (including a body corporate representing the Crown) who is a volunteer is not liable to be prosecuted under this section for anything done or not done by him or her as a volunteer.

69A Liability of officers of partnerships and unincorporated bodies or associations

S. 69A inserted by No. 19/2010 s. 59.

If—

(a) this Act imposes a duty on a person or provides that a person is guilty of an offence; and

(b) the person is a partnership or an unincorporated body or association (including a partnership or an unincorporated body or association representing the Crown)—

the reference to the person is taken to be instead a reference to each officer of the partnership, body or association (as the case may be).

70 Effect of compliance with regulations or approved codes of practice

If—

(a) the regulations or an approved code of practice make provision for or with respect to a duty or obligation imposed by this Act or the regulations; and

(b) a person complies with the regulations or the approved code of practice to the extent that it makes that provision—

the person is, for the purposes of this Act and the regulations, taken to have complied with this Act or the regulations in relation to that duty or obligation.

71 Tabling and disallowance of approved codes of practice

(1) On or before the 6th sitting day after an approved code of practice is published in the Government Gazette, the Minister must ensure that a copy of that code is laid before each House of the Parliament.

(2) A failure to comply with subsection (1) does not affect the operation or effect of the code of practice but the Scrutiny of Acts and Regulations Committee of the Parliament may report the failure to each House of the Parliament.

(3) A code of practice may be disallowed in whole or in part by either House of Parliament.

(4) Part 5 of the **Subordinate Legislation Act 1994** applies a code of practice as if—

(a) a reference in that Part to "statutory rule" were a reference to a code of practice; and

(b) a reference in section 23(1)(c) of that Act to "section 15(1)" were a reference to subsection (1).

(5) A reference to a code of practice in this section includes a reference to any amendment to, or revision of the whole or any part of, a code of practice.

Division 2—Regulations

72 General

(1) The Governor in Council may make regulations for or with respect to—

(a) prescribing forms to be used for the purposes of this Act;

(b) prescribing the keeping and the form of any records or other documents as may be necessary for the administration of this Act;

(c) the collection, provision, transfer, disclosure or use of information for the purposes of this Act;

(d) any matter or thing authorised or required to be prescribed or necessary to be prescribed for carrying this Act into effect.

(2) Regulations made under this Act—

(a) may be of general or of specially limited application;

(b) may differ according to differences in time, place or circumstance;

(c) may leave any matter or thing to be from time to time determined, applied, dispensed with or regulated by a specified person or specified class of persons;

(d) may provide in a specified case or class of case for the exemption of persons or things from any of the provisions of the regulations, whether unconditionally or on specified conditions, and either wholly or to such extent as is specified;

(e) may confer powers or impose duties in connection with the regulations on any specified person or specified class of persons;

(f) may apply, adopt or incorporate with or without modification, any matter contained in any document, code, standard, rule, specification or method formulated, issued, prescribed or published by any person—

(i) wholly or partially or as amended by the regulations; or

(ii) as formulated, issued, prescribed or published at the time the regulations are made or at any time before then; or

(iii) as formulated, issued, prescribed or published from time to time;

(g) may impose a penalty not exceeding 20 penalty units for any contravention of the regulations.

73 Bus services and bus safety work

(1) Without limiting the generality of section 72, the regulations may be made for or with respect to—

(a) prescribing a class of courtesy bus service to be a non-commercial courtesy bus service;

(b) prescribing a class of bus service to be a—

(i) commercial bus service; or

(ii) courtesy bus service; or

(iii) hire and drive bus service; or

(iv) community and private bus service; or

(v) local bus service;

(c) prescribing a class of bus service not to be a—

(i) commercial bus service; or

(ii) courtesy bus service; or

(iii) hire and drive bus service; or

(iv) community and private bus service; or

(v) local bus service;

(d) prescribing a motor vehicle in a class of vehicles to be a bus;

(e) prescribing a motor vehicle in class of vehicles to not be a bus;

(f) prescribing activities to be bus safety work.

74 Safety duties

Without limiting the generality of section 72, the regulations may be made for or with respect to—

(a) specified safety obligations to be imposed on—

(i) operators, bus safety workers and procurers; and

(ii) persons who design, determine the location of, construct, install, modify and maintain, bus stopping points or bus stop infrastructure;

(b) prohibiting specified conduct by—

(i) operators, bus safety workers and procurers; and

(ii) persons who determine the location of, design, construct, install, modify or maintain, bus stopping points or bus stop infrastructure—

for bus safety purposes;

(c) the way in which duties or obligations imposed by this Act or the regulations are performed;

(d) regulating or requiring the taking of any action to avoid a hazard or incident in relation to operating bus services;

(e) regulating, requiring or prohibiting the taking of any action in the event of an incident in relation to the operation of bus services;

(f) regulating the engineering standards and specifications of buses and standards relating to the maintenance of buses, including in relation to safety equipment or devices to be installed on buses;

(g) regulating or requiring the examination, testing, maintenance or repair of buses, or equipment in, or on, a bus.

75 Inspections and safety audits

Without limiting the generality of section 72, the regulations may be made for or with respect to—

(a) bus inspections, including in relation to—

(i) the nature of the inspections;

(ii) the frequency of the inspections;

(iii) the manner in which inspections are to be carried out;

(iv) who may conduct the inspections and the qualifications, experience and certifications required by inspectors;

(v) the form and content of inspection reports;

(vi) circumstances when an inspector cannot conduct an inspection;

(b) regulating the manner in which inspectors are to make recommendations to operators including with respect to—

(i) the type and nature of recommendations which may be obligatory and require compliance by operators;

(ii) the consequences for noncompliance by operators with the recommendations made by inspectors;

(iii) the notification of the Safety Director by an operator if an operator is unable to comply with a recommendation;

(c) requiring inspectors to notify the Safety Director in prescribed circumstances;

(d) prescribing the process by which the Safety Director may impose requirements on operators, which must be complied with, following an inspection, or based on a notification by an inspector or an operator;

(e) prescribing the consequences for non-compliance by an operator with a requirement imposed by the Safety Director;

(f) regulating the notifications required before a safety audit can be conducted by the Safety Director on an operator;

(g) the manner in which a safety audit is to be conducted;

(h) the requirements the Safety Director may impose on an operator, which must be complied with, following a safety audit.

76 Accreditation and registration

Without limiting the generality of section 72, the regulations may be made for or with respect to—

(a) the requirements and process to be observed by operators of a bus service applying to be registered;

(b) the form of a certificate of registration;

(c) the form of a certificate of accreditation;

(d) the requirements, manner and process to be observed by operators of a commercial bus service or local bus service applying for accreditation;

(e) prescribing the form of an application for accreditation;

(f) prescribing documents and things that must accompany an application for accreditation;

(g) matters to be considered by the Safety Director when determining an accreditation application;

(h) prescribing approved training courses that must be completed by an applicant for accreditation or a responsible person;

(i) prescribing classes of accreditation;

(j) prescribing conditions of accreditation;

S. 76(k) amended by No. 19/2010 s. 60.

(k) prescribing registration fees, application fees or accreditation fees.

77 Fees

(1) A power conferred by this Act to make regulations providing for the imposition of fees may be exercised by providing for all or any of the following matters—

(a) specific fees;

(b) maximum or minimum fees;

(c) maximum and minimum fees;

(d) scales of fees;

(e) the payment of fees either generally or under specified conditions or in specified circumstances, including conditions or circumstances relating to the late lodgement of an application, or the late payment of fees, under this Act;

(f) the reduction, waiver or refund, in whole or in part, of the fees.

(2) If under subsection (1)(f) regulations provide for a reduction, waiver or refund, in whole or in part, of a fee, the reduction, waiver or refund may be expressed to apply either generally or specifically—

(a) in respect of certain matters or transactions or classes of matters or transactions; or

(b) in respect of certain documents or classes of documents; or

(c) when an event happens; or

(d) in respect of certain persons or classes of persons; or

(e) in respect of any combination of matters, transactions, documents, events or persons—

and may be expressed to apply subject to specified conditions or in the discretion of any specified person.

(3) A fee that may be imposed by regulation is not limited to an amount that is related to the cost of providing a service.

78 Transitional regulations

(1) The Governor in Council may make regulations containing provisions of a savings or transitional nature consequent on the enactment of this Act.

(2) A provision mentioned in subsection (1) may be retrospective in operation to the commencement of section 78.

(3) Regulations made under this section have effect despite anything to the contrary in any Act (other than this Act or the Charter of Human Rights and Responsibilities) or in any subordinate instrument.

(4) This section expires on 31 August 2013.

Pt 8 Div. 3 (Heading and ss 78A–78D) inserted by No. 19/2010 s. 61.

Division 3—Transitional provisions for operators who must be registered or accredited

S. 78A inserted by No. 19/2010 s. 61.

78A Definition

In this Division—

commencement day means 31 December 2010.

S. 78B inserted by No. 19/2010 s. 61.

78B Transitional provision for existing bus operators requiring registration from commencement day

(1) This section applies to a person who was an operator of a bus service immediately before the commencement day and that bus service in respect

of which the person is the operator, is on and from the commencement day, a bus service that is not a commercial bus service or a local bus service.

(2) Subject to subsection (3), a person to whom this section applies is not required to comply with section 22 until 31 December 2011.

(3) A person who is an operator of a bus service to whom this section applies is required to comply with section 22 before 31 December 2011 if the person is served with a notice from the Safety Director requiring the person to register as an operator of a bus service to which section 22 applies.

(4) A notice served on a person under subsection (3) must—

(a) be in writing; and

(b) be served by registered or certified post; and

(c) state that the person is required to apply for registration under section 22 within the period specified in the notice.

(5) The period specified in a notice under subsection (4)(c) must not be less than 28 days after the notice is served on the person.

78C Transitional provision for bus operators no longer required to be accredited from commencement day

S. 78C inserted by No. 19/2010 s. 61.

Despite the repeal of Part 2 of the **Public Transport Competition Act 1995** by this Act, a person who—

(a) immediately before the commencement day, was accredited to operate a road transport passenger service within the meaning of the **Public Transport Competition Act 1995**; and

(b) on and after the commencement day—

(i) is not required to be accredited as an operator of a bus service under Division 2 of Part 4; and

(ii) is required to be registered as an operator of a bus service under section 22—

continues to be, on and after the commencement day, a person accredited under the **Public Transport Competition Act 1995**, as if Part 2 of that Act had not been repealed, until 31 December 2011 unless that person is registered under section 22 before 31 December 2011.

S. 78D inserted by No. 19/2010 s. 61.

78D Transitional provision for drivers of commercial passenger vehicles

(1) This section applies to a person who was licensed to operate a commercial passenger vehicle immediately before the commencement day under Division 5 of Part VI of the **Transport Act 1983** and the vehicle in respect of which the person is licensed, is on and after the commencement day, a bus.

(2) A person referred to in subsection (1) is, on and after the commencement day, deemed to comply with this Act and the regulations if the person complies with the conditions of his or her licence issued under Division 5 of Part VI of the **Transport Act 1983** until the earlier of—

(a) the person becoming a registered bus operator or an accredited bus operator; or

(b) 31 December 2011.

PART 9—AMENDMENTS TO OTHER ACTS AND REPEAL OF PART

Division 1—Criminal Procedure Act 2009

Pt 9 Div. 1 (Heading and s. 79) substituted by No. 68/2009 s. 97(Sch. item 14.10).

S. 79 substituted by No. 68/2009 s. 97(Sch. item 14.10).

79 Amendment of Schedule 2—Indictable offences that may be heard and determined summarily

After item 3 of Schedule 2 to the **Criminal Procedure Act 2009 insert**—

"**3A Bus Safety Act 2009**

Indictable offences under the **Bus Safety Act 2009**.".

Division 2—Public Transport Competition Act 1995

80 Amendment of section 12—Duration of accreditation

After section 12(2) of the **Public Transport Competition Act 1995 insert**—

"(3) Despite subsection (1), the Director may extend the period that an accreditation which is in force immediately before the commencement of section 80 of the **Bus Safety Act 2009** remains in force for a period of not more than 2 years.".

81 Section 1 substituted—Purpose of Act

For section 1 of the **Public Transport Competition Act 1995 substitute**—

"**1 Purpose**

The purpose of this Act is to implement a system of service contracts for certain types of bus services and to provide for the service standards that are to apply in the provision of those bus services and other bus services.".

82 Consequential amendments

(1) In section 3(1) of the **Public Transport Competition Act 1995**—

(a) the definitions of ***accredited person***, ***courtesy service***, ***disqualifying offence***, ***hire and drive service***, ***private bus service***, ***public passenger vehicle***, ***road transport passenger service*** and ***temporary accreditation*** are **repealed**;

(b) for the definition of ***bus*** **substitute**—

"***bus*** has the same meaning as it has in section 3(1) of the **Bus Safety Act 2009**;";

(c) for the definition of ***regular passenger service*** **substitute**—

"***regular passenger service*** means—

(a) a route bus service within the meaning of the **Bus Safety Act 2009**;

(b) a demand responsive bus service within the meaning of the **Bus Safety Act 2009**;

(c) a prescribed class of bus service other than a prescribed class of route bus service or demand responsive bus service;

(d) a bus service declared under section 4A to be a regular bus service—

but does not include—

(e) a bus service which is prescribed not to be a class of regular passenger service;

(f) a bus service which is declared under section 4A not to be a regular passenger service;".

(2) Sections 3A and 3B of the **Public Transport Competition Act 1995** are **repealed**.

(3) Part 2 of the **Public Transport Competition Act 1995** is **repealed**.

(4) Sections 36(1B) and 36(2) of the **Public Transport Competition Act 1995** are **repealed**.

S. 82(4) substituted by No. 19/2010 s. 62.

(5) After section 38(1) of the **Public Transport Competition Act 1995 insert**—

S. 82(5) amended by No. 19/2010 s. 66.

"(1A) Without limiting the generality of subsection (1), regulations may be made under this Act for or with respect to—

(a) service standards or other requirements, restrictions or conditions which are to apply in the provision of bus services;

(b) prescribing a class of bus service to be a regular passenger service;

(c) prescribing a class of bus service not to be a regular passenger service;

(d) regulating the standards relating to the maintenance of buses, including in relation to safety equipment or devices to be installed on buses;

(e) regulating or requiring the examination, testing, maintenance or repair of buses, or equipment in, or on, a bus;

(f) imposing duties on drivers.

(1B) For the purposes of this section, ***service standards or other requirements, restrictions or conditions*** includes any matter relating to—

(a) the condition of a bus and the equipment to be installed in, or objects to be attached to, a bus;

(b) the conduct, powers and obligations of the driver of a bus;

(c) ticketing, fares and timetables;

(d) the operation of a bus for a particular purpose.".

(6) Sections 39 and 40 of the **Public Transport Competition Act 1995** are **repealed**.

83 Change of name of Act

(1) In the title to the **Public Transport Competition Act 1995** for "**Public Transport Competition**" **substitute** "**Bus Services**".

(2) After section 3(4) of the **Public Transport Competition Act 1995 insert**—

"(5) On and from the commencement of section 83 of the **Bus Safety Act 2009**, a reference to the **Public Transport Competition Act 1995** in any Act (other than in the **Bus Safety Act 2009**) or in any instrument made under any Act or in any

other document of any kind, must be read and construed as a reference to the **Bus Services Act 1995**, unless the context otherwise requires.".

84 New section 4A inserted

After section 4 of the **Public Transport Competition Act 1995 insert—**

"**4A Declaration power of Director**

(1) Subject to subsection (2), the Director may declare by notice published in the Government Gazette that—

(a) a bus service that is a regular passenger service specified in paragraph (a) or (b) of the definition of ***regular passenger service*** in section 3(1) is not a regular passenger service within the meaning of that definition;

(b) a bus service that is not specified in paragraph (a) or (b) of the definition of ***regular passenger service*** in section 3(1) is a bus service that is a regular passenger service within the meaning of that definition.

(2) If the Director intends to make a declaration under subsection (1), the Director must—

(a) advise operators and sectors of the industry that will be affected by the declaration, if declared, of the proposed declaration; and

(b) provide those operators and sectors with an opportunity to make a submission in relation to the proposed declaration.

(3) The Director must have regard to any submissions received under subsection (2) before making the declaration.".

Division 3—Rail Safety Act 2006

85 Amendment of section 55—Safety Director may vary, revoke or impose new conditions or restrictions of an accreditation on own initiative

After section 55(3) of the **Rail Safety Act 2006 insert**—

"(3A) If the Safety Director takes immediate action under subsection (3), the Safety Director must notify the accredited rail operator within 48 hours of making the decision.".

Division 4—Road Management Act 2004

86 Consequential amendment

In section 3(1) of the **Road Management Act 2004**, in paragraph (b) of the definition of ***provider of public transport***, for "**Public Transport Competition Act" substitute "Bus Services Act**".

Division 5—Road Safety Act 1986

87 Definitions

In section 3(1) of the **Road Safety Act 1986** in the definition of ***road or transport law***, after paragraph (a) **insert**—

"(aa) the **Bus Safety Act 2009**;".

88 Amendment of Part 10A definitions

In section 191A of the **Road Safety Act 1986, insert** the following definition—

"***Safety Director*** has the same meaning as it has in section 3(1) of the **Bus Safety Act 2009**;".

89 New section 191ZGA inserted

S. 89 substituted by No. 19/2010 s. 63.

After the heading to Subdivision 1 of Division 6 of Part 10A of the **Road Safety Act 1986 insert**—

"**191ZGA Fatigue regulated heavy vehicle that is a bus**

(1) For the purposes of this Subdivision and Subdivision 2, if a fatigue regulated heavy vehicle is a bus used to provide a bus service within the meaning of the **Bus Safety Act 2009**, any reference to the Corporation must be read as a reference to the Safety Director.

(2) For the purposes of Subdivisions 4 and 5, if a fatigue regulated heavy vehicle is a bus used to provide a bus service within the meaning of the **Bus Safety Act 2009**, any reference to the Corporation must be read as a reference to the Safety Director to the extent that a provision in those subdivisions relates to accreditation.".

Division 6—Safety on Public Land Act 2004

90 Consequential amendment

In section 3 of the **Safety on Public Land Act 2004**, in paragraph (c) of the definition of ***transport authority*** for "**Public Transport Competition Act" substitute "Bus Services Act**".

Pt 9 Div. 7 (Heading) amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

Division 7—Transport (Compliance and Miscellaneous) Act 1983

S. 91 amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

91 Definitions

In section 2(1) of the **Transport (Compliance and Miscellaneous) Act 1983**—

(a) **insert** the following definitions—

"***accredited bus operator*** has the same meaning as it has in section 3(1) of the **Bus Safety Act 2009**;

bus service has the same meaning as it has in section 3(1) of the **Bus Safety Act 2009**;

mandatory bus safety decision means—

(a) a decision of the Safety Director under the **Bus Safety Act 2009** whether to—

(i) accredit or refuse to accredit an operator of a commercial bus service or local bus service within the meaning of the **Bus Safety Act 2009**;

(ii) impose, vary or revoke a condition on an accreditation of an accredited bus operator;

(iii) vary an accreditation of an accredited bus operator;

(b) a decision of the Safety Director or a transport safety officer to—

(i) serve an improvement notice; or

(ii) amend an improvement notice under section 228ZZF; or

(c) a decision of the Safety Director or a transport safety officer to—

(i) serve a prohibition notice; or

(ii) amend a prohibition notice under section 228ZZL;";

(b) in the definition of ***bus company***, for "**Public Transport Competition Act**" **substitute** "**Bus Services Act**";

(c) in the definition of ***relevant transport safety law***, after paragraph (b) **insert**—

"(ba) the **Bus Safety Act 2009** or any regulations made under that Act;".

92 Consequential amendments

* * * * *

S. 92(1)–(4) repealed by No. 6/2010 s. 203(1)(Sch. 6 item 4.6) (as amended by No. 45/2010 s. 22).

(5) In section 85F(1)(a)(i) of the **Transport (Compliance and Miscellaneous) Act 1983**, for "road transport passenger service (as defined by section 3(1) of the **Public Transport Competition Act 1995**)" **substitute** "commercial bus service (within the meaning of section 3(1) of the **Bus Safety Act 2009**)".

S. 92(5) amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

S. 92(6) amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

(6) In section 139(1) of the **Transport (Compliance and Miscellaneous) Act 1983**, for "subsections (1A) and (1B)" **substitute** "subsection (1B)".

S. 92(7) amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

(7) Sections 139(1A) and 139(1C) of the **Transport (Compliance and Miscellaneous) Act 1983** are **repealed**.

S. 92(8) amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

(8) In section 221U of the **Transport (Compliance and Miscellaneous) Act 1983**, in the definition of ***private omnibus***, for "a private bus service within the meaning of the **Public Transport Competition Act 1995**" **substitute** "a community and private bus service within the meaning of the **Bus Safety Act 2009**".

S. 93 repealed by No. 6/2010 s. 203(1)(Sch. 6 item 4.6) (as amended by No. 45/2010 s. 22).

* * * * *

S. 94 amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

94 Amendment of section 86—Definitions

In section 86(1) of the **Transport (Compliance and Miscellaneous) Act 1983**—

(a) in the definition of ***category 2 offence*** after paragraph (d) **insert**—

"(da) an offence against the **Bus Safety Act 2009**; or";

(b) in the definition of ***commercial goods vehicle*** after paragraph (b) **insert**—

"or

(c) a bus used to provide a bus service that carries goods as part of that service;";

(c) in the definition of ***commercial passenger vehicle*** after "reward" **insert** "but does not include a bus used to provide a bus service";

(d) the definition of ***private bus service*** is **repealed**.

95 Amendment of Division 6 of Part VI

(1) In the heading to Division 6 of Part VI of the **Transport (Compliance and Miscellaneous) Act 1983** for "**and private bus services**" **substitute** "**, commercial bus services and local bus services**".

S. 95(1) amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

(2) In section 164(1) of the **Transport (Compliance and Miscellaneous) Act 1983** for "private bus services" **substitute** "commercial bus services and local bus services".

S. 95(2) amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

(3) For section 165(1)(b) of the **Transport (Compliance and Miscellaneous) Act 1983 substitute**—

"(b) a bus used to provide a commercial bus service or local bus service within the meaning of the **Bus Safety Act 2009**—".

S. 95(3) amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

(4) In section 165(2) of the **Transport (Compliance and Miscellaneous) Act 1983** for "(1)(a)" **substitute** "(1)".

S. 95(4) amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

S. 95(5) amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

(5) Section 165(3) of the **Transport (Compliance and Miscellaneous) Act 1983** is **repealed**.

S. 95(6) amended by Nos 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22), 19/2010 s. 64(1).

(6) For section 166(1) of the **Transport (Compliance and Miscellaneous) Act 1983 substitute**—

"(1) The Director may accredit a person to drive—

(a) a commercial passenger vehicle; or

(b) a bus used to provide a commercial bus service or local bus service within the meaning of the **Bus Safety Act 2009**.".

S. 95(6A) inserted by No. 19/2010 s. 64(2), amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

(6A) For section 167(1C)(b) of the **Transport (Compliance and Miscellaneous) Act 1983 substitute**—

"(b) the objective of ensuring that applicants are technically competent to operate—

(i) a commercial passenger vehicle; or

(ii) a bus used to provide a commercial bus service or local bus service within the meaning of the **Bus Safety Act 2009**.".

S. 95(7) substituted by No. 19/2010 s. 64(2), amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

(7) In section 167(1D)(d) of the **Transport (Compliance and Miscellaneous) Act 1983**, for "private bus services" **substitute** "local bus services".

(8) In section 169S(2) of the **Transport (Compliance and Miscellaneous) Act 1983** for paragraph (c) of the definition of ***relevant operator*** **substitute**—

"(c) is an accredited bus operator.".

S. 95(8) amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

(9) The note at the foot of section 169S(2) of the **Transport (Compliance and Miscellaneous) Act 1983** is **repealed**.

S. 95(9) amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

(10) In section 169WA(1) of the **Transport (Compliance and Miscellaneous) Act 1983** for paragraph (c) of the definition of ***relevant operator*** **substitute**—

"(c) is an accredited bus operator.".

S. 95(10) amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

(11) The note at the foot of section 169WA(1) of the **Transport (Compliance and Miscellaneous) Act 1983** is **repealed**.

S. 95(11) amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

(12) In section 169WA(2)(b) of the **Transport (Compliance and Miscellaneous) Act 1983** for "private bus service" **substitute** "commercial bus service or a local bus service".

S. 95(12) amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

(13) In section 169WB(1)(b) of the **Transport (Compliance and Miscellaneous) Act 1983** for "private bus service" **substitute** "commercial bus service or a local bus service".

S. 95(13) amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

96 Amendment of section 228S—Definitions

S. 96(1) amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

(1) In section 228S(1) of the **Transport (Compliance and Miscellaneous) Act 1983 insert** the following definitions—

"***approved bus code of practice*** means a code of practice approved under the **Bus Safety Act 2009**;

bus premises means—

(a) a bus; or

(b) a bus stopping point; or

(c) a depot or base of operations for a bus service;

bus safety worker has the same meaning as it has in section 3(1) of the **Bus Safety Act 2009**;

public transport premises means—

(a) railway premises; or

(b) bus premises;".

S. 96(2) substituted by No. 19/2010 s. 65(1), amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

(2) In section 228S(1) of the **Transport (Compliance and Miscellaneous) Act 1983**, after paragraph (d) of the definition of ***compliance and investigative purposes*** **insert**—

"(e) related to ascertaining whether an approved bus code of practice has been or is being complied with;

(f) related to an audit under section 20 of the **Bus Safety Act 2009**;".

S. 96(3) amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

(3) In section 228S(1) of the **Transport (Compliance and Miscellaneous) Act 1983**, in the definition of ***relevant person***—

(a) after paragraph (a) **insert**—

"(aa) an operator of any bus service; or".

S. 96(3)(a) substituted by No. 19/2010 s. 65(2).

(b) after paragraph (b) **insert**—

"(ba) a driver of a bus used to provide a bus service; or";

(c) after paragraph (c) **insert**—

"(ca) a procurer of a bus service within the meaning of the **Bus Safety Act 2009**; or";

(d) after paragraph (d) **insert**—

"(da) a bus safety worker; or".

(4) In section 228S(2) of the **Transport (Compliance and Miscellaneous) Act 1983**, for "a premises or a part of a premises, that is used for the carrying out of rail operations" **substitute** "a public transport premises, or a part of a public transport premises".

S. 96(4) amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

97 Power of entry

S. 97 amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

In section 228Z of the **Transport (Compliance and Miscellaneous) Act 1983**—

(a) in paragraph (a)—

(i) for "railway premises" (wherever occurring) **substitute** "public transport premises";

(ii) after "rail operations" **insert** ", bus services";

(b) in paragraph (b) for "railway premises" (wherever occurring) **substitute** "public transport premises".

S. 98 amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

98 Procedure for entry with consent

In section 228ZA(1) of the **Transport (Compliance and Miscellaneous) Act 1983** for "railway premises" (wherever occurring) **substitute** "public transport premises".

S. 99 amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

99 Improvement notices

In section 228ZZC(1)(c) of the **Transport (Compliance and Miscellaneous) Act 1983** after "accredited rail operator" **insert** "or an accredited bus operator".

100 Prohibition notice

S. 100(1) amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

(1) In section 228ZZJ(1) of the **Transport (Compliance and Miscellaneous) Act 1983**—

(a) in paragraphs (a) and (b) for "railway premises" (wherever occurring) **substitute** "public transport premises";

(b) in paragraph (c)—

(i) for "or rolling stock" **substitute** ", rolling stock or a bus stopping point";

(ii) for "rail operations" **substitute** "members of the public, rail operations, bus services or bus stopping points and areas near bus stopping points".

S. 100(2) amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

(2) In section 228ZZJ(6) of the **Transport (Compliance and Miscellaneous) Act 1983**—

(a) in paragraph (a) for "railway premises" (wherever occurring) **substitute** "public transport premises";

(b) after paragraph (b) **insert**—

"(ba) a bus stopping point, or a place in the immediate vicinity of a bus stopping point at which the activity is not to be carried out;".

101 Amendment of section 249B—Regulations with respect to services operated by a passenger transport company etc.

S. 101 amended by No. 6/2010 s. 203(1)(Sch. 6 item 4.5) (as amended by No. 45/2010 s. 22).

In section 249B(1) of the **Transport (Compliance and Miscellaneous) Act 1983**—

(a) for "or tramway" **substitute** ", tramway or bus service";

(b) for "or a rail freight operator" **substitute** ", a rail freight operator or an operator of a bus service".

Division 8—Transport Integration Act 2010

Pt 9 Div. 8 (Heading and s. 101A) inserted by No. 6/2010 s. 203(1)(Sch. 6 item 4.7) (as amended by No. 45/2010 s. 22).

101A Consequential amendments

S. 101A inserted by No. 6/2010 s. 203(1)(Sch. 6 item 4.7) (as amended by No. 45/2010 s. 22).

(1) In section 3 of the **Transport Integration Act 2010**—

(a) in the definition of ***corresponding safety law***—

(i) **omit** "or" after paragraph (b);

(ii) paragraph (c) is **repealed**;

(b) after the definition of ***Linking Melbourne Authority*** **insert**—

"***mandatory bus safety decision*** has the same meaning as it has in section 2(1) of the **Transport (Compliance and Miscellaneous) Act 1983**;";

(c) in the definition of ***mandatory transport safety decision***, after paragraph (b) **insert**—

"or

(c) a mandatory bus safety decision;";

(d) in the definition of ***transport legislation***, in paragraph (d) for "**Public Transport Competition Act 1995**" **substitute** "**Bus Services Act 1995**".

(2) For section 172(2)(b) of the **Transport Integration Act 2010 substitute**—

"(b) section 4 of the **Bus Safety Act 2009**;".

(3) In sections 173(1)(a) and 178(1) of the **Transport Integration Act 2010**, for "**Public Transport Competition Act 1995**" (wherever occurring) **substitute** "**Bus Safety Act 2009**".

(4) In sections 173(1)(b)(iv) and 173(1)(e)(i) of the **Transport Integration Act 2010**, for "Part 2 of the **Public Transport Competition Act 1995**" **substitute** "Part 7 of the **Bus Safety Act 2009**".

102 Repeal of Part

This Part is **repealed** on 31 December 2011.

Note

The repeal of this Part does not affect the continuing operation of the amendments made by it (see section 15(1) of the **Interpretation of Legislation Act 1984**).

ENDNOTES

1. General Information

Minister's second reading speech—

Legislative Assembly: 4 December 2008

Legislative Council: 12 March 2009

The long title for the Bill for this Act was "A Bill for an Act to provide for the safe operation of bus services in Victoria, to amend the **Public Transport Competition Act 1995**, the **Rail Safety Act 2006**, the **Road Safety Act 1986** and the **Transport Act 1983**, to make consequential amendments to certain other Acts and for other purposes."

The **Bus Safety Act 2009** was assented to on 7 April 2009 and came into operation as follows:

Sections 1, 2 and 80 on 8 April 2009: section 2(1); sections 3–79, 81–91, 92(5)–(8), 94–102 on 31 December 2010: section 2(3).

Sections 92(1)–(4) and 93 were never proclaimed, repealed by No. 6/2010 section 203(1)(Schedule 6 item 4.6).

Endnotes

2. Table of Amendments

This Version incorporates amendments made to the **Bus Safety Act 2009** by Acts and subordinate instruments.

Criminal Procedure Amendment (Consequential and Transitional Provisions) Act 2009, No. 68/2009

Assent Date:	24.11.09
Commencement Date:	S. 97(Sch. item 14) on 1.1.10: Government Gazette 10.12.09 p. 3215
Current State:	This information relates only to the provision/s amending the **Bus Safety Act 2009**

Statute Law Amendment (Evidence Consequential Provisions) Act 2009, No. 69/2009

Assent Date:	24.11.09
Commencement Date:	S. 54(Sch. Pt 2 item 8) on 1.1.10: s. 2(2)
Current State:	This information relates only to the provision/s amending the **Bus Safety Act 2009**

Transport Legislation Amendment (Hoon Boating and Other Amendments) Act 2009, No. 93/2009

Assent Date:	15.12.09
Commencement Date:	S. 49(3) on 17.12.09: Government Gazette 17.12.09 p. 3339
Current State:	This information relates only to the provision/s amending the **Bus Safety Act 2009**

Transport Integration Act 2010, No. 6/2010 (as amended by No. 45/2010)

Assent Date:	2.3.10
Commencement Date:	Ss 24(5)(Sch. 1 item 4), 203(1)(Sch. 6 item 4) on 1.7.10: Special Gazette (No. 256) 30.6.10 p. 1
Current State:	This information relates only to the provision/s amending the **Bus Safety Act 2009**

Transport Legislation Amendment (Compliance, Enforcement and Regulation) Act 2010, No. 19/2010

Assent Date:	18.5.10
Commencement Date:	Ss 47–66 on 1.6.10: Government Gazette 20.5.10 p. 988
Current State:	This information relates only to the provision/s amending the **Bus Safety Act 2009**

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3. Explanatory Details

No entries at date of publication

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☐ Urgent ☐ Return receipt ☐ Sign ☐ Encrypt ☐ Mark Subject Restricted ☐ Expand personal&public groups

To:
Cc:
Bcc:
Subject: Expert advice

From: "John Stanley" [redacted]>
To: <peter_chan@irc-bus.gov.hk>,
Cc: "'Rebecca Lau'" [redacted]
Date: 08/10/2018 06:59
Subject: Expert advice

Dear Peter,

I had one remaining matter to follow up following my oral evidence to the Review Committee and the subsequent advice that I provided. This outstanding matter is in relation to KPIs used by Transport Safety Victoria to assess bus safety. I have now received advice from TSV on this matter, as follows (and I quote from the relevant email):

Our bus operator population makes the use of mvkm as a base measure difficult as, while capturing the distance travelled data would be relatively simple for accredited bus operators with government contracts, about 80% of Victorian bus operators are registered bus operators and we'd be unable to capture the necessary distance travelled data.

Like many other regulators of outcomes-based legislation, it is difficult for TSV to empirically measure its impact on the safety of bus operations in Victoria and we are continually vigilant for such metrics.

We will interrogate for causal factors any types of incidents which become obvious as issues and will then seek to influence behavioural changes and track (hopefully) downtrends in those incidents. This is a simple (though not necessarily the best) method to shown how a regulator makes a positive safety impact.

I have thanked TSV for this response and encouraged them to adopt (1) total and (2) per million vkm measures of at least

- Fatalities
- Serious injuries
- Other involvements
- Total involvements and
- Particular incident types (involvements) known to be significant and on the increase, such as slips, trips and falls,

for the following categories of bus operation:

- Government Contracted route bus
- Government Contracted school bus
- Other bus (where distances travelled can be reasonably estimated by using surveys undertaken every 3 years by the Australian Bureau of Statistics and then deducting the Government contracted route and school bus distances travelled)
- Total bus.

This would, I believe, strengthen the approach to safety performance measurement in Melbourne.

I have taken the opportunity to read the transcript of Mr Weston's evidence and note our general

agreement on many matters. Two points of apparent difference deserve brief comment. The first relates to London's Bus Safety Committee, as compared to the Standing Committee on Bus Safety that I proposed (at item 6 on page 41 of my second report). Mr Weston's evidence at page 83 suggests that the London Committee is comprised of operator managing directors and Transport for London (TfL) senior executives, with supporting sub groups (as outlined later in his evidence). My proposal also sees bus manufacturers as having a major contribution to make to an industry level safety committee, because of their key roles in safety invention and innovation. I would also include unions in the committee and a couple of independent experts from local universities, to broaden the sources of advice and knowledge.

The second point concerns the role of an independent safety director, discussed at page 108, and following, in Mr Weston's evidence. Mr Weston expresses concern that such an initiative might delay progress that is being achieved in London, if such a position was (hypothetically) to be established in that city. I do not see this as a problem, since the two processes can evolve alongside each other (the establishment of an independent Safety Director and the continuation of the bus safety dialogue between the industry and TfL). They are not alternatives. An independent safety regulator provides a good additional safety valve in the public interest, including helping to guard against regulatory capture (i.e., of the government PT service manager by operators).

As a final point, I have calculated the London route bus fatality rate, from data published by TfL (https://tfl.gov.uk/corporate/publications-and-reports/bus-safety-data#on-this-page-1). This is perhaps the single most reliable indicator of bus safety performance. That data implies a London route bus fatality rate of 0.024/mvkm over the three years from Q2/2015 to Q1/2018, which is around 50% higher than the Melbourne rate I reported in my second report (p. 12) of 0.016/mvkm (over a longer period) but slightly below the Kong Kong rate that I calculated (also second report, page 12) of 0.026/mvkm, from the longer period of 2012-March Qtr 2018. Melbourne is thus well ahead of both London and Hong Kong if bus safety is to be judged on fatality rates. However, as I noted in my second report, Melbourne's operating environment may be somewhat easier, the city's lower densities (for example) expected to reduce the relative pedestrian exposure rate and Hong Kong's frequent narrow and often windy roads being challenging. On the other hand, slower bus speeds in London and Hong Kong would probably work in the favour of fatality rate outcomes in those cities, compared to Melbourne, higher speeds increasing the likelihood of an accident involving a fatality.

I think that completes all the matters that I undertook to provide to the Committee. Thank you again for the opportunity to be involved in this most interesting project and I wish the Committee, you and your team, well in your deliberations.

(Professor) John Stanley

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Report prepared by Mike Weston, Passenger Transport Consultant for the Independent Review Committee on Hong Kong's Franchised Bus Service

September 2018

Contents

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1. CONTEXT

This report has been commissioned by the Independent Review Committee (IRC) on Hong Kong's Franchised Bus Service to seek further understanding on the organisation and structure of the London bus franchising system and to ascertain best practice which could potentially be used in Hong Kong to further improve the existing franchising model. The Committee have already had sight of Transport for London's (TfL) document titled "London's Bus Contracting and Tendering Process" dated August 2015 [1]

This report has been prepared by Mike Weston an Independent Consultant with over 30 years' experience within the bus industry including senior roles at Transport for London most recently as Director of Buses. A career resume is included in Appendix A.

In preparation of this report meetings have been held with officers from Transport for London and the contracted bus operators. The report has also drawn upon the responses received from Abellio and Stagecoach to the questionnaire (Information on Franchised Bus Services in London) issued by the IRC.

In commissioning the report, the IRC have asked for the following:

(i) A description of the regulatory and governance arrangements together with the operations and management of franchised buses in London, having regard to bus safety.

(ii) A summary of the regime obtaining in Hong Kong in respect of franchised buses.

(iii) So that, having regards to the differences in the two regimes at (i) and (ii), you are asked to express opinions as to the adequacy of the regime obtaining in Hong Kong and make recommendations, as are warranted in your opinion, to enhance the safety of the franchised system in Hong Kong.

This report covers items (i) and (iii) above and with regards to (ii) above draws on the submissions by the Transport Department and Professor Stanley.

Sections 2-5 of the report give an overview of London's public transport system, explains the structure of the UK bus industry and the history of London's bus contracting regime and describes the current bus contracting regime and how contractor performance is monitored and managed. Section 6 gives an overview of safety management within London's bus industry and section 7 describes the various initiatives currently being delivered by TfL and the contracted bus operators under the Bus Safety Programme. The report concludes in section 8 with the author's observations and opinions of how the approaches adopted in London could be used to improve the Hong Kong regime.

[1] London's Bus Contracting and Tendering Process dated August 2015
http://content.tfl.gov.uk/uploads/forms/lbsl-tendering-and-contracting.pdf

2. LONDON'S PUBLIC TRANSPORT SYSTEM

2.1. Public Transport in London

Transport for London (TfL) is a local government body responsible for the transport system across Greater London including, responsibility for London's network of principal road routes and the provision of public transport. It manages the provision of public transport through a mix of direct in-house operation, as is the case with the London Underground metro services, and through the tendering and franchising of services from the private sector. The services operated by London Overground, Docklands Light Railway, TfL Rail and those on the bus network are provided by private companies under contract to TfL. TfL is also responsible for licensing of some services including commercial bus services (such as sightseeing tours), taxis & private hire vehicles/drivers and river services.

TfL was created in 2000 as part of the Greater London Authority by the Greater London Authority Act 1999. It gained most of its functions from its predecessor London Regional Transport who were previously responsible for the provision of the Underground and bus networks.

During financial year 2017/18 Transport for London had a total income of £6,559m including operating grants and operating costs of £6,240m. Section 2.3 provides further information on the financial performance of the bus network.

Transport for London's Annual Report and Statement of Accounts 2017/18 provides more information on the organisation's financial performance[2]

In terms of corporate governance TfL is overseen by the TfL Board. The Mayor can either elect themselves as the chair or can appoint an independent chair. The Mayor also appoints the non-executive board members whose role through the board and its various panels is to review and approve TfL's budget, business plan, annual report and other major and strategic issues and policies.

[2] https://tfl.gov.uk/corporate/publications-and-reports/annual-report

2.2. Public Transport Usage in London

During financial year 2017/2018 the total usage of the main public transport modes in London were as follows:

Mode	Passenger Journeys (2017/18) millions (m)
Buses	2,247
London Underground	1,357
Docklands Light Railway	119.6
London Trams	29.1
London Overground	190.10
TfL Rail	45.3
Total	**3,988.1**

During the period 2017/2018 the bus network operated 490million kilometres and achieved a customer satisfaction score of 86 compared with 83 during 2013/14.

London has seen significant growth in bus usage since 2000 with 1,430m passenger journeys during 2001/2002 growing to 2,385m during 2014/15 (66% increase). Although more recently passenger numbers have started to decline slightly, especially in central London, due to several factors including the impact of increased traffic congestion and increased capacity on Underground lines due to signalling and line upgrades.

The longer-term underlying increase in usage has been driven by strong political direction from elected Mayors who have had a clear policy of reducing congestion (for example introduction of Central London Congestion Charge scheme in 2003) and increasing use of public transport (for example through fares policy and network expansion). Despite the recent reduction in usage over the longer term strong economic growth and a rapidly rising population is expected to lead to further increases in bus usage.

2.3. Financial performance of the London Bus Network

During financial year 1984/85 London Transport's published accounts indicate an operating cost for the London bus network was £553m with revenue of £313m (a cost recovery of 56%). The early years of competitive tendering (1985 onwards) reduced operating costs and a fares policy kept fares revenue in pace with inflation leading to an improving cost recovery ratio. By financial year 1997/98 the network broke even with passenger revenue covering operating costs.

From 2000 a subsidy requirement returned as elected Mayors expanded the bus network and adopted a more conservative fares policy impacting on revenue growth per passenger. During financial year 2003/04 the network cost recovery had peaked at 61%. By financial year 2016/17 the total cost of operation was £2,097m with revenue standing at £1,471m giving a cost recovery of 70%.

This subsidy can be attributed to several factors including Mayoral fares policy, which in some years has held fare increases below inflation thus resulting in operator's inflation-based Contract Price Adjustments (CPA) increasing ahead of revenue increases. The other main factor is TfL's service planning guidelines, which strive to provide a comprehensive bus service to all parts of London, which impacts on subsidy as on many services revenue does not cover the operating costs.

The gross cost contract model adopted by Transport for London means that passenger revenue is retained by TfL and the contracted bus operators are wholly dependent upon contract income from TfL to cover both operating cost, capital investment and profit. Any changes to TfL's requirements, including for example changes to vehicle specification, service levels or mandated driver training must be funded by TfL through the gross cost contract payment or other payment mechanisms.

TfL's business plan 2017[3] indicates that service volume (million km operated) will reduce from 486m in 2017/18 to 453m by 2022/23, a reduction of 6.8%. Passenger numbers during the same period are forecast to increase from 2,230m to 2,308m an increase of 3.5% indicating the average load factor per bus will increase.

The underlying assumptions of the business plan are a redistribution of resources, in terms of kilometres operated, from inner to outer London which reflects changes in demand due to:

- reduced ridership in central London due to increased congestion and journey times.
- reduced ridership in central London due to rail improvements, for example Jubilee & Victoria line signalling & frequency improvements and the forthcoming opening of the Elizabeth Line (previously known as Crossrail).
- increased residential development in outer London will drive bus growth with kms operated being increased with compensating reductions in central London.

The forecast reduction in volume could lead to more competition amongst bus operators under pressure to maintain or increase their volume/market share/turnover at the expense of their competitors. The potential for achieving this from network growth will not exist.

[3] https://tfl.gov.uk/corporate/publications-and-reports/business-plan

2.4. Contracted Bus Operators' Financial Position

Although no analysis has been undertaken as part of this report on bus operator margins anecdotal evidence suggests they are low compared with other industries. During bus operator discussions one company quoted a return of 3% during the previous financial year which was below their groups' expectations.

In 2009 TfL commissioned KPMG to undertake a strategic review of bus services in London[4]. Section 4.2 of the report includes analysis indicating that between 2004 and 2008 London operators have on average generated earnings before interest and taxes (EBIT) in the region of five to ten percent with two companies falling short of this. Without further detailed analysis this supports the presumption that London is a highly competitive market.

3. STRUCTURE OF THE UK BUS INDUSTRY

3.1. Deregulation of Bus Industry 1986

To understand how the London bus franchising system has evolved and developed it is important to understand the structure and changes within the UK bus industry over the last 30 years.

In 1986 the UK Government enacted legislation to deregulate bus services outside of Greater London thus allowing operators to openly operate competing bus services on common corridors/routes. At the same time the government privatised the publicly owned subsidiaries of the National Bus Company effectively putting bus operation into the private ownership. Some local authority owned bus companies remained in public ownership although these were relatively small compared with the size of the overall industry.

However, at the time the government were concerned about deregulating London partly because the market was dominated by the publicly owned London Transport (LT) who operated most of the bus service across the capital and hence concerned that, perhaps except for central London where new players might be encouraged to enter the market, competition would be limited. Within central London the government were concerned about the potential chaos and traffic congestion that open "on the road" competition might bring.

[4] http://content.tfl.gov.uk/Item05-Independent-Bus-Review-July09.pdf

This new government policy resulted in the implementation of the Transport Act 1985 on 26 October 1986 and the deregulation of bus services in England, Scotland and Wales. As indicated above, deregulation did not apply to London, but the government instructed London Transport to start opening the market up to private operators through the adoption of a competitive tendering process.

Section 3.3 describes how the London bus tendering system has evolved from its early days.

3.2. Regulatory and Governance Arrangements for London & the UK

In addition to generic legislation covering health & safety, such as the Health & Safety at Work Act 1974 and general road traffic regulations, the bus industry in the UK is subject to regulations regarding both the operation & maintenance of the vehicles and the use of drivers.

All UK bus & coach operators are required to obtain an Operator's Licence which is granted by the Traffic Commissioner. The Department for Transport's website summarises the priorities of the Traffic Commissioners as follows:

- to ensure that people operating Heavy Goods Vehicles (HGV) and Passenger Service Vehicles (PSV) are reputable, competent, and adequately funded.
- to encourage all operators to adopt robust systems, so that there is fair competition and that the operation of goods and public service vehicles is safe.
- to consider on behalf of the Secretary of State for Transport the fitness of drivers or those applying for passenger carrying vehicle or large goods vehicle driving licences based on their conduct.
- to consider, and where appropriate impose, traffic regulation conditions to prevent danger to road users and/or reduce traffic congestion and/or pollution.
- to ensure public inquiry proceedings are fair and free from any unjustified interference or bias to engage with stakeholders - listening to industry, meeting with local authorities, trade organisations, passenger groups and operators and presenting seminars.

The duties of the Traffic Commissioner apply to all bus operators across the UK.

The other nationwide government agency with responsibility for commercial vehicles including buses is the Driver & Vehicle Standards Agency (DVSA) whose responsibilities are summarised as follows:

- carrying out theory tests and driving tests for people who want to drive cars, motorcycles, lorries, buses and coaches, and specialist vehicles.
- approving people to be driving instructors and motorcycle trainers and making sure they provide good-quality training.
- approving people to be MOT testers, approving the centres they work in, and testing lorries, buses and coaches themselves.
- carrying out roadside checks on commercial drivers to make sure they follow safety rules and keep their vehicles safe to drive.
- monitoring recalls of vehicles, parts and accessories to make sure that manufacturers fix problems quickly.
- approving training courses for qualified drivers, such as Driver Certificate of Professional Competence courses for lorry, bus and coach drivers, and drink-drive rehabilitation courses.
- supporting the Traffic Commissioners for Great Britain and the Northern Ireland transport regulator to license and monitor companies who operate lorries, buses and coaches, and to register local bus services.

In terms of drivers' hours from the legal perspective these are covered by the Domestic Driver Hours Regulations[5]. Tachographs are not required on buses used to provide scheduled bus services.

However, as identified in the responses to the IRC questionnaire and discussions with the London operators' driver hours do vary between operators depending upon local agreements with the trade union, for example guaranteeing longer breaks than the required minimum and a longer minimum rest period between shifts.

Transport for London also imposes its own contractual requirements and monitoring systems in addition to the legal requirements imposed through the government agencies. These are discussed further in section 4.

3.3. History of bus tendering regime

It is useful to understand the contract regime pertaining to London to understand how safety management, by both TfL and the bus operators, fits into this regime. The competitive tendering of individual bus routes with the whole network being controlled, regulated and planned by the Transport Authority (Transport for London - TfL) is currently unique to London due to government policy dating back to 1985.

[5] https://www.gov.uk/drivers-hours/gb-domestic-rules

Route tendering was introduced in 1985 with the overall structure of awarding 5-year contracts, with operators receiving 2-year extensions if they meet certain performance criteria, having remained unchanged over this period.

Gross cost contracts are used by TfL with the operators being paid for each mile operated with additional bonuses and deductions based on the reliability of the service. Passenger revenue is retained by TfL so in practice any enhancements to the contract, including safety or other improvements to buses, are funded by TfL not the bus operator.

The Tendered Bus Division was established within London Transport to tender bus services and this started the process of competition for individual route contracts between private sector operators and London Transport's in-house bus business – London Buses. Over time an increasing number of bus routes were subject to competitive tender and in 1994 the in-house operation, which had earlier been split into 13 subsidiary companies was privatised.

The timeline in terms of the evolution of the system was as follows:

- **Pre-1985** All services directly provided by London Transport (a public corporation) with LT owning assets (buses & garages) and employing all the operating staff.

- **1985** – First routes tendered. Private operators competing with in-house direct operator.

- **1989** – In-house operation prepared for privatisation by being split up into several smaller companies.

- **1993** – 50% of the network had been subject to competitive tendering of which 40% awarded to private sector operators.

- **1994** - Remaining routes placed onto negotiated contracts with privatisation of the public owned companies. All bus operation privately owned but controlled and managed through the tendering process by London Transport.

3.4. London's Contracted Bus Operators

The London bus network is now dominated by six large bus groups with several smaller companies making up the remaining 5.6% of the network.

Operator Market Share as at April 2017

Ultimate Group	Annual Scheduled Mileage Percentage
Abellio Transport Holding BV	8.1%
Arriva Passenger Services Limited	17.2%
Comfort Delgro Corporation Limited	19.2%
Go Ahead Group Plc	23.7%
RATP Development	11.6%
Stagecoach Group Plc	14.6%
Other	5.6%
Total	100%

During 2018 the bus fleet consists of approximately 9,200 buses of which around 6,800 are double deck with the remaining being rigid single deck. The bus fleet is generally owned or leased by the private sector operators the exemptions being the New Routemaster (1,000 double deck buses) and some new technology/trial vehicles which are owned by Transport for London.

The nature of the London bus market, which is based on a route level tendering programme, leads to a very contestable and dynamic market with most operators having route agreements at every stage of their contract life. This approach, with routes constantly being tendered, allows TfL to constantly judge and react to operator performance and, if appropriate reflect this in award recommendations. This ability to send clear messages to operators through individual contract awards is more reactive than resorting to the ultimate sanction of contract termination due to poor performance.

The London bus market is extremely competitive with, according to TfL, routes receiving an average of 2.6 bids. During discussions with bus operators in London it is clear that operating margins are tight and operators are bidding competitively to ensure garage capacity is used as efficiently as possible to spread operating overheads across the maximum number of buses. One operator was very clear that "Competition stops Complacency".

4. LONDON BUS CONTRACTING – CONTRACT STRUCTURE

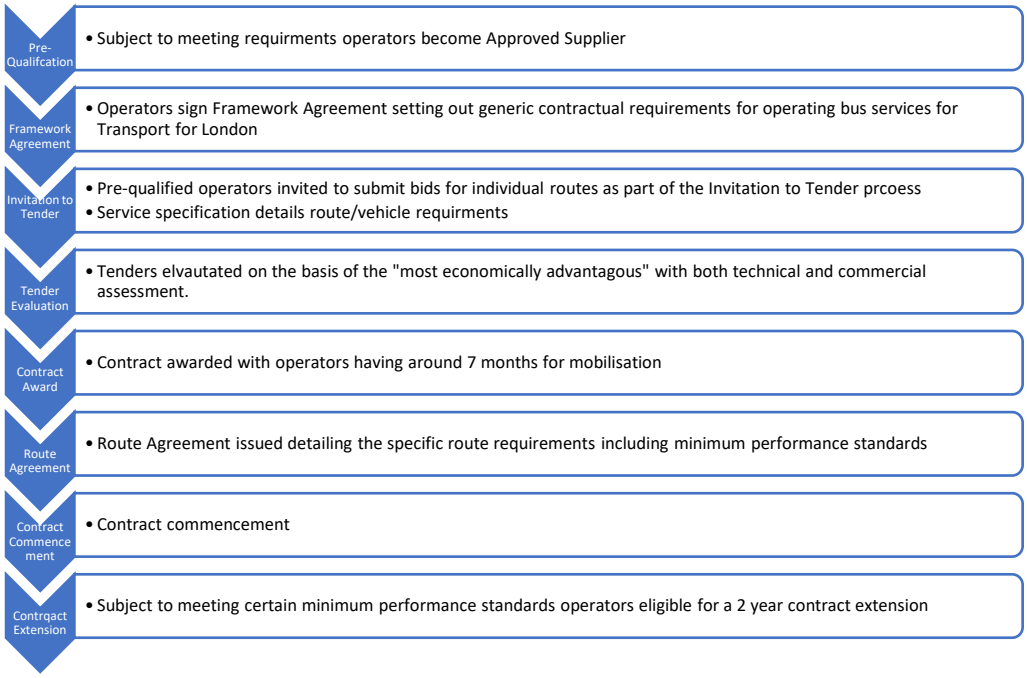
4.1. Contract Responsibilities

At a high level the responsibilities of The Mayor, Transport for London and the contracted bus operators can be summarised as follows:

The Mayor	Transport for London	Contracted Bus Operators
• Sets Strategy • Chairs (or appoints chair) of the Transport for London Board • Determines passenger fares	• Contracting of services and setting performance standards • Service/route planning • Contract monitoring & management • Provision of bus passenger infrastructure • Passenger information • Ticketing & vehicle location equipment	• Tender for individual bus routes • Employ drivers, controllers, engineers and other operating staff • Operates services to TfL standards • Own assets – garages & buses

4.2. Contract Life Cycle

The process adopted by Transport for London to award contracts can be summarised as follows:



Transport for London operate a pre-qualification system with new operators being required to complete a prequalification questionnaire. Subject to successful evaluation of this questionnaire a newly approved supplier would then be asked to sign a Framework Agreement[6] and invited to start bidding for individual bus routes.

For each route tendered TfL will issue a service specification setting out all the requirements specific to that bus route including frequency required at certain times of the day, route to be followed and vehicle type – double deck, single deck etc.

The Framework Agreement covers all the generic contract provisions with the route specific information in terms of the route – for example timetable, minimum performance standards, vehicle type being contained within the Route Agreement.

[6] TfL Framework Agreement for the provision of bus services http://content.tfl.gov.uk/metroline-bus-contract.pdf

TfL run a regular tendering programme which, at a route level, offers tendering opportunities to pre-qualified operators on an almost continuous basis. This approach has several benefits including ensuring a constantly contestable and competitive market is created as operators are continuously bidding to either retain existing work or to win new work from other operators. This approach also means that TfL can take current performance of operators' existing portfolio of routes into account as part of the tender evaluation process. The tender evaluation process will seek the 'most economically advantageous' outcome.

The technical evaluation of an operator's bid will include an assessment of all aspects of their current performance including safety. This approach allows TfL to reflect an operator's current performance into the tender evaluation process thus acting as a strong incentive for operators to constantly improve their performance. In terms of safety performance, along with performance on all other aspects of the route agreement this will feed into the tender evaluation process and could result in either operating contracts not being renewed or an operator failing to win a new contract. However, safety is not currently scored as part of the technical evaluation but treated as a 'redline' in terms of the award of new contracts. An example given by TfL was a contractor in 2015 who due to concerns about maintenance standards, which were visible due to high mechanical lost mileage and poor engineering quality monitoring results, was not awarded new contracts whilst they addressed the area of concern.

Following the award of individual contracts TfL publish the tender results for each route award on its website[7].

Information published includes the following:

Number of tenders received
Name of successful tenderer
Accepted bid £
Lowest bid £
Highest bid £
Cost per Mile

Appendix B gives an example of the information published.

London bus contracts typically run for an initial period of 5 years with the potential for a two-year extension based on operational performance during four quarters of years 3&4 (see table below). If operators meet the contract extension criteria, then they are eligible for an automatic extension. The operator can decide whether they wish to accept the extension.

[7] TfL Publication of Tender Results https://tfl.gov.uk/forms/13923.aspx

The contract extension criteria are defined in the route agreement and operators are required to exceed the minimum performance standard (On-time or Excess Wait Time) to be eligible for a contract extension. In practice these criteria could be varied to include other matrices such as safety performance during the initial contract period in terms of either absolute performance or trends, however at present only EWT or On-time performance form part of the extension criteria.

Under the current system after 7 years all contracts are offered back to the market through the competitive tendering process. TfL mentioned that they may look at longer contract terms especially if linked to the provision of a new garage.

Contract Extension Review Period

Year	Q1	Q2	Q3	Q4
1	Contract Start	1	2	3
2	4	5	6	7
3	8	9	10	11
4	12	13	14	15
5	16	17	18	19
6	Initial Expiry			

4.3. Contract Types

4.3.1 Gross Cost Contracts

From 1985 until 2000 London Transport adopted a gross cost contract regime with the revenue risk being taken by the transport authority and operators being paid a contractual rate per mile for operating the service. These early contracts only incentivised quantity of service as there were no payments/deductions in relation to the quality of the service provided (i.e. on-time performance). Mileage not operated is either classified as 'deductible' for mileage not operated which was within the operators control and 'non-deductible' for mileage lost beyond the operator's control, for example due to adverse traffic conditions.

4.3.2 Net Cost Contracts

During the period 1995 to 2000 the organisation adopted a net cost contract regime with bus operators retaining the revenue for each route and taking the revenue risk. Operators would bid for contracts based on forecast revenue and either bid for a subsidy from LT for unprofitable routes or offered to pay LT a share of the surplus on profitable routes.

Net cost contract only operated for a short period of time partly due to the heavy administrative burden it placed on LT in allocating revenue (the majority of which came from pre-paid tickets) across over 700 routes. Also, it became clear that operators in practice had very little influence over the actual route revenue as route planning, setting frequencies and fares was still controlled and managed by LT.

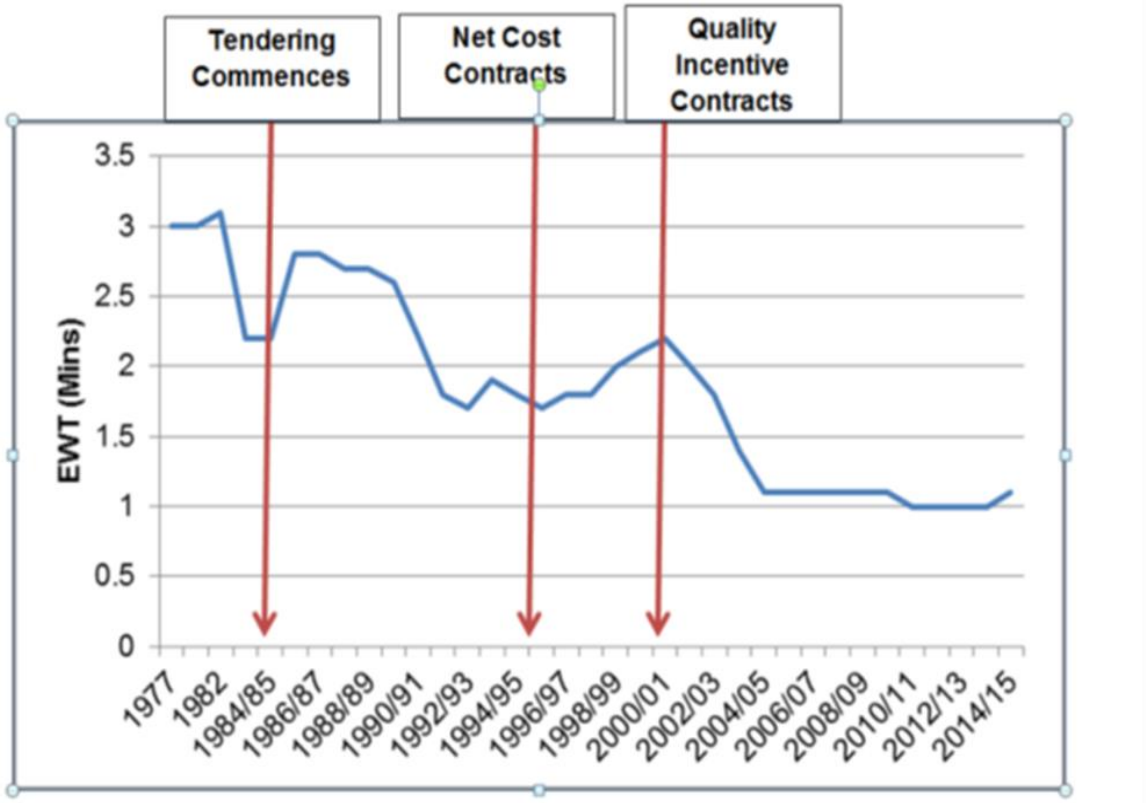
4.3.3 Quality Incentive Contracts

In 2000 TfL introduced a new contract regime called Quality Incentive Contracts which combined the base payment regime of gross cost contracts with additional payments or deductions based on the actual Quality of Service Indicator (QSI) performance compared to the minimum performance standard contained within the route agreement. Payments are graduated with an increase or decrease in the payment for every 0.10-minute change in Excess Wait Time (EWT) and every 2.0-minute change in on-time performance for low frequency routes compared with the contract minimum standard. These payments could range between +15/-10 % and were aimed at increasing operators focus on reliability of the service in addition to quantity (i.e. mileage operated) which had been the focus of the gross cost contracts.

For high frequency routes (every 12 minutes or more) the measure of quality of service is EWT and for low frequency route the on-time performance is measured. EWT measures the excess wait passengers experience on high frequency services where it is assumed they arrive randomly at the bus stop and should therefore ideally wait on average half the scheduled headway. The chart below illustrates how EWT has improved under the different contract regimes.

The research for this report found no link between QIC's payments received by the bus operators and payments to drivers.

4.4. Network Wide Excess Wait Time Performance 1977-2015



4.5. Other Framework Agreement Provisions

The Framework Agreements includes full details of the contractual requirements, and a Master Invitation to Tender. The following are of interest in the context of the IRC review:

4.5.1. Contract Termination

Section 27 of the Framework Agreement makes provision for the termination of the Route Agreement(s) for several reasons including a material breach of any provisions of the Route Agreement, including where performance in respect of the route agreement is not, in the opinion of the Corporation, to the standards required. The Corporation is required to give 14 days' notice in the cases of breaches capable of remedy. Other failures include appointment of administrators, appointment of receivers and the commitment of offences under legislation such as Bribery Act 2010.

In practice the contract termination provisions have been rarely used, partly due to the collaborative nature of the relationship between TfL and its contracted operators which aims to resolve performance related issues prior to contract termination being deemed necessary, and the on-going route tendering programme which can be used as an alternative to early termination.

As detailed in section 4.2 the continuous nature of the route level tendering programme allows TfL to cease awarding new contracts until the breach or performance concerns are remedied.

4.5.2. Safety Requirements

The Framework Agreement places obligations on the operator to take all necessary steps to ensure the safety and wellbeing of all persons including:

- Members of the public.
- Passengers boarding, travelling on and alighting from the vehicles used in operating the services.
- All employees, agents and contractors of the Corporation whilst on or visiting any of the operator's vehicles or premises used in the provision of the services for any purpose in connection with the Route Agreement.
- Other road users.

The Framework Agreement also requires the operator to produce information on health and safety and other issues including the Operator's Health & Safety policy statement and supporting documentation.

Sections 6 & 7 provide more detail on the monitoring and management of bus network safety and the relationship between TfL and the operators in terms of safety management.

4.5.3. Vehicle Specification

Schedule II A of the framework agreement details TfL's requirements in terms of vehicle specification setting out specific requirements in addition to the national requirements for initial certification of a new bus.

This generic vehicle specification documents any additional requirements above national requirements for buses. Examples of additional features included in the specification are the provision of a second door (most UK buses outside of London are single door only), powered wheelchair ramp located at the second door, engine bay fire suppression, a minimum wheel bay dimension above the legal requirement.

In addition to the national legal requirements and TfL's additional specification operators can include their own specification enhancements. Examples include driver seatbelts and other warning systems. For example, one London operator adopts an in-cab voice warning announcement activated when the driver opens the cab door reminding them to check that the handbrake has been deployed. This follows a serious accident. TfL has not adopted this as standard although the development of the new Bus Safety Standard is likely to incorporate similar requirements.

Currently TfL's generic vehicle specification includes several passive safety features such as assault screens, engine bay fire suppression, CCTV systems including in-vehicle monitors, however the new Bus Safety Standard which is currently being developed by TfL is looking at the potential for active systems such as driver fatigue and intelligent speed assistance. Section 7.3 provides more details on the proposed Bus Safety Standard.

Currently bus driver or passenger seat belts are not a legal requirement in the UK on scheduled bus services.

In terms of passenger seat belt the Department for Transport guidance note makes the following statement:

> "General Requirements Since 1 October 2001, seat belts have been required to be installed in each forward and rearward facing seat in all new buses. The use of an approved and properly fitted restraint system can help prevent death or serious injury, not only by restraining the occupant from forward motion but also by preventing their ejection from the vehicle, particularly in accidents where the vehicle rolls over.
>
> The only exemption from this requirement is for buses that are designed for urban use with standing passengers. An exemption is permitted for these vehicles because they are typically used for short journeys, in both time and distance, undertaken at moderate speeds on urban routes. Although we are aware that vehicles equipped with seat belts are used by some operators for urban fare paying services, ultimately, it is for the operator to choose the type of vehicle used to provide a service".

At present no London operators fit passenger or driver seatbelts on buses contracted to TfL. Historically First Group did fit driver seat belts but sold out their London operations to Tower Transit and Metroline (Comfort Delgro) in June 2013.

One London operator now fits footwell cameras to its new buses to aid investigation into incidents where pedal confusion may have occurred. Whilst these cameras are likely to become part of the next TfL vehicle specification it will not form part of the Bus Safety Standard as it's a feature to aid post incident investigation not directly reduce accidents. However, as discussed in section 7 some recommendations, including changes to pedal design, are likely to form part of the new Bus Safety Standard.

4.5.4. Annual Contract Price Adjustment

All route contracts are eligible for an annual Contract Price Adjustment (CPA) on the anniversary of the date of tender to reflect cost inflation. At present the following formula is used:

- 62% of contract price in line with Average Earnings Index
- 16% of contract price in line with general inflation (Retail Price Index – RPI)
- 7% index for diesel price increase
- 15% unchanged

This approach helps keep contracts payments in line with bus operators' general inflation.

5. CONTRACT MONITORING & PERFORMANCE MANAGEMENT

5.1. Background

This section describes the contract monitoring and management processes in place between TfL and the contracted bus operators to manage delivery of contracts to the required performance standards.

Whilst they are many formal processes in place to collect data and manage the performance of the bus network it is also important to understand the nature of the relationship between TfL and its contracted bus operators. Although this relationship is underpinned by the formal Framework Agreement and Route Agreements much of the relationship between TfL and the operators is based on partnership and collaborative working with the various teams with the Buses Directorate having continuous dialogue with the bus operators on delivery and performance related issues.

Each contracted operator is allocated a Performance Account Manager who is the key point of contact between the operator and TfL. The Performance Account Manager will identify performance issues and then work with the operator to identify solutions and implement plans to resolve the issue. It is important to realise that this is a continuous and dynamic relationship and encourages collaborative working to quickly identify and resolve issues.

In addition to the formal contract monitoring system described below TfL also encourage the sharing of knowledge and best practice amongst the operators. Operators and TfL regularly meet through the Bus Operators Forum and its various sub-groups to discuss issues of common interest. The Safety sub-group encourages operators to share best practice in how they individually manage safety and to share lessons learnt from incident investigation. This approach is trying to create a culture where improvements to safety are not seen as being a competitive advantage but are shared openly amongst all operators to achieve overall improvement. During the discussions with operators during the preparation of this report they supported this approach.

5.2. Contract Monitoring Regime

TfL monitors the provision of its contracted bus services through several monitoring processes. The following summarises the main approaches:

Output Monitoring	**Customer Perceptions**
• Mileage Operated • Reliability (Excess Wait Time/On-time performance) • Driving Standards – DQM • Contract Audits – driving hours, mileage returns etc • Engineering Standards - EQM	• Customer Satisfaction Surveys • Mystery Traveller Surveys • Customer Correspondence

Contract monitoring, and management is one of the key factors impacting on the success of the London contracting model. In depth monitoring of a comprehensive suite of factors (see table above) with regular formal and informal dialogue between TfL's bus performance teams and the contracted bus operators ensure that all aspects of performance, including safety management, are regularly reviewed and targeted for improvement as appropriate.

This performance monitoring approach linked with a constant route level tendering leads to a very dynamic and competitive relationship between TfL and its contracted operators. Operators are constantly striving to improve and maintain performance standards as the constant route tendering process means they will inevitably have contracts at every stage of the contract life – for example under evaluation for re-award, under review for the 2-year performance extension.

Apart from mileage operated, EWT and On-time performance none of the other monitoring data directly influences the contract payment regime.

5.3. Driver Quality Monitoring

The quality of bus drivers from a technical point of view is assessed under the Driver Quality Monitoring (DQM) survey which employs technically qualified driving instructors to undertake covert observations of a driver's performance. The overall aim of this survey is to observe a sample of each companys' drivers during a year. Drivers are scored on their driving style using a predefined scoring matrix with a "4" being "Unacceptable with dangerous faults". Whilst individual bus companies will receive feedback from the observations on a regular basis they will be notified immediately of any driver receiving a "4". Although drivers would not usually see their individual scores a driver receiving a '4' would be interviewed and corrective action taken.

Appendix C is a copy of the DQM scoring sheet completed by the assessor for each driver observation.

Scoring/ratings are as follows:

1 - Fully Acceptable	0 points
2 - Acceptable with some driving faults	2 points
3 - Unacceptable with serious faults	20 points
4 - Unacceptable with dangerous faults	50 points

The following is a briefing note produced by TfL GLA Transport Committee explaining the DQM process.

https://www.london.gov.uk/moderngovlldc/Data/Transport%20Committee/20070131/Agenda/11%20Appendix%20B%20PDF.pdf

In addition to the above the Mystery Traveller Survey (MTS), which is undertaken by trained surveyors, will assess drivers from a non-technical viewpoint in terms of helpfulness, attitude to passengers etc.

5.4. Engineering Quality Monitoring

Operators are required to maintain their vehicles in accordance with all laws, regulations and orders applicable to Public Services Vehicles as defined in the Public Passenger Vehicles Act 1981.

In addition to the annual test (MOT) undertaken by the Driver and Vehicle Standards Agency (DVSA) operators will undertake they own maintenance and inspection regimes with all buses typically being subjected to examination at least every 28 days. Drivers are also required to undertake daily walk round checks prior to the bus entering service.

TfL also employ a specialist contractor – at present the Freight Transport Association (FTA) - who undertake engineering checks under the Engineering Quality Monitoring (EQM) system. Approximately 25% of the fleet will be inspected each year which each garage being subjected to an unannounced inspection. The inspectors employed by the FTA will examine a random sample of buses to a pre-agreed inspection sheet and allocate marks for faults found. The scoring system gives higher scores to more serious faults hence the higher an Operators overall score the worse their maintenance standards will be deemed to be.

Incident data published by TfL suggests that mechanical failure is not a major factor in bus accidents although pedal confusion is, on occasions, a factor and is being reviewed as part of the Bus Safety Programme.

5.5. Bus Contract Audit Team

TfL have a contract audit team who will regularly visit individual garages to undertake audits to assess compliance of recording processes. These audits will check records for items such as lost mileage, drivers' hours etc.

5.6. Monitoring of Customer Perceptions

In addition to the Mystery Traveller Survey described in section 5.3 above TfL also undertake Customer Satisfaction Surveys which will interview a sample of customers across the transport network and ask them questions about their last journey which they have just completed.

5.7. Bus Operator Forum – Meeting Structure

In addition to the direct contractual and performance management relationship between TfL and individual bus operators TfL encourages collaboration between itself and all the bus operators through the Bus Operator Forums (BOF). The main BOF meets approximately every 8 weeks and involves bus operator Managing Directors and directors & senior managers from TfL. This meeting is used by TfL to share information and updates with the operators on initiatives and all business-related issues, for example the consequences of TfL's business plan on the bus network. The meeting will also be used by operators to raise generic issues and concerns.

Below the main BOF is a series of sub-groups including the Engineering BOF and the Safety BOF which convene on a similar cycle to discuss issues of common interest and share best practice. For example, at the Safety BOF operators will share findings from investigations into serious incidents to ensure lessons learnt are spread across the network.

6. SAFETY MANAGEMENT ON THE LONDON BUS NETWORK

6.1. Introduction

This section gives an overview of the processes and systems in place to manage safety across the London bus network.

TfL's annual report and accounts for 2017/18 quotes that "London's bus fleet is one of the safest in the world, with fewer than three injuries for every million passenger journeys". However, TfL recognises the need to further reduce injuries and has therefore developed a new Bus Safety Programme to drive a major safety improvement across London's buses. Section 7 looks specifically at TfL's Bus Safety Programme which was launched in February 2016.

Data from a presentation to the IRC Chairman and Mike Weston on 29th August 2018 (Appendix D) indicates that during 2017 10 people were killed by a bus and 258 people were seriously injured.

Those killed or seriously injured can be categorised as follows:

- Passenger 42%
- Pedestrians 35%
- Cyclists 8%
- Motorcyclists 6%
- Other 9%

In addition, there were 3,075 slips, trips and falls on buses during 2017 with 44% of these involving standing passengers and 21% being during boarding and alighting.

Safety on London's roads is a key part of the 2018 Mayor's Transport Strategy [8], which has set a "Vision Zero" target that no one will be killed or seriously injured on London's roads by 2041. The Mayor has also set an earlier target that no one is killed on or by a London bus by 2030.

As discussed in section 6.2 greater transparency by the organisation with regards to safety data has led to increased public and stakeholder scrutiny and accountability in terms of the safety of the bus network.

In July 2017 the Greater London Assembly Transport Committee published a report "Driven to Distraction – tackling safety on London's buses"[9]

The report recommends that TfL:

- Sets safety targets for bus operators as soon as possible.
- Revise its senior staff bonus scheme to introduce a direct link between bus safety and performance-related payments.
- Improves the data it uses for bus safety analysis and trend reporting.
- Reduces the number of distractions and difficulties facing drivers.
- Delivers driver safety training, in the same way it delivers customer service training.
- Reviews bus maintenance practices in garages.

TfL's safety team are responsible for the monitoring of safety performance through the collection of data, investigating serious incidents and undertaking audits to ensure compliance with Health & Safety requirements. This team also work closely with the bus contracts performance team to ensure that bus safety is part of the ongoing performance management process.

[8] Mayor's Transport Strategy 2018 https://www.london.gov.uk/sites/default/files/mayors-transport-strategy-2018.pdf

[9] GLA Transport Committee Driven to distraction report https://www.london.gov.uk/sites/default/files/final_driven-to-distraction-17-07-17.pdf

6.2. Data Collection & Transparency

As part of bus operators' contractual requirements, they are required to submit comprehensive data relating to incident and accidents which have occurred across the network. This data is submitted through IRIS (Incident Reporting Information System) although in the case of serious incidents these will be reported and monitored in real time through TfL's central control room who will work with other agencies to manage the intermediate response to the incident.

TfL also publish STATS19 data which is the national data set of road traffic collisions involving death or personal injury. This data is compiled by the Police and is published on a quarterly basis.

TfL has a very clear transparency policy. They recognise that with responsibility for both the financial and operational performance of the road and public transport networks and an annual budget of around £11bn, they have a duty to spend that money as efficiently as possible and to be held accountable for how it is spent. They publish a huge amount of data on a range of subjects including contracts, expenditure, service reliability, customer satisfaction, journey data, financial performance and safety performance.

Their strategy starts with a presumption that all our information should be made publicly available unless there are legitimate reasons not to - for example, disproportionate cost, personal data or information which would harm their ability to maximise value for money for customers and tax payers.

Over recent years TfL has increased the amount of data it publishes in relation to the safety of the bus network including raw data for all reported incidents and quarterly performance dashboards. The reports are available on the TfL website.

Every quarter TfL publish excel spreadsheets[10] listing all reported incidents which occurred across the network and include the following information for each incident – route, date, operator, location in terms of London borough, injury result (treated at scene, taken to hospital), details of the injured party whether passenger, third party their gender and, if known, their age.

TfL also publish, on a quarterly basis a bus safety dashboard[11] which provides a narrative of the published data and trend analysis with previous quarters.

[10] TfL Quarterly bus incidents https://tfl.gov.uk/corporate/publications-and-reports/bus-safety-data

[11] TfL bus safety dashboard http://content.tfl.gov.uk/q1-18-london-bus-safety-dashboard.pdf

This openness, and the associated increased scrutiny from stakeholders, encourages accountability from both TfL and its contracted bus operators for safety performance and encourages continuous improvement.

Despite safety having always been a key priority for Transport for London it is probably true to say that recent scrutiny, partly driven by greater transparency, has led to a renewed focus on bus network safety with several new initiatives being developed under the banner of the Bus Safety Programme.

6.3. Bus Collision Investigations

Both the bus operators and the Police will undertake investigations following a serious collision. The aim of the bus operator's investigation is to determine the root cause of the incident whilst the Police investigation will be used to determine whether a crime or road traffic offences have taken place.

For a more serious or major incidents TfL will also gather all available information from both the Police, Operators and other relevant agencies to determine root causes and to ensure that lessons learnt are disseminated amongst the relevant stakeholders – primarily the bus operators. The sharing of good practice and lessons learnt amongst the contracted bus operators is seen as an important aspect of the safety management process.

6.4. Route Risk Assessments

As part of the Framework Agreement operators are required to produce a Route Risk Assessment (RRA) for each route it operates. The aim of this RRA is to identify potential risks along a route, for example a difficult junction or the presence of a school which might generate a lot of pedestrian movement at certain times of the day. Drivers allocated to that route would be expected to be familiar with the RAA.

6.5. Telematics

Vehicle telematic systems are not currently mandated by TfL although all operators have adopted systems over the last few years from several suppliers including Green Road and Mixtelematics.

Some operators have used these to promote driver incentive schemes with one London company awarding £50 gift vouchers to the best drivers at each garage each month with the best driver across the whole company each year winning a car. This company had originally calibrated the system to set a maximum number of driver faults (counts) at 12 per month although following improvement this had been reduced to 8 and will shortly be reduced to 4. During discussions during the writing of this report there were mixed views on linking driver incentives to safe driving with some operators believing that whilst it may have an initial impact the benefit of this incentive wasn't always sustained.

Another bus company were in the process of retendering their telematics contracts as it felt the current system was no longer delivering benefits partly due to the wrong trigger points being calibrated into the system.

Telematic systems clearly have a role to play in monitoring and managing bus driving standards. However, how this data is used and how bus company supervisors interact with drivers in the use of this data can heavily influence the benefits which accrue from such systems.

6.6. Driver Recruitment & Training

Bus drivers are recruited, trained and employed by the individual bus operating companies. In terms of recruitment companies will adopt a mixture of approaches to attract adequate numbers of drivers in what is usually a very challenging employment market. During discussions with the London bus operators it became apparent that there was a strong preference to recruit non- Public Service Vehicle (PSV) licence holders and train them in-house, however in practice recruiting a mixture of existing licence holders and new drivers is necessary to recruit adequate numbers of drivers. One company interviewed indicated they had also had success recruiting from continental Europe especially eastern Europe although this had become more challenging following the referendum by the UK to leave the European Union.

Traditionally TfL have had little or no involvement in setting terms & conditions, including pay, working hours for bus drivers with the individual bus operating companies agreeing their own local packages with the recognised trade union. In the early days of tendering, with the pressure of the competitive tendering process, this allowed companies to negotiate the most appropriate local terms & conditions and remove many of the historic working practices increasing the efficiency of the operation. The Trade Unions would argue that these local negotiations, coupled with the competitive tendering process, leads to a “race to the bottom” in respect of terms & conditions.

However, by 2000 when Ken Livingstone was elected the first Mayor of London driver turnover was running at over 30% per year and the Mayor decided to intervene by introducing a “Mayors Bonus” for all bus drivers. This flat rate bonus was paid to all drivers who have completed 5 duties in a week and was in addition to their normal pay. This helped recruitment and retention and after a few years was consolidated into base pay packages.

The next significant intervention into drivers pay & conditions was in 2016 following the election of Sadiq Khan as Mayor of London. In his manifesto under the section “A Fairer and More Equal City” he committed to “Establish a unified, fair pay structure across London for bus drivers”.

To date the Mayor has announced several initiatives[12] the main two being the introduction of a minimum wage of £23,000 per annum for all new bus drivers and a "Licence for London" to allow drivers to move between bus companies and enter the new company on the pay grade consumit with their length of service and experience.

The training of bus drivers is the ultimately the responsibility of the contracted bus operators, however TfL has intervened over the years by setting minimum requirements and developing some standard training modules which all bus drivers have been required to achieve.

At a national level all PSV drivers are required to pass a specific driving test and medical to obtain their PSV licence. To maintain eligibility for their licence a driver must undertake 5 days accredited training every five years plus undergo a medical examination every 5 years from the age of 45. In practice most bus companies will provide one days accredited training each year to maintain a drivers Certificate of Professional Competency (CPC). These requirements are national requirements applying to all PSV drivers.

TfL has for several years set a mandatory requirement that all new bus drivers must obtain the Level 2 Professional Bus Driving in London qualification accredited by City & Guilds within 1 year of qualifying as bus driver. This course covers topics such as customer service, how the London bus network is monitored, the use of vehicle ramps, PA systems, safe operation in bus stations and depots.

In terms of safety a specific training courses focused on bus driver behaviours was delivered to all 24,500 drivers between 2015 and 2016. The training called "In the Zone" was focused on encouraging greater awareness of the human factors and behaviours related to crashes. The course was aimed to help drivers recognise where and why risk-taking behaviour occurs and help them implement effective self-reflection and self-policing techniques to reduce the consequences of risk taking. The training was focused around a series of films showing the build up to a road traffic crash and two potential outcomes (crash/no crash) depending upon the risks taken. This course and all the training material were developed by TfL and delivered by bus companies own in-house trainers.

[12] Mayoral Press Releases on bus drivers terms and conditions https://www.london.gov.uk/press-releases/mayoral/new-fair-pay-deal-for-londons-25000-bus-drivers and https://www.london.gov.uk/press-releases/mayoral/mayor-sets-out-fairer-deal-for-bus-drivers-0

The attached link is a presentation to TfL's Safety, Accessibility and Sustainability Panel giving an overview of the course (http://content.tfl.gov.uk/sasp-20150707-part-1-item08-tfl-bus-driver-behaviour-training.pdf).

More recently TfL has delivered centrally a 2 days CPC accredited course called "Hello London" whose primary objective was to improve the customer service provided by bus drivers as this was an area where customer satisfaction was scored down by customers. The course was delivered by trained actors who provided interactive drama to a group consisting of 100 drivers from various bus companies to create an interactive dialogue about how they could handle situations differently to avoid conflict. Whilst the course was primarily focused on customer service it did recognise that the interaction between drivers, supervisors and passengers is often an area of conflict leading to drivers potentially being frustrated and distracted thus taking risks whilst driving. This course which was completed in May 2018 took two years to deliver to all 24,500 bus drivers.

One of the aims of the approaches described above has been to achieve consistent standards across all bus companies. With 24,500 bus drivers consistency of delivery in all aspects of the service is probably one of the greatest challenges.

6.7. CIRAS

CIRAS is a confidential incident reporting system which staff can use to raise safety related issues which they have already raised through the normal internal channels but don't believe have been adequately dealt with. CIRAS was originally developed for the UK rail industry but was expanded to cover the London bus industry during 2016.

The following link gives an example of the type of issue which CIRAS have reviewed since it started to cover the London bus industry.

http://www.ciras.org.uk/articles/2018/cab-seat-audit-leads-to-review-of-process-for-reporting-defects/

7. BUS SAFETY PROGRAMME

7.1. Introduction

In February 2016 TfL, partly in response to increased public and stakeholder pressure, launched its Bus Safety Programme the core elements of which can be summarised as follows:

Core Elements:	**Recent Additions:**
Bus Collision data analysis	Reducing Customer Injuries
Transparency	Fatigue Management
Contract and Performance Management	Safety Innovation Fund
Vehicle Design	Working in Partnership
Sarah Hope Line	
Bus Driver Training	

The following sections provide further information on the key aspects of the Bus Safety Programme. Whilst there are individual workstreams under each of the above headings many of the items will also be picked up as part of the new Bus Safety Standard.

7.2. Data Analysis

One of the key initiatives as part of the programme has been an in-depth data analysis into the cause of individual accidents and how this might impact on street design, vehicle designs and other operational practices.

7.3. Safety Innovation Fund

During November 2017 TfL announced as part of the Safety Innovation Fund the award of £500,000 to six bus operators to develop new ideas that will improve safety across London's bus network. Abellio, CT Plus, Go-Ahead, RATP, Tower Transit and Metroline were all awarded funding for their ideas for safety devices and to improve workplace behaviour. These trials form part of the data collection process which has fed into the development of the Bus Safety Standard.

During discussions with London bus operators a demonstration was seen of a driving fatigue monitoring system called Seeing Machines which monitors drivers eye movements and alerts drivers, through seat vibration, to early signs of drowsiness. If the system monitors eye closure for more than 1.5 seconds an alert sounds in a central control room allowing a supervisor to quickly verify the incident and then alert the operating garage who would then radio the driver. The driver would then be interviewed about the incident including discussions about lifestyle and other issues which may impact on their ability to safely drive a bus. The operator had observed a 25% reduction in incidents since May on one route where the system has been trialled.

Another operator had been trialling a system called Mobi-eye which involves a forward-facing camera detecting and providing warning messages to the driver via a small in-cab monitor on the dashboard. In addition to showing changes to speed limits the system also alerts drivers when travelling too close to the vehicle in front, or other potential conflicts with cyclists or pedestrians. The operator had seen a 28% reduction in accidents, with on-board injuries falling by 75%, since the system trial started in March. The operator will continue to monitor to obtain the longer-term effectiveness of the system.

The above examples illustrate the increasing number of systems and technologies designed to reduce incidents and accidents and it is therefore important that in-depth trials and research takes place before adopting such systems.

Other trials have included alarms to alert nearby pedestrians to approaching buses, acceleration limiters, psychometric testing and a joint project with London Cycling Campaign to introduce road user champions in depots. If the trials are successful they will be considered for introduction across the wider bus network following consultation with unions and staff.

7.4. Incident Support Service (Sarah Hope Line)

In the past TfL has attracted criticism for the lack of engagement it has had with victims of incidents across the whole public transport network. On the Underground network initial contact with the victim is often easier as station staff are usually on-hand dealing with the immediate aftermath. In terms of the bus network the lack of staff on the ground often leads to little or no direct contact with the victim.

Post incident historically there has been a reluctance by TfL or the bus operators to contact the victims to either offer an apology or any support. This was driven by a concern that doing so would potentially open the organisation to an acceptance of liability. More recent advice is that offering sympathy, an apology and practical support to victims and their families would not be accepting liability. This change of approach led to the setting up of an Incident Support Service called the Sarah Hope Line. The aim of this service is to assist those affected by incidents where someone is killed or seriously injured. The service aims to provide a first point of contact and practical help to solve practical problems resulting from the incident.

The support service is led by a dedicated team to make sure that individuals get the help they need following an incident on the network. TfL will work in partnership with organisations that can provide further specialised support. The service is named after Sarah Hope[13] who, along with her mother and young daughter where involved in a serious bus incident in April 2007.

7.5. Bus Safety Standard

A core output of the Bus Safety Programme is the development of a new Bus Safety Standard. TfL have been working in collaboration since 2016 with road safety consultant TRL, Loughborough University, the bus operators and manufacturers to assess and then recommend features which should be incorporated into future bus design to help drive safety improvements. The primary objective of the Bus Safety Standard is casualty reduction especially those killed & seriously injured.

Several potential technologies including intelligent speed assistance, autonomous braking, runaway bus prevention, pedal confusion prevention, acoustic and visual conspicuity, mirror design and frontal crash protection are being considered as part of this programme with both the costs and benefits of each being thoroughly assessed to ensure that the causality reduction is maximised in return for the financial investment made.

Intelligent speed assistance is already an available feature on Volvo Euro V and Euro VI and several London operators are in the process on turning on this feature.

TfL are planning to announce the first phase of its Bus Safety Standard on the 16th October 2018 and it is currently envisaged that they will have three introductory phases:

- Phase 1 2019
- Phase 2 2021
- Phase 3 2022

Although it is currently envisaged the standard will apply to new buses (around 700 per annum) consideration is also being given to the potential for retro-fitting to existing buses possibly as part of their mid-life refurbishment which takes place around 7 years. It is worth noting that TfL have adopted a rigorous approach to the assessment of each potential option using cost/benefit analysis to target the interventions which will give the greatest return for each £ spent in terms of injury/accident reduction.

It is not anticipated that seat belts will form part of the new Bus Safety Standard.

A further report will be produced for the IRC following the launch of the Bus Safety Standard on the 16th October.

[13] The Story of Sarah Hope https://tfl.gov.uk/campaign/sarah-hope-s-story

7.6. Working in Partnership (Safety Culture)

It is clear from discussion with both TfL and the bus operators that safety, although always taken seriously, has had a renewed focus over the last few years. All parties are now focused on identifying the root cause of incidents and using this learning to take corrective action. There is also more of a 'deep dive' into investigations by both TfL and the bus operators more focused on generating root causes rather than purely apportioning blame between company, driver or third party.

This re-focused approach has come about through partnership working between TfL and operators. It is also worth noting that the Framework Agreement or Route Agreements have not been changed to achieve this approach. The creation of a dedicated team within TfL focused on delivering the Bus Safety Programme has been critical in pushing the agenda forward.

It is also clear there has also been a shift towards 'behavioural safety' such as fatigue management.

7.7. Bus Company Initiatives

With a renewed focus on safety many bus companies have introduced local initiatives.

Section 4.6 highlights some examples which operators have introduced in relation to the vehicle specification. This section summarises some of those initiatives discussed during the operator interviews.

- Many companies are now looking more closely at driver behaviour/fatigue management. One bus company have looked in-depth at long service drivers and why some have never had accidents. They identified that many of these adopted life-styles to support their role for example arriving at work early, better routines in terms of adequate sleep before each shift.
- Some operators are introducing audio recording to capture conversations between drivers and passengers to aid future investigations and training.
- Another operator had recently introduced a voluntary Safety Pledge which drivers are invited to sign. This pledge includes commitments such as 'to get enough sleep', 'driver within the speed limits'. Over 60% of the company's drivers have so far signed the pledge.
- Most operators also have processes in place to monitor secondary employment although the general agreement was that this was not a major issue.

- Psychometric testing. There were mixed views on the use of psychometric testing with some operators having ceased previous trials and others looking at developing new tests. However, this type of testing as part of the initial assessment process has been funded as part of the Safety Innovation Fund. One operator is in the process of developing a new system and developing questions to help identify risk takers and those likely to overreact.
- An operator had trialled the use of a mindfulness coach for a selection of drivers with the coaching sessions teaching breathing techniques in difficult situations and self-reflection techniques at the end of shifts. Whilst this approach had received positive feedback it was very resource intensive in terms of trainer/driver ratios making large scale rollout difficult to justify.
- All operators have extra processes in place to manage night workers.
- No bus driving simulators are currently in use in London.

The above list illustrates that operators are clearly engaged in the safety agenda and introducing local initiatives to drive improvement.

7.8. TfL Safety Performance Indicator

As part of the Bus Safety Programme TfL have developed a Safety Performance Indicator (SPI) based on an approach already used within the rail industry. The SPI monitors a basket of measures including incident data and outputs from the observational measures giving an operator an overall score which is benchmarked at 80. Their individual future performance is then measured against the benchmark to track for either deterioration or improvement. The system is not designed to compare bus companies between each other but to track the trend of an individual company.

8. COMPARISON OF FRANCHISING SYSTEMS – LONDON AND HONG KONG

8.1. Introduction

This section makes observations and comparisons of the Hong Kong bus franchising system with London based on a review of the submissions to the IRC. The observations are made under several key topic areas.

8.2. Competitive Tendering

The Hong Kong franchised bus network has not been subject to any open competition since 1995.

The continuous route level tendering adopted by TfL leads to a constantly competitive market with operators having to focus on operational performance, including health & safety, to ensure they continue to retain and win new bus operating contracts.

The route level tendering programme allows TfL to proactively take operators' current performance into account as part of the tender evaluation process and reflect this as part of individual route awards. This provides a very flexible approach to contract management without the need to resort to the ultimate sanction of contract termination which is always a challenge for large bus network contracts due to the potential disruption early termination might bring to passengers.

However, it could be argued that the gross cost contract regime can lead to operators becoming very cost focused as despite the technical evaluation considering all aspects of operational performance the contract price is still a significant factor in the recommendation of contractor. The contract price is likely to be even more in focus during the current period where TfL finances are under significant pressure.

The availability of bus depots is often seen as a barrier to competition. In London there are around 85 bus depots and for most routes at least two operators will have a garage located close enough to actively compete thus ensuring a high degree of competition. In Hong Kong the availability of land to develop new bus depots is limited which would act as a major barrier to competition and restrict the ability to bring new players into the market. Any future competitive tendering of bus services in Hong Kong would require a clear strategy around depot ownership and availability.

8.3. Network Financial Performance

As explained in 2.3 for most years since competitive tendering commenced in 1985 the London bus network has been in receipt of public subsidy. Hong Kong's bus network is probably unique for a world city in not requiring public subsidy. This, linked to fares control from the TD, creates a very challenging financial environment for the FB operators. This is an exceptional achievement; however, the question must be asked whether the emphasis on operating a commercial network without public subsidy is sustainable and potentially drives either the wrong behaviours or lack on focus on certain aspects of the operation. Also does this overly restrict the investment the franchised operators can make in the network especially in terms of developing and introducing new technology and initiatives.

Consideration could be given as to whether certain safety initiatives, such as the uptake of new safety technology and bus driver training targeted specially at safety might need to be funded by the TD as direct grants outside of the franchise agreements with specific outcomes linked to these grants. Providing funding outside of the Franchise Agreements is also justified especially if the benefits accrue to the wider society.

Ultimately under the London system the cost of any improvements, for example the proposed new Bus Safety Standard, will be reflected in operators' future tender bids and thus impact on the subsidy requirements of TfL. This means that any network wide improvements required by TfL do not impact on the competitive tendering process as they must be adopted by all operators to submit a compliant bid thus maintaining a level playing field. So, whilst TfL proposed Bus Safety Standard is likely to increase the capital cost of buses all operators will reflect these increased costs in the route level tender bids.

However, it could be argued that this approach discourages operator initiatives as any additional costs incurred by individual operators will need to be reflected in their tender bids thus making them less competitive. Also, in practice individual initiatives are very difficult to reflect in the tender evaluation process and on their own unlikely to impact of the actual award recommendation especially if the tender bid costs are significantly different.

8.4. Safety Data Transparency/Performance

It is clear from London's experience that greater transparency of data in relation to the safety performance of the bus network not only leads to greater stakeholder and public scrutiny it also leads to a sharper focus from both the transport authority and its contracted bus operators on the safety agenda. An open approach to incident data leads to accountability.

Consideration should be given to what safety data in relation to the Hong Kong franchised bus network could be placed into the public domain.

8.5. Incentivisation of Safety Improvements

As referred to in section 6.1 one of the recommendations from the Greater London Assembly Transport Committee was "Revise its senior staff bonus scheme to introduce a direct link between bus safety and performance-related payments". Also, within the body of the report there is a recommendation that "TfL's contracts with bus operators do not incentivise safety and should be revised". During discussions with the London bus operators it was clear that operators do not support the direct incentivisation of safety within the route agreement. Operators were concerned that direct financial incentivisation might drive the wrong behaviours, especially at lower levels within the company, including potentially encouraging underreporting. Also, operators felt that linking safety performance to financial payments could lead to a reluctance to collaborate with other operators on safety related issues as it now had a competitive and commercial benefit. Overall options to incentivise safety within the bus contracts were not seen as a positive move.

8.6. Contractual Relationship between Transport Authority and Bus Operators

The Hong Kong system of franchising is clearly different to the system adopted in London or more recently established systems in cities such as Singapore. Whilst the contractual structure is different in Hong Kong the high-level contractual model adopted in Hong Kong does not necessarily need to change to achieve improvement in terms of the contractual monitoring, performance management and collaboration between franchised operators and the Transport Department.

In reviewing the submission by the Transport Department TD 01 "An Overview of the Regulatory and Monitoring Regime of Franchised Bus" it appears that in terms of safety there is clearly a strong reliance on statutory regulations as the main thrust of safety management for the FB operators.

Paragraph 3 quotes that "as far as safety is concerned, the requirements imposed on FB operators are mainly statutory requirements under the Road Traffic Ordinance and its subsidiary legislation" and paragraph 21 of part 1 of this document highlights that "as far as safety is concerned, FBs are no different from any other vehicles, in that both the buses/vehicles and the drivers are all subject to the licensing regime as statutory requirements".

The above suggests, in the view of the author, an over dependency on the statutory regulations applying to all vehicles and fails to recognise some of the unique features of the bus operation especially in terms of their ability to carry upwards of 100 passengers. This over reliance on ensuring compliance with statutory regulations may also stifle innovation in terms of safety by both the TD and the FB operators.

In terms of experience from London, compliance with the statutory requirements relating to both vehicles and drivers is very much expected and it is the initiatives, projects and collaborative working beyond these that have and will make the real-world differences to safety. The collaboration between the London bus operators and TfL and their willingness to innovate and try new technologies and approaches has, and as part of the Bus Safety Programme, will deliver real results in terms of incident and injury reduction. The TD should consider how they can improve the collaborative working with the FB operators.

8.7. Role of the Transport Department in Safety Management

The author would agree with the TD that at present there are comprehensive monitoring and regulatory regimes for FB services. However, a new approach which sits alongside the contractual/regulatory regimes is clearly required to drive the safety agenda forward. TfL and the London contracted bus operators have over the last few years moved to a different level in terms of safety management. This approach is very much based on collaboration and joint working, and whilst this may lead to either the Framework Agreement or Route Agreement being changed in the future this has not been necessary to facilitate the initial progress.

From the documents submitted by the TD and others it is clearly difficult to understand the exact nature of the relationship between the TD and the FB operators, however the documents reviewed do suggest a very contractual based relationship which could benefit from more joint working and collaboration outside of the contract regime. This is joint working and collaboration came across very strongly during the discussions with both TfL and the operators during the preparation of this report.

8.8. Bus Driver Training

Whilst the contractual requirements in London place the responsibility for driver training on the individual bus companies TfL has over the years developed some standard training courses for all drivers as described in 6.6, with all drivers required to complete within certain timescales. With a multi operator franchising system it is important that common and consistent standards are provided to the travelling public and hence the transport authority is often best placed to set common training requirements especially in the topic areas beyond technical driving skills.

8.9. Adoption of New Technology

It is clear from London's experience that the adoption of new technology needs to be done in a considered way to ensure that the benefits from any financial investment are maximised. It is clearly necessary to understand both the cost and benefits of various technology options to ensure that any investment made maximises the benefits in terms of accident reduction. The approach adopted by TfL in the development of its Bus Safety Standard is worthy of consideration in Hong Kong especially given the main two UK bus manufacturers are key suppliers to both London and Hong Kong.

Safety technology will also continue to develop as the vehicle industry sees increasing autonomy. In this regard the assessment and adoption of new technology needs to be an ongoing process as vehicle safety features will continue to develop and any standards need to constantly respond to these developments.

8.10. International Benchmarking

TfL is a member of the International Bus Benchmarking Group (IBBG)[14] which allows it to benchmark many aspects of its performance, including safety, with other world cities. The International Bus Benchmarking Group (IBBG) was established in 2004 to provide a confidential forum to share experiences, compare performance, identify best practices and learn from one another in order for member organisations to improve performance. All IBBG activities are carried out within a framework of confidentiality, ensure and honest and open information exchange. Any information that is released externally is therefore anonymised.

The Hong Kong TD and the franchised bus operators might benefit from such international benchmarking either through organisations such as the IBBG or directly with individual transport authorities across the world.

[14] IBBG https://busbenchmarking.org/

8.11. Independent Safety Regulator

Within the UK there is currently no Independent Safety Regulator for the bus industry although as detailed in section 3.2 the Traffic Commissioners do have some duties relating to ensuring operators' suitability.

In the UK the Rail Safety Standards Board, an independent body, works through its members to drive improvements in the British Rail System. Through research, standards, analysis and insight, RSSB supports its members and stakeholders in driving improvements in health and wellbeing and delivering a safer, more efficient and sustainable rail system.

Following an accident on TfL's Croydon tram network on the 9th November 2016 in which 7 passengers were killed and 62 others injured TfL are currently looking at establishing a similar organisation for the tram industry across UK. The Light Rail Safety Standards Board would potentially be established with financial support from other UK trams operators and the Department for Transport.

Discussions with TfL during the research for this report prompted the question about whether the UK bus industry would also benefit from a similar type of organisation. This could prove a very pro-active way of driving improvements and spreading good practice across the whole industry. This type of organisation could also be worth consideration in Hong Kong.

APPENDIX A – MIKE WESTON CAREER RESUME

Personal Profile

An experienced and well-respected senior executive with substantial financial and commercial experience within the bus industry, especially within the contracted regime of London, with strong leadership and management skills gained through managing a large team and a number of TfL subsidiary companies.

High profile in the bus industry both in London, throughout the UK and internationally with extensive experience of stakeholder engagement. Demonstrates strong personal integrity and professionalism exemplified by constructive relationships with bus operators, vehicle manufacturers and other key stakeholders.

Recent Career History

Independent Consultant (October 2016 to date) - undertaking consultancy work in the bus industry providing support with focus on environmental management of bus fleets and the franchising of bus networks. Clients include bus manufacturers, operators and transport authorities both within the UK and internationally.

Director of Buses, Transport for London (October 2013 to September 2016)
Accountable for the effective management of London's bus network, including network planning, procurement, operation and performance. Circa £2bn per annum budget, and a team of 550.

Also, responsible for the provision of a safe network, including engineering standards and development and implementation of environmental strategy to minimise the environmental impact of the bus fleet.

Other recent roles:
Operations Director, Transport for London – London Buses (2004 - 2013)
Head of Bus Operations, London Buses (2003-2004)
Head of Bus Infrastructure, London Buses (1999-2003)

Other Professional Interests

Chair of the UITP Bus Committee (May 2015 to September 2016)
Employer nominated Trustee of the TfL Pension Fund (October 2013 to September 2016)
Member of the Chartered Institute of Transport.
Chair of the UK Low Carbon Vehicle Partnership Bus Working Group (2014 - to date)

APPENDIX B – DETAILS OF BUS TENDER RESULTS

Bus tender results

Route 110 - award announced 28 October 2016

Route	110
Number of Tenderers	Three
Successful Tenderer	London United
	£ PA
Accepted Bid	1,570,335
Lowest Individual Compliant Bid	1,568,213
Highest Individual Compliant Bid	1,592,000
Cost per mile of awarded contract £/mile	6.02
Reason for not awarding to Lowest Bidder	Joint bid discount.
Joint Bids	Part of a joint bid with route 111 totalling £8,053,000 per annum.

APPENDIX C – DRIVER QUALILTY MONITORING (DQM) SCORING SHEET

DQM Assessment number | Assessor id | score 1, 2, 3 or 4 Overall grade

		comment (around 70 words)
Date	Time assessment started	
Route number	Time assessment ended	
Operator	Location assessment started	
Garage	Destination of bus	
Registration number	Origin of bus	
Fleet number, eg PVL 24	Weather	
Running number, eg SW123	Gender of driver? *M or F*	
Vehicle type	Company uniform worn? *Y or N*	

Passenger Consideration *score 1, 2, 3 or 4*	Other safety *Write yes or no ("yes" indicates a fault)*	Driving ability *Score 1, 2, 3 or 4*
Moving off - smoothly	Mobile phone used in motion	Move off - safely
Door operation	Talking to person whilst driving	Move off - control
Moving off - timing	Radio playing in cab	Use of all mirrors
Stopping - smoothly	Smoking whilst in motion	Give signals
Stopping - position	Reading whilst in motion	Reaction to signals
Comfort - cornering	Handling cash in motion	Stopping safely
Comfort - acceleration	Eating / drinking	Lane discipline
Comfort - braking	Parking brake not applied at stop	Road position
Customer service	Headphones / earphones worn	Junctions/roundabouts
Other safety related issues (based on *Other Safety*)	Driving one-handed	Keep distance
	Insufficient use of internal mirrors	Adequate clearance
	Not paying heed to Advanced Stop Lines.	Appropriate speed
	Not acting appropriately in response to on-board alerts and warnings	Anticipation

APPENDIX D - TfL Presentation to Chairman, IRC and Mike Weston on 29th August 2018

Attached separate pdf file.


BUSES
TRANSPORT
FOR LONDON
EVERY JOURNEY MATTERS

Bus safety

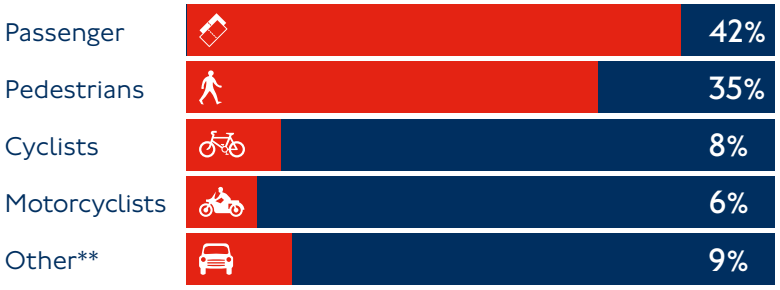
The challenge

Bus collisions*

10
people killed
by a bus in 2017

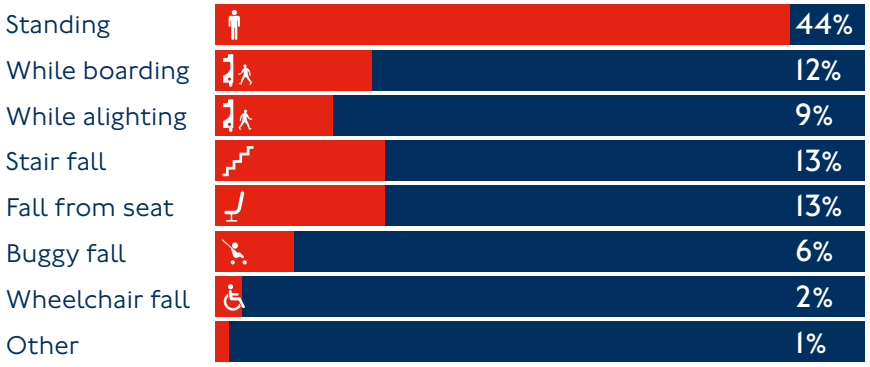
258
people seriously injured
by a bus/coach in 2017

Of those killed or seriously injured in collisions:



On board

3,074
slips, trips and falls
on buses in 2017



* provisional data

** vehicle occupants

Vision Zero

A fundamental conviction that loss of life and serious injuries are not acceptable nor inevitable.

The Mayor's Transport Strategy sets out that no one will be killed or seriously injured on London's roads by 2041.

Target

80%

of all journeys to be by walking, cycling, or public transport by 2041

Countdown to Vision Zero

2022

70 per cent reduction in people killed or seriously injured in or by a bus (based on 2005-09 baseline)

2030

No one killed in or by a London bus

2041

No one killed or seriously injured on London's roads

Bus safety programme

The majority of the bus safety work in this presentation is part of our bus safety programme, which was launched in February 2016.

The core elements are:

1. Bus collision data analysis
2. Transparency
3. Contract and performance management
4. Vehicle design
5. Sarah Hope Line
6. Bus driver training

But the programme is constantly evolving and now includes:

7. Reducing customer injuries
8. Fatigue management
9. Safety innovation fund
10. Working in partnership

Our safe system approach

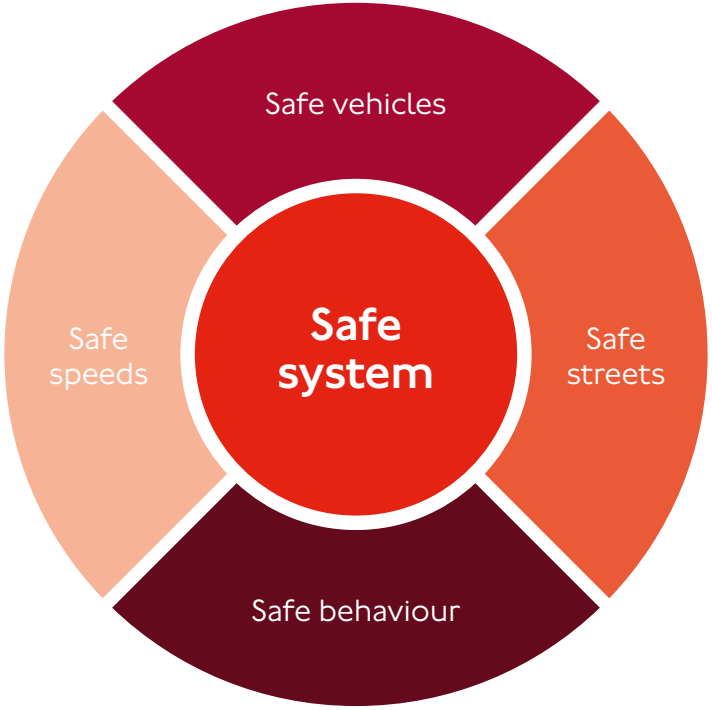
A safe system needs to accommodate human error and ensure impact energy levels are not sufficient to cause fatal or serious injury.

Safe speeds

Speed is one of the most important factors in whether a collision occurs and how severe the collision is. Reducing speeds is fundamental to creating a safe system.

Safe behaviour

All road users are responsible for safe driving, especially drivers of large vehicles who have the most potential to cause danger to others.



Safe vehicles

Large vehicles are disproportionately involved in collisions with people who walk and cycle, and therefore these vehicles should be made as safe as possible.

Safe streets

Streets must be designed, built and maintained to support a mix of safe walking, cycling and public transport use.

Bus safety programme highlights

Speeds

700

buses per year will have Intelligent Speed Assistance technology

Vehicles

Six

bus operators are trialling safety technology via TfL funded schemes

Streets

95%

of bus stops in London are accessible, reducing the number of slips, trips and falls

Behaviours

All 25,000 bus drivers to receive innovative safety training

Post collision

2016

saw the launch of the Sarah Hope Line to support victims of road collisions

Partnerships

41

safety indicators will be monitored across all bus operators in new Safety Performance Index

Safe speeds

Progress

Intelligent Speed Assistance

- Trialled successfully on two bus routes in June 2016
- The percentage of time buses spent travelling above the speed limit reduced from a range of 15-18 per cent to 1-3 per cent in 20mph zones
- Intelligent Speed Assistance is currently being retrofitted onto some vehicles and will start to be rolled out on to new buses in 2019

The Speed Compliance tool

- This will be used to monitor speed compliance by operators, route, vehicle and driver, and will be launched by the end of 2018

Safe speeds

Next steps

iBus 2 – automated vehicle locator technology

- Once adopted in 2022, this will include Intelligent Speed Assistance capability

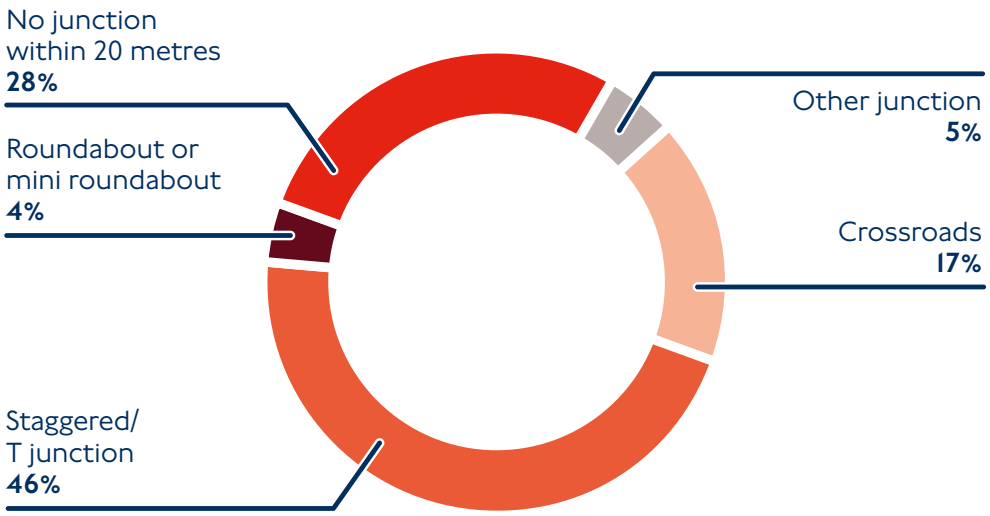
Reduce speed limits to 20mph

- Designing streets to keep speeds low, in line with the Healthy Streets objectives in the Mayor's Transport Strategy

Safe streets

Progress

Location of bus collisions with pedestrians, cyclists and motorcyclists:



95%

of bus stops in London are accessible, reducing the number of slips, trips and falls

Safe streets

Next steps

Research pedestrian behaviour around bus stops to identify infrastructure types that might encourage safer behaviour

A rolling programme of tree cutting targeted at problem locations

Working with surface health and safety and sponsorship teams to investigate high-risk locations identified by operators

Safe vehicles

Progress

Building an evidence base

We have completed detailed research to inform the development of the Bus Safety Standard and the countermeasures to reduce injuries inside and outside the bus:

- An investigation of police files involving a fatal bus collision (from 2009-2014)
- A comprehensive analysis of police and bus operator safety data

Intelligent speed assistance

- This year we are rolling out Intelligent Speed Assistance technology onto the bus fleet. It will be required on all new buses from 2019 as part of the Bus Safety Standard

Bus Operator Safety Innovation Fund projects

- Eight projects across six bus operators were awarded funding under the Bus Operator Safety Innovation Fund to trial, research and promote safety in 2018

Safe vehicles

Bus Safety Standard

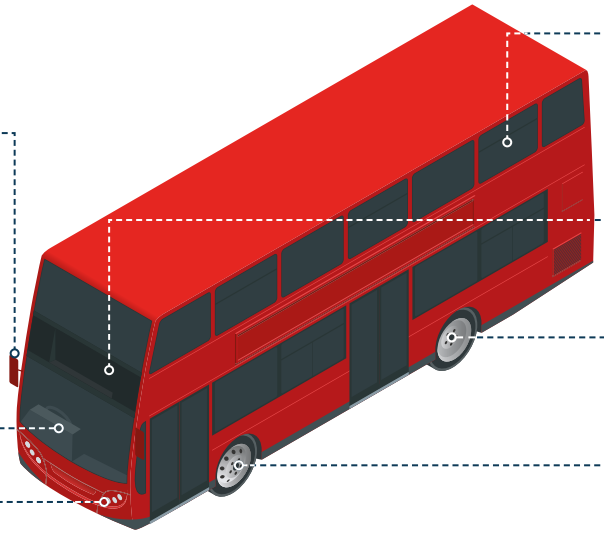
To improve the safety of buses we are testing 12 new technologies and innovations. These address:

- Bus occupant protection e.g. customer-friendly interiors and slip-resistant flooring
- Mitigating high-risk events e.g. prevention of pedal confusion and 'runaway' buses
- Vulnerable road user protection e.g. making buses more noticeable both visually and audibly; improving bus design e.g. Autonomous Emergency Braking

The most effective technologies will be included in a new and world-leading Bus Safety Standard. All new buses delivered from 2019 will meet the standard.

Safe vehicles

Safety interventions being looked at in the initial Bus Safety Standard



Interiors to reduce frequency of slips, trips and falls

Improving direct and indirect vision for drivers

Mitigating high risk events: preventing 'runaway' buses and pedal confusion

Redesigning the front of buses to help reduce the impact of a collision

Autonomous Emergency Braking

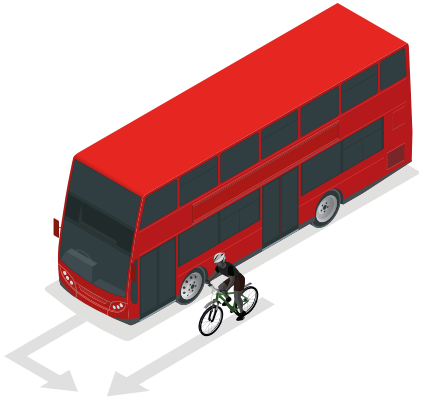
Improve how visually and audibly noticeable buses are to alert people and road users

Speed-limiting technology

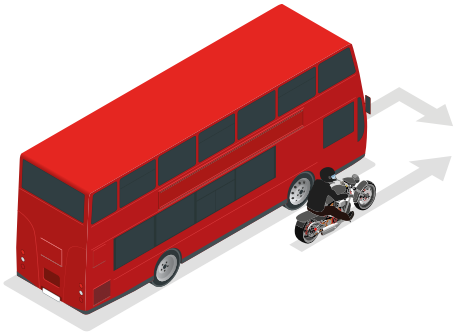
Safe vehicles

Most common types of collisions with pedestrians, cyclists and motorcyclists

Pedestrian



Cyclist



Motorcyclist

Safe vehicles

Next steps

Bus Safety Innovation Fund – Round 2

- We will open the Bus Safety Innovation Fund for the next round of applications for safety innovation trials in autumn 2018

Bus Operations Staff Safety Innovation Fund

- Launch a new Safety Innovation Fund specifically for staff working in Bus Operations to put forward their applications for safety funding in autumn 2018

Safe vehicles

Next steps

Bus Safety Standard – roadmap, and EuroNCAP for buses

- Some of the tested countermeasures will not be sufficiently developed or widely enough available to feature in the initial Bus Safety Standard. Therefore, they will be included in the roadmap for bus safety technology (with dates for when they will become mandatory for London buses)
- New countermeasures are likely to become available as technology advances and these will also be added to the roadmap
- The roadmap will also form part of a new 'EuroNCAP' for buses which will describe and mandate a graduated improvement in safety on buses for London

Safe behaviours

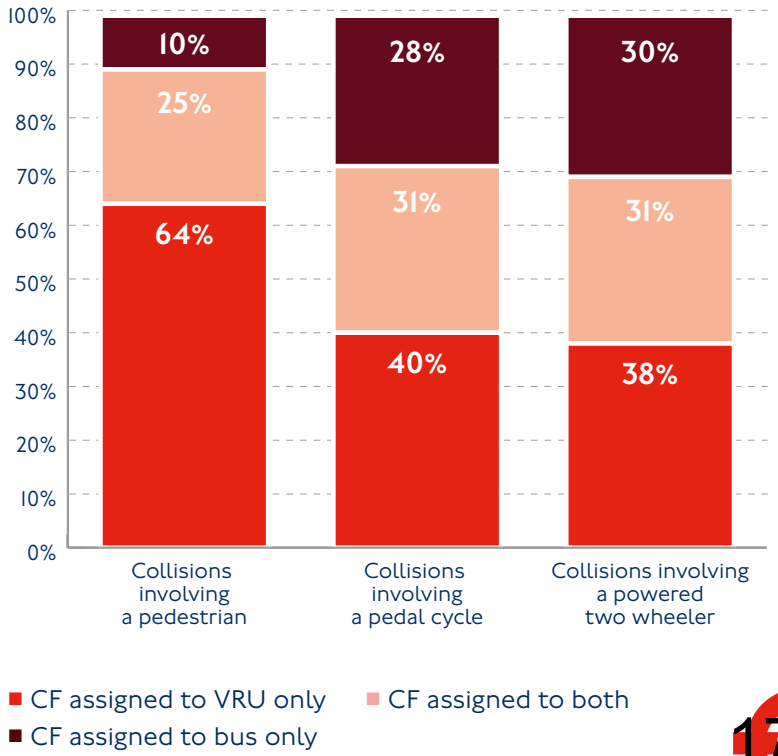
When attending an injury collision, the police can code up to six factors that they believe have contributed to causing the collision.

In collisions involving a bus between 2013 and 2015, bus driver error or bus blind spot was noted as a contributory factor in:

- 35 per cent of bus collisions involving a pedestrian
- 59 per cent involving a cyclist
- 61 per cent involving a motorcyclist

The most commonly coded factors were failing to look, close passing cyclists and poor manoeuvres.

Proportion of collisions



Safe behaviours

Progress

In autumn 2018 we will commission an innovative new safety training course for:

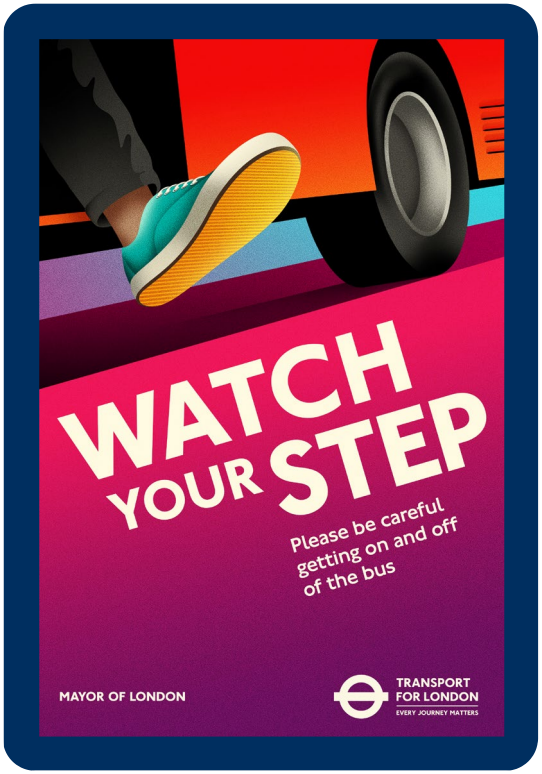
1. All 25,000 bus drivers. The training will be designed by our supplier and delivered by the bus operators' trainers
2. Bus driving instructors, to ensure that the right messages and behaviours are passed on to new drivers

Safe behaviours

Progress

Customer marketing

- A safety campaign, launched by us in July 2017, encouraged customers to think about their personal safety
- A four-week trial of ‘Please hold on. The bus is about to move’ automated messaging was completed in February 2018



Safe behaviours

Progress

Exchanging places for bus drivers

- This scheme enabling drivers to see the point of view of other road users, particularly cyclists, was launched at Brixton bus garage and will be rolled out in other areas

Make Space for Cyclists

- This campaign was introduced by the Metropolitan Police to encourage all drivers to avoid close-passing cyclists
- The police are now looking at options to target this message specifically at bus drivers

Safe behaviours

Progress

Driver fatigue

- Workshop held with bus operators to establish their current fatigue management processes
- Commissioned independent academic research into the extent and nature of bus driver fatigue

Safe behaviours

Next steps

Customer safety campaign

- Develop targeted customer safety campaigns to address issues highlighted by our comprehensive data analysis, in particular, the vulnerability of children and older people to slips, trips and falls on the network

Post collision

Progress

In-depth research and data analysis

- We are working to obtain a clearer picture of how and why collisions occur through both ongoing and specific in depth analysis

The Sarah Hope Line

- Launched in 2016 to support people involved in road collisions

Notification and Investigation of Major Incidents

- The process has been reviewed so that additional data is collected by operators
- All Notification and Investigation of Major Incident reports are now seen by us
- A field has been added to IRIS data to help match with police data bringing together police and bus operational data to add detail to the reports
- We are also developing software to automatically upload incident data from operators' own databases into IRIS. This will cut down on errors caused by the current manual process

Post collision

Next steps

Enhanced collision investigation

- We should aim to use a similar format of investigation to the rail, air and maritime industry to investigate major accidents. This will increase our understanding of the underlying causes of bus accidents and help to put systems in place to prevent them

Data transparency

- The entire bus safety programme is evidence-led and we are continuously adding to this evidence base
- We have a dedicated area on our website for bus safety data, which includes links to the London Collision Map, our 10-year bus safety trends and up to date IRIS data in a user-friendly format

Partnerships

Progress

Operator Safety Performance Pack

- We have launched a new Operator Safety Performance Index demonstrating progress against 41 safety-related indicators
- Alongside this we also assess the processes in place and the overall safety culture for each operator, resulting in a Safety Assurance Score
- Together, these are used to inform performance monitoring of operators

Partnerships

Progress

Knowledge sharing

- First Bus Safety Summit was held in autumn 2017 with experts from rail and aviation sectors sharing experience in fatigue management
- The next Bus Safety Summit will be held in October 2018
- Bus operator forums held every three months, focusing on safety and engineering

The national Confidential Incident Reporting Analysis System for transport (CIRAS)

- We facilitate promotion of CIRAS to drivers, as an alternative independent confidential reporting line for any safety concerns
- CIRAS holds a twice-yearly London bus operators working group meeting where operators share best practice
- CIRAS has also invited two London bus operators to join the CIRAS Board

tfl.gov.uk

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Transport for London

London’s Bus Contracting and Tendering Process

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Contents

1. Introduction

London's bus network is unique in the mainland United Kingdom in that it is regulated. This enables Transport for London to plan, procure and manage a network of services in a consistent and co-ordinated manner. This system, along with adequate funding and collaborative working with other organisations has lead to increased service levels, improved quality of services and significant increases in patronage.

Bus operators compete for contracts to provide specified services for up to seven years, and are rewarded for exceeding defined targets to improve the service to our passengers. Their role is crucial to the current and future success of bus transport in London.

The tendering and contracting arrangements are designed to deliver value for money, balancing the expectations of our passengers against the costs of improvements. The system has been emulated in other countries around the world.

Transport for London is committed to promoting fair and sustained competition to provide bus services in market that is dynamic and unique. This document explains our bus service tendering and contracting process and we look forward to further developing and building on its already proven success.

2. The Market in London – overview

London Bus Services Limited (London Buses) is part of Transport for London (TfL) which is one of the organisations responsible for delivering the Mayor of London's Transport Strategies.

London Buses manages bus services in London. It plans routes, specifies service levels and ensures service quality. It is also responsible for bus stations, bus stops and other support services.

The bus services are operated by privately owned operating companies, which work under contract to London Buses.

Every weekday over 7,700 scheduled buses carry over six million passengers on 675 different routes. Over 120 of those routes run 24 hours a day, seven days a week.

The network is dynamic and responds to London's growth and changing transport needs. Every year up to a fifth of the total bus service is re-tendered, with around half of the network subject to some level of review.

Buses are widely recognised as the best option for increasing public transport capacity in the short-term. Many initiatives are in place to make journeys as easy, reliable, quick, convenient, comfortable and affordable as possible.

The following figures demonstrate how much the bus network has developed in the last few years:

- Bus ridership has grown by 70% per cent between 2000/01 and 2014/15
- Buses in London now carry the highest number of passengers since 1959
- In the year to March 2015, there were 2.4 billion passenger trips on the network
- Bus kilometers in London is higher than at any time since 1957, with 490 million km operated in 2014/15

3. Purpose and Structure of key organisations in London's bus tendering process

3.1. Historical and Political Situation

When London's urban public transport was brought together in 1933 with the support of the London Passenger Transport Board, bus services covered a vast area. At the time, they served much of what is now Greater London, as well as areas in many of the adjacent counties, up to around 35 miles distance from Central London.

From 1970 to 1984, London Transport (LT) came under the direct control of the Greater London Council (GLC) and the area for which LT was legally responsible was also reduced to the present 1,580 sq km (610 sq miles). Cross boundary links were retained and the GLC and county councils took decisions on the funding of those services.

Under the London Regional Transport Act 1984, LT was again brought under central government control. The Act required LT to set up subsidiary companies to run both buses and the Underground.

It also stipulated that, where appropriate, competitive tendering should be introduced to ensure LT operated economically and required less financial assistance from public funds.

In 1986, bus services outside London were deregulated. This meant that any licensed operator could decide to run a new route even if another company already ran a service along the same roads.

Although London was exempted, it was intended that once bus services in the capital had become less dependent on government assistance and steps had been taken to encourage greater competition between operators, deregulation would be extended to include London.

In 1985, LT set up a subsidiary known as London Buses Limited (LBL) to run its bus services. However, route planning and fare structures remained the responsibility of LT.

In the same year, LT set up the Tendered Bus Division to begin the process of competitive tendering. This required LBL to compete against privately owned operators for the opportunity to run individual bus routes on behalf of LT.

The routes were awarded to the operator which could run the best service at the most cost-effective price, and about 40% of the initial contracts were awarded to private companies rather than LBL. It also led to another change as buses began appearing on London's streets in liveries that were not traditional LT red.

As a step towards the planned deregulation of services, LBL created 13 locally based subsidiary companies, each with its own commercial remit.

These companies conducted their own wage negotiations, took appropriate steps to reduce their overheads and competed against each other, as well as private companies, for the contracts to run LT bus routes. The subsidiaries became increasingly successful in competing for routes.

In December 1992, the government announced that the LBL operating companies would be sold into the private sector ahead of deregulation. However, a year later, it decided to postpone deregulation until after the General Election in May 1997, although the sale of the operating companies to the private sector was completed in 1994.

The new government elected in 1997 was committed to reintroducing a strategic governing authority for London. In July 2000, London Transport was replaced by a new organisation called Transport for London (TfL).

3.2. Legal and Statutory Framework

Transport for London and London Bus Services Ltd (London Buses) are required to comply with a number of UK and European statutes and regulations. Some of the key obligations for the provision of bus services are detailed in this section.

The Mayor and the Greater London Authority have a duty to develop and implement policies for the promotion and encouragement of safe, integrated, efficient and economic transport facilities to, from and within Greater London under Section 141 of the Greater London Authority Act 1999 (GLA Act).

Transport for London has functions conferred or imposed on it by the GLA Act which facilitate the implementation of the duties imposed on the Mayor and Greater London Authority under Section 141 of the GLA Act.

London Buses, as a subsidiary of TfL, has powers under Section 169(2) of the GLA Act to enter into transport subsidiary agreements with any person for the provision of any public transport services.

Agreement to operate any bus routes within Greater London must be in accordance with Section 182 (1) of the GLA Act.

London Buses and TfL also have obligations under other more general Acts of Parliament, including the Transport Acts and the Disability Discrimination Act, and under European Union legislation.

3.3. The Mayor & Greater London Authority

The Greater London Authority (GLA) is made up of the elected Mayor of London, the 25 elected London Assembly Members and a team of support staff. The Mayor draws up policies for London's social, economic and environmental development in addition to transport.

The London Assembly examines the Mayor's activities, scrutinising decisions and policies, approves the Mayor's proposed budget before it is finalised and

investigates issues of importance to Londoners. It then uses this information to make proposals and recommendations to the relevant organisations.

The GLA is responsible for a range of services that affect all of London and those that need strategic London-wide planning. These include policing, fire services, economic development and transport. The Mayor sets their budgets and appoints the board members.

3.4. Transport for London

Transport for London (TfL) was created in 2000 as the integrated body responsible for the Capital's transport system and is a functional body of the Greater London Authority. TfL's primary roles are to implement the Mayor of London's Transport Strategy and to manage transport services across the Capital. TfL is responsible for:

- London's buses, the Underground, the Docklands Light Railway (DLR), London Rail, Croydon Tramlink and London River Services
- The Public Carriage Office, Victoria Coach Station and River Services
- The red route network, Congestion Charge, and London's 4,600 traffic lights
- Supporting a range of other ways of moving around the city, including cycling, cycle hire and walking

TfL is directed by a Board whose members are chosen for their understanding of transport matters and appointed by the Mayor of London, who chairs the Board. The policies are implemented by the Commissioner for Transport.

3.5. London Buses

London Bus Services Ltd (London Buses) is part of Surface Transport within TfL. London Buses implements relevant sections of the Mayor's Transport Strategy, and delivers against passenger expectations.

It is the organisation that plans bus routes, specifies service levels and monitors service quality. It is also responsible for bus stations and stops, and other services that support bus services on the road - around the clock. The bus services are operated by private operators, which work under contract to London Buses.

3.6. London TravelWatch

London TravelWatch (LTW) is the official watchdog organisation representing the interests of transport users in and around the capital. Officially known as London Transport Users Committee, it was established in July 2000.

LTW is independent of the transport operators and TfL, although it is sponsored and funded by the London Assembly, which is part of the Greater London Authority. It can assist with complaints about bus services in London where the service provider has not satisfactorily resolved them. London Buses is required by law to consult with LTW regarding proposed changes to bus services, however in practise London Buses consults LTW on a much wider range of issues.

4. The History of London Bus Contracts and Tendering

4.1. The introduction of Competition

Up to 1985 London Transport operated nearly all bus services in London via its wholly owned subsidiary London Buses Limited (LBL). Whilst bus services in the rest of the UK were deregulated in the 1980s, regulation was retained in London but competition was introduced through tendering for individual routes as Gross Cost contracts. A separate unit called the Tendered Bus Division was set up within London Transport to manage the tendering process and initially the competition was between private companies and subsidiaries of LBL. The operators tendered on the basis of all the costs required to operate the specified service, including vehicle, staff and overhead costs, and London Transport retained the fares revenue.

At this time, an unsatisfactorily large number of scheduled journeys simply did not operate - often due to lack of staff or serviceable vehicles. Under the new contracts operating companies were not paid for cancelled journeys within their responsibility (as detailed in Section 6.3). New standards for safety and reliability were also introduced, and contracts could also be terminated for poor performance.

Three distinct types of contract have been tendered since 1985:

- Gross Cost Contracts, between 1985 and 2000;
- Net Cost Contracts, between 1995 and 1998; and
- Quality Incentive Contracts, from 2000 onwards

which are detailed further below.

4.2. Privatisation

In preparation for the proposals of the government of the time to privatise LBL, the company was divided up geographically into 13 subsidiary companies. The subsidiaries competed with private bus companies for tendered contracts. To allow for a controlled programme of tendering, until routes were tendered the subsidiary companies were funded by a ‘block grant’ agreement to cover the net cost of those services.

To allow for privatisation, it was necessary to put in place formal contracts for each route. This meant that after privatisation the tendering programme could continue, allowing all routes to be subject to competition. Government policy at the time was to transfer risk to the private sector, so it was decided that these “block grant” agreements should be on a net cost basis. This shifted the revenue risk to the operators but it also gave them the incentive to generate more revenue by increasing the quality of the service provided.

These net cost contracts were initially not subject to competition as the routes were allocated to each subsidiary and the terms of the contracts were agreed by negotiation. The length of these contracts varied, to give each company a reasonable forward order book, and to allow the network to be tendered over a reasonable timescale. This process is still represented by the current tendering programme.

The process of transferring risk to the private sector continued from 1996 with the introduction of tendered Net Cost contracts, which whilst similar to the Gross Cost contracts transferred the revenue risk to the operator. Contracts were awarded under both Net Cost and Gross Cost terms to deliver the best value to London Transport for each route.

In 1994 the LBL subsidiaries were privatised, either through Management Buyouts or through sales to larger bus operators from outside London. The Tendered Bus Division was merged with other sections such as the LT Planning bus sections to form London Transport Buses. Following the creation of devolved government for London in 2000, under the Mayor and the Greater London Authority, London Transport Buses became London Bus Services Limited (London Buses), a part of Transport for London (TfL).

4.3. Present Contracts

In 2001, Quality Incentive Contracts were introduced to replace Gross Cost and Net Cost contracts as routes were tendered. These contracts are a development of previous contracts, but with direct financial incentives for operators linked to the quality of service. The contracts are an extension of the gross cost model insofar as TfL retains the revenue.

By the late 1990s, the proportion of the scheduled mileage being operated had become more satisfactory. However reliability of all services – the regularity of buses on high frequency routes, and the adherence to the published timetable on low frequency routes - was still a cause for concern. Whilst each route already had a reliability benchmark called the Minimum Performance Standard (MPS), the older Net Cost and Gross Cost contracts had no financial incentive to achieve those targets. Further details of how Quality Incentive contracts work are given in Section 6.

4.4. Tendering and Contracts - Key Features

The key features of London Buses' tendering and contracts system can be summarised as follows:

- Contracts are designed to provide incentives to operators to improve quality
- Routes are generally tendered individually, but often at the same time as other routes in the same area to facilitate service changes.
- Contracts are normally for 5 years, with a potential 2 year performance related extension available to the operator
- It is a continuing programme of tendering, with between 15% and 20% of the network typically tendered each year.
- Tender evaluation is based on best value for money, taking into account quality and safety as essential features
- Contract payments are related to the mileage operated and overall reliability of the service
- Comprehensive quality measurements are used across all aspects of delivery.

5. The Tendering System In London

London Buses reviews every route prior to tender, and takes into account views from statutory consultees including London TravelWatch, London boroughs and other interested parties. This information is used to provide a service specification, which details:

- the route the buses will take (including the terminal arrangements),
- the frequency of the service at different times of the day & the week (including the first and last bus times),
- the type and capacity of vehicles to be used
- the Minimum Performance Standard.

Operators are then asked to provide a schedule to deliver the level of service specified, and the total cost plus profit margin for providing the service to the specification.

5.1. European Procurement Directives

Bus service procurement activities are subject to the European Union's Procurement Directive 2004/17/EC of 31st March 2004 for utilities contracts. This directive has been implemented into UK law via the Utilities Contracts Regulations SI 2006 No. 2911. These regulations are principally concerned with ensuring that the procedures followed allow for fair competition within the EU. LBSL complies with the EU Directive and UK Procurement Regulations.

5.2. Approved Contractors

London Buses operates a pre-qualification system to maintain an approved supplier list and routinely publishes advertisements in the Official Journal of the European Union (www.ojeu.com) seeking expressions of interest. Once a potential operator has expressed an interest, we issue a pre-qualification questionnaire. When a completed questionnaire is returned, a 'desk-top' evaluation is undertaken. This includes an assessment of areas such as the financial stability of the company, health and safety and previous experience in the transport or services sector. Where appropriate visits and meetings are arranged. If the initial assessment is acceptable, the organisation will be added to the approved supplier list for bus services. This does not necessarily mean that the organisation meets all of the requirements to be awarded a contract, but that it meets the basic conditions to be considered further. The organisation may then be able to submit a dummy bid, which will be assessed using standard evaluation principles and feedback given to assist future genuine submissions.

The approved operator will be issued with a Bus Services Framework Agreement which includes full details of the contractual requirements, and a Master Invitation To Tender which includes a guide to submitting tenders. Award of any contract is conditional on the signing of the Framework Agreement.

When approved, the operator will be notified of all bus service tendering opportunities, and asked to confirm if it wishes to be issued with the documentation for each tender on a route by route basis.

5.3. Tendering Programme

London Buses has a continuous programme of tendering with Invitations to Tender (ITT) being issued throughout the year. The rate of tendering is about 15% to 20% of London's bus network each year (circa 90-120 routes, depending on the number of performance related extensions) with ITTs typically issued every 2-4 weeks. The annual tendering programme for each financial year is issued to all approved suppliers, and the latest version is available on the TfL website.

5.4. Types of Route Tendered

Services range from routes which require only one bus, through low frequency midibus routes up to high frequency 24-hour double deck routes. There are also dedicated school bus routes. Rail replacement services are secured on behalf of London Underground, London Overground, the DLR and Crossrail – you can find more information in Section 5.9 below.

Route size varies significantly, with Peak Vehicle Requirements (PVR) ranging from 1 to over 50. Services are classed as either High Frequency (5 buses or more per hour throughout much of the week) or Low Frequency (4 buses per hour or less), and about 82% of the network is High Frequency. The highest frequency routes have a bus every 2-3 minutes, and the lowest frequency have a single return journey per day. Most routes operate from about 0430 until after midnight, but an increasing number of routes run 24 hours per day. Some additional 'nightbus' services only operate between about midnight and 04:30.

5.5. Types of Vehicle Utilised

Vehicles used on contracted services range from 40 capacity midibuses through to 87 capacity double deck buses, depending on the specific requirements of each route. London Buses specifies the minimum requirements for the vehicles within the tender documentation. The operator may choose the vehicle manufacturer as long as the vehicles meet all of the criteria in the vehicle specification.

5.6. Service Specification

London Buses specifies the terminals, routeing, frequency and operating times of the route. It gives an indication of current running times and any significant problems identified with these running times. It also provides current performance & minimum standards required by the new contract. Compliant tender submissions are evaluated against this specification.

5.7. Tender Information and Response

All tenders are submitted on a sealed bid basis with all the relevant information that is required by London Buses for the evaluation. Each submission must have a compliant bid, but operators may put forward alternatives that they believe would have benefits to passengers and/or

London Buses. Alternatives may include options such as use of existing vehicles or variations to the service structure such as routeing or frequency.

5.8. Tender Evaluation

The overriding principle applied throughout the tendering process is one of fairness to all parties. Contracts are awarded with the intention of achieving the most economically advantageous outcome within the resources available to London Buses. The criteria used include (in no particular order, and are not limited to):

- Price
- Ability to deliver quality services - to at least the levels specified in the ITT
- Staffing – ability to recruit, train and retain staff of a suitable calibre
- Premises – status of depot, and/or ability to obtain a suitable depot
- Vehicles – type proposed and any additional features offered. This includes ability to maintain vehicles in an acceptable condition through the life of the contract
- Financial Status – the resources to fund the start up costs and provide stability over the contract term
- Schedules – compliance with the specifications
- Health and Safety Policy and records
- Sustaining competition for tendered routes

Tender evaluation is lead by the Senior Bus Contracts Evaluation Manager and is carried out by a small team of skilled technical and commercial staff. Recommendations for contract awards are discussed and approved by the Tender Evaluation Committee, which is comprised of the directors of London Bus Services Ltd.

During the evaluation, Contracts Tendering managers may contact bidders to clarify any areas of uncertainty and if considered necessary for commercial or technical reasons may enter into further negotiations with shortlisted tenderers.

5.9. Rail Replacement Bus Services

London Buses procures rail replacement services on behalf of London Underground, London Overground, Crossrail and the DLR. Planned services range in scope from one or two vehicle early morning and late evening journeys through to weekend closures requiring 50+ vehicles, and longer term arrangements during major upgrades of lines and stations. Over one hundred contracts are tendered in a typical year, most of which are for weekend closures so buses used on the main bus network during the week are generally used.

The tendering process is similar to that used for network bus services. A separate Framework Agreement exists for rail replacement contracts, but they are tendered under the same legislative procedures as bus services. The prequalification procedure is similar to that described in Section 5.2.

To ensure high standards, contracts for most rail replacement services are operated by companies that also operate London Buses' main network contracts. Sub-contracting to operators that are not pre-qualified is not normally permitted.

The rail operator identifies the scope of the specific rail closure and a strategy for rail replacement is agreed with London Buses. Where a dedicated rail replacement service is required, a specification is produced and pre-qualified operators are invited to tender for one or more periods of closure. If the same closure occurs again within a year of the original tender, London Buses may invite the successful tenderer to operate the service again at the same cost.

Emergency rail replacement services following major service disruption are also managed by London Buses.

National Rail operators make their own arrangements for replacement services.

6. Quality Incentive Contracts

Quality Incentive Contracts were introduced in 2001 and have delivered significant improvements in service quality and passenger numbers. These contracts are based on gross cost contracts but also contain incentive provisions in the form of performance payment bonuses & deductions and the option of a two year contract extension. The routes/contracts are tendered for an initial period of five years and when awarded contain a specific Minimum Performance Standard (MPS) which will generally be fixed for the life of the contract and which reflects the particular characteristics of the route.

The contract price is adjusted each year in respect of inflation on the anniversary of the deadline date for tender submission. A formula which is designed to be representative of the actual movements in the cost base using a number of indices (e.g. labour rates, the Retail Price Index and fuel costs) is used to calculate these adjustments

6.1. Incentive Provisions

In addition to the requirement to operate the scheduled mileage two further incentive provisions exist within the Quality Incentive Contract.

6.1.1. Reliability Performance Payments

These are calculated on an annual basis by comparing the Operator's annual reliability performance on each route against the contracted MPS. Payments are based on a graduated scale with an increase or decrease in the payment for every whole 0.10 minute change in Excess Wait Time (EWT) for High Frequency routes and every whole 2.0 percentage point change in percentage On Time for Low Frequency routes. Bonus payments are paid at a rate of 1.5% of the contract price for each step above the standard. Deductions are made at a rate of 1% of the contract price for each step below the standard. Bonus and deduction payments are capped at 15% and 10% respectively of the contract price.

6.1.2. Contract Extensions

Under the terms of the contract an Operator is entitled to an automatic two year extension of the contract if it meets or exceeds the reliability "Extension Threshold" criteria set in the tender documentation for that route. This reliability threshold is slightly higher but related to the reliability MPS.

Where a route qualifies for an extension, it is offered on the basis of the current contract provisions. The operator can choose to accept or reject the contract extension. If the operator declines to accept the extension, the route is tendered in the usual manner. If the extension is offered, the route is withdrawn from that year's tendering programme, and is tendered two years later.

A small minority of routes are not operated under full incentive mechanisms (e.g. school and other very low frequency services). Furthermore some routes may operate under partial incentive provisions e.g. Performance

Payments may be applicable but contract extensions may not be available for routes funded by some third parties. These are detailed in each ITT.

6.2. Minimum Performance Standards

The primary objective of bus operators is to safely operate all of the scheduled mileage and adhere fully to the level of service shown in the published timetable. London Buses sets specific MPS in respect of the quality of service to be provided. The measurement criteria for reliability used depend on whether the route is designated High or Low frequency, and are detailed further in Section 7.4. The specific reliability standard for each route depends on a set of consistently applied criteria, including the length and average journey time of the route, the type of areas it serves (such as congested town centres) and recovery time available at termini.

6.3. Payment Adjustments for Service Reliability

Whilst operators are expected to operate the full contracted service this is not always possible for various unpredictable reasons, including mechanical breakdowns, staff sickness, roadworks, road closures and other incidents on or near buses. London Buses specifies an acceptable minimum performance standard for mileage operated for each route.

Any mileage that is not operated can be split into two categories:

- "Deductible Lost Mileage" (mileage not operated but considered to be within the Operator's reasonable control i.e. staff absences, mechanical breakdown); and
- "Non Deductible Lost Mileage" (beyond the Operator's reasonable control i.e. adverse traffic conditions).

Operators are not paid for any mileage not operated under the category of "Deductible Lost Mileage", and a deduction is made in proportion to the annual contract price and scheduled mileage. Deductions are not made for "Non Deductible Lost Mileage", although poor performance in this area is kept under review.

6.4. Contract Payments and Revenue

London Buses operates on the basis of 4 week accounting periods, with 13 periods each year running from April to March. Contract payments are made by BACS. 75% of the contract price is paid during the relevant period. The balance, less deductions for Deductible Lost Mileage, is paid at the end of the following period.

Payments (and deductions) under the reliability incentive scheme are made annually.

6.5. Summary of Responsibilities

The contractual and tendering system places responsibilities on both London Buses and operators.

London Buses, or its third party contractors:

- Determines and runs the tendering programme
- Determines the route
- Specifies the frequency
- Sets and monitors quality and safety standards
- Sets vehicle capacities and minimum standards
- Agrees the schedule prepared by the operator
- Sets fares and retains the revenue
- Supplies and maintains ticket machines
- Provides revenue protection (on-bus revenue protection inspectors)
- Supplies and maintains radio and vehicle tracking equipment
- Provides and maintains bus network infrastructure (bus stops, stands and bus stations)
- Provides an emergency communication facility (CentreComm) 24 hours a day
- Provides roadside staff to deal with diversions and major incidents 24 hours a day
- Markets the bus services to the public
- Manages liaison with local authorities and other stakeholders
- Coordinates public customer service contacts – complaints, comments and compliments
- Invests in major network and infrastructure projects.

The Operators:

- Develop and submit bids
- Develop timetables, schedules and staff rotas – timetables must be agreed with London Buses
- Provide and maintain premises and vehicles
- Recruit, train and mange sufficient staff of a suitable calibre
- Manage the day to day operation of routes
- Provide day to day supervision of routes, to maintain quality and deal with disruption
- Control the use of passes and collect any cash revenue on buses
- Comply with UK statutory and regulatory regimes, including Operating Licenses
- Provide data that is reasonably required by London Buses.

7. Measuring Quality of Performance

7.1. Targets

The Mayor and the TfL Board set performance targets for London Buses within TfL's Business Plan.

7.2. Monitoring Systems

London's Buses have seen a considerable increase in quality standards since 1990, and continually seeks to maintain year on year improvements to the service provided to passengers. To do this, there are a number of performance monitoring systems in operation, in addition to any other system operators may use for their own management processes. The data obtained by London Buses is normally shared with the appropriate operator, and network level data is also published for many measures, and is normally available on TfL's website.

London Buses tries to avoid duplicating the monitoring systems of other UK organisations.

The current measurements and monitoring are as follows:

7.3. Mileage Operated (excluding traffic and other non deductible losses)

This measure is used as an incentive by London Buses, as deductions from contract payments are made for mileage that is lost for reasons that are reasonably within the control of the operator. These include non availability of staff and vehicles not being mechanically fit to be used on the road. This has shown a vast improvement over the last 10-15 years.

7.4. Reliability

This forms part of the assessment of an operator's ability to schedule, control and adjust services. It also forms the basis of financial bonuses and deductions on incentivised contracts. The iBus system which tracks vehicles and provides real time passenger information provides the data to calculate reliability data. The measurements are different for high and low frequency routes:

7.4.1. Regularity on High Frequency services

On services that are defined as High Frequency – five or more buses per hour throughout most of the week – London Buses measures the interval between buses and compares it to the advertised frequency. The aim is to ensure that the buses are evenly spaced, and that on average a passenger should not have to wait for longer than half of the advertised frequency. On High Frequency routes, it is considered that passengers can "turn up and go" as the waiting time should be relatively short and the timetable is less important.

The measure is expressed as "Excess Wait Time" (EWT), which is defined as the extra time that passengers have had to wait above the expected waiting period. The objective is to reduce EWT to zero.

Additionally, ‘long gaps’ in service are measured, which tend to indicate more fundamental problems such as cancelled buses, curtailments and poor service control leading to ‘bunching’.

7.4.2. Punctuality on Low Frequency services

On Low Frequency routes - four buses per hour or less throughout most of the week – London Buses measures how close the departure time from the stop is to the advertised timetable. On these routes, the timetable is more important as passengers are more likely to rely on the published departure time when planning their journey.

The measure is expressed as a percentage of departures that are “On Time”. On Time is a window from 2½ minutes earlier than expected to five minutes later than expected. The objective is to increase “On Time” departures to 100%.

Additionally the percentage of journeys running “Early” is also monitored, where early is defined as a bus departing between 2½ and eight minutes ahead of the schedule. It is normally considered that there is little excuse for early running, as passengers may not have arrived at the stop.

7.5. Driver and Vehicle Quality Monitoring

The Driver and Vehicle Quality Monitoring Programme provides robust and actionable data on which bus operating companies can also use to improve performance. The programme builds on earlier Mystery Traveller Surveys and objectively monitors service quality and compliance with contractual requirements utilising auditing and ‘mystery shopping’ survey techniques to measure pre-defined, key aspects of service delivery.

The research is conducted on London Buses’ behalf by a leading market research agency, and comprises two compatible surveys:

- Static audit of buses in service assessed at bus stands to evaluate ‘fixed’ aspects of service delivery (e.g. etching, graffiti, structural damage and in-grained dirt). Around 17,000 surveys are carried out per annum.
- Mystery shopping surveys whilst the vehicle is in service to assess vehicle handling, customer interaction and aspects of the vehicle affected by buses being in service. Around 33,000 surveys per annum are carried out.

The data is collated and following a quality assurance process is shared with the operators so that they can take action to address any areas of weakness that are identified. The results are used by London Buses to generate the payments (or deductions) under the driving and vehicle quality incentive regime.

7.6. Driver Quality Monitoring

This is a separate independent survey carried out by London Buses' specialist contractor which covertly undertakes over 6,500 assessments each year across the London Bus network to assess driving skills. It differs from the assessments detailed in Section 7.5 by focussing as much on the technical ability of the driver – such as use of mirrors and lane discipline - as it does on passenger consideration.

For each assessment, a driver receives a graded score for a series of measures such as speed, road position and braking and there are over twenty categories per assessment. This level of monitoring is rare, in that most employers of professional drivers undertake no such monitoring of their staff, and manage their professional drivers solely on the basis of claims or accidents. A combination of initiatives has led to a steady improvement in the scores in the recent past.

7.7. Engineering Quality Monitoring

London Buses' independent contractor undertakes regular checks on the maintenance procedures and mechanical condition of the vehicles used on its contracts. This is undertaken by a thorough examination of about 25% of each operator's fleet throughout the year, similar to an 'MOT' test for cars. The examinations are conducted by trained staff working to the same criteria. Any defects are noted and given a score, with higher scores for more serious defects. The key measure is the average number of points per vehicles, with a target of zero. The monitoring also includes the maintenance procedures, and the operators' vehicle pass rate at annual test.

7.8. Customer Satisfaction

There are three London Buses Customer Satisfaction Surveys (CSS), focusing on Bus Services, Night Buses and Bus Stations which have been undertaken since 1997. These enable London Buses and bus operators to monitor customers' satisfaction with the quality of services provided and identify areas for improvement. Face-to-face interviews are conducted with passengers alighting from buses. Questions relate to the journey that has just been made including overall satisfaction with journey just made, information, safety and security, cleanliness, reliability and staff behaviour.

7.9. Public Correspondence Data

London Buses collates all public communications made by phone, email or letter. This data is analysed at route level on themes including driving standards. This helps London Buses to understand and address specific concerns.

7.10. Contract Compliance Audits

To ensure that operators comply with the specifications in the contract, London Buses' Contract Compliance team make regular visits to all operating garages. These audits help to ensure that: there are sufficiently rigorous administration systems in place to handle and account for on-bus revenue and London Buses owned or managed equipment. They also ensure that lost

mileage is reported correctly so that the correct contract payments are claimed; and that drivers comply with working time and driving time legislation.

7.11. Other Sanctions and Remedies

Operators' performance is regularly reviewed by senior London Buses staff. They examine a range of indicators, including mileage operated, reliability, driving and engineering standards as well as the measures detailed above. Unsatisfactory performance is discussed with individual operators, and if necessary operators may be required to produce and implement action plans to resolve performance issues.

Current and recent past performance is taken into account in the evaluation of tenders and recommendation for award of new contracts.

London Buses usually resolves any performance issues through normal contract management. However if performance continues to be poor and it is considered that it cannot be resolved by other means, as an ultimate sanction London Buses retains the right to terminate any contract.

7.12. Safety

A range of data is used by London Buses as part of the assessment of an operator's ability to provide a safe service and failure can result in the loss of a contract. Unsatisfactory performance can also lead to the failure to win new contracts. The incentive is not directly related to payments/deductions due to the importance of avoiding the suggestion that safety of operation is in any way a negotiable trade off against cost.

Safety is not generally measured against 'front line' passenger experience, but from an insight into an operator's standards.

Much of the work is based on visits to operating premises and interviews with operational staff. These include checks on policies, procedures and risk assessments. These visits are followed by a report highlighting areas of concern and an action plan. This plan is then reviewed and forms the basis of the next inspection.

In addition to Driver and Engineering Quality Monitoring, as described above, operators provide data regarding all accidents and incidents which occur whilst a bus is in service. This information is collated and analysed by London Buses.

7.13. Passenger & Staff security

The entire London Bus fleet is fitted with CCTV and recording equipment. This is used to identify individuals who commit offences, against both other passengers and the vehicle. It can also be used to assist in the investigation of injury and insurance claims.

London Buses operates a central communications facility, CentreComm, and each bus is fitted with a two-way radio system which allows drivers to issue an

emergency call if they require assistance. The radio system is otherwise used to communicate information about disruptions to service.

TfL funds a dedicated team including staff from the Metropolitan Police which is in place to deal with surface transport related policing issues, which includes enforcement of bus lanes, supporting revenue protection operations and investigating and prosecuting fare evaders.

8. Environment

8.1. London Buses and the environment

Environmental issues are of increasing concern in London, with much of the debate focused on transport. TfL is committed to minimising harm to the environment. The provision of a comprehensive, safe and efficient public transport network in Greater London (including the bus network) is an important element. TfL complies with the relevant environmental legislation, and follows the Mayor's Air Quality Strategy, which specifies key objectives for London's bus fleet.

8.2. Lowering emissions

Tenders for bus services specify that new vehicles should be to the latest legal European emissions standards, and operators are encouraged to introduce higher standards sooner than required. Older buses have been retrofitted with additional filters to reduced the levels of pollutants. However TfL has the largest fleet of hybrid buses buses (which are powered by batteries that are charged by regenerative braking and smaller engines, which produce lower emissions than a full size diesel engine) in the world, with 1,700 in service by 2016, increasing to 3,400 by 2020.

Zero-emission at tailpipe buses are being rolled out, with a small number of hydrogen fuel cell buses augmented by increasing numbers of pure electric single deck buses to at least 300 by 2020.

It is also recognised that driving techniques can reduce emissions, and this is included within the BTEC training for bus drivers (see Section 9.3).

Despite the increased fleet size and mileage, emissions from buses are reducing year on year.

9. Current and Future Initiatives

9.1. Smartcards and Cashless Buses

TfL bus network is cash free. Payment is by Oyster (TfL's travel smartcard) or contactless bank cards. Passengers can put period "Travelcard" or "Bus Pass" products on Oyster cards, add electronic travel value to pay as you go, or have a combination of both.

Oyster cards are also reusable. This means that when the season ticket expires it can be replaced on the same Oyster card, and when electronic travel value runs out, it can just be topped up. Contactless cards remove the need to top up – the fares are deducted from your bank account daily.

9.2. Bus Priority

The bus priority team develop and deliver highway and traffic management schemes to improve journey times and service reliability for bus passengers. These schemes include bus lanes, junction improvements and traffic signal priority. This involves working with other parts of TfL Surface Transport and the London boroughs.

Some schemes are individual local projects to deal with a specific local problem. In other cases schemes for entire bus routes or network corridors are introduced. These measures improve bus reliability, protect bus passengers from excess delays and facilitate improvements capacity of bus services.

9.3. Bus Driver and Service Controller Training

Raising training standards and achieving greater consistency in the training of front line bus operating staff is a key objective for London Buses. To help achieve these aims, London Buses commissioned two bespoke BTEC qualifications in consultation with bus operators, training providers and trades unions.

The two qualifications (one aimed at drivers, the other aimed at service controllers) were developed in conjunction with Edexcel, the examinations award body. Both qualifications have been designed so that the staff taking them are able to demonstrate their ability to do their job competently and to a consistent standard across the London bus network. The degree of assessment required and paperwork associated with the qualifications has been kept to the minimum, but it still allows staff to show what they are capable of and what they understand about the industry they work in.

Responsibility for delivering the training rests with the individual bus operators. At the end of the training, provided the candidate has successfully met all of the assessment requirements, they will achieve their BTEC qualification.

Driver also undergo annual training for their Certificate of Professional Competence.

9.4. iBUS

iBus is the radio and Automatic Vehicle Location (AVL) system for buses. It ensures that the service controllers at garages know the exact location of all buses fitted with the system at all times.

Using a combination of technologies, including satellite tracking and GPRS data transfer, iBus keeps track of where London's buses are, allowing bus controllers to regulate services to make them more reliable.

Thanks to on board 'next stop' audio-visual announcements, passengers know where their bus is, even if they're on an unfamiliar route. They also benefit from more reliable real-time information on "Countdown" signs at bus stops and through Apps on smartphones.

CentreComm – London Buses' 24/7 Emergency Command and Control Centre – is able to use the on-bus PA system to communicate directly with passengers in the event of an emergency. Another benefit to passengers is that in case of the driver making emergency radio contact following an accident or emergency, CentreComm will immediately be able to pinpoint the precise location of a specific bus, so any necessary assistance can be despatched immediately.

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10. More Information and Contacts

The information in this booklet is based on the latest details available at the time of publication in April 2015. More information about bus services in London can be found on TfL's web pages, including the latest performance trends and latest tendering programme. Relevant links to these and other sources of information are listed below, along with other contact details.

10.1. Links

Current information about The Mayor, GLA, TfL and London Buses can be found by following links within the following websites:

www.london.gov.uk
www.tfl.gov.uk

Information covering the UK and EU legislative framework can be found within the following sites:

www.dft.gov.uk
www.ojeu.com

Specific links have not been given, as updates often change them.

10.2. Contacts

If the information you require is not available from the TfL web pages, or if you would like to apply to become an approved operator, please write to:

Tom Cunnington
Senior Commercial Development Manager
London Bus Services Ltd
The Palestra Building (10Y3)
197 Blackfriars Road,
Southwark,
London SE1 8NJ

☐ Urgent ☐ Return receipt ☐ Sign ☐ Encrypt ☐ Mark Subject Restricted ☐ Expand personal&public groups

Fw: Independent Review Committee on Hong Kong 's Franchised Bus Services

04.10.2018 15:48

From: mike weston [redacted]>
To: "peter_chan@irc-bus.gov.hk" <peter_chan@irc-bus.gov.hk>,
Cc: "annaau@irc-bus.gov.hk" <annaau@irc-bus.gov.hk>, "haddy_lee@irc-bus.gov.hk" <haddy_lee@irc-bus.gov.hk>, "iris_yu@irc-bus.gov.hk" <iris_yu@irc-bus.gov.hk>, "lawrence_chung@irc-bus.gov.hk" <lawrence_chung@irc-bus.gov.hk>

2 attachments

Hello London Course Layout Summary - Module 1 final version.docx

Hello London Course Layout Summary - Module 2 final version.docx

Peter,
It was good to meet you in Hong Kong last week.
During my session on Thursday Mr Lunn requested some further information on the Hello London bus driver training programme. Please find attached a summary of the course approved by JAUPT which means the two days of training counts towards a drivers Certificate of Professional Competence (CPC) training which requires them to do 5 days training every 5 years.
JAUPT (Joint Approvals Unit for Periodic Training) is a not-for-profit company that was established in 2007 to enable the DVSA in Great Britain to manage the application process and quality assurance programme of centres and courses for the periodic training element of CPC Regulations.
Regards
Mike

Course Layout / Summary (v12) - JAUPT

Name of Centre: Mermaid

Name of Course: Bus Drivers' Programme - 'Hello London – Great Journeys Start with You' – Module 1

Delivery Team: 1 Lead Facilitator (LF), 7 Actor-Facilitators (AFs)

Admin/Management: Steps' Project Manager and/or Event Co-ordinator on site, + Admin/Co-ordinator from the venue

Session No.	Timing	Content	Delivery Method	Resources	Location	CPC Ref No.
		Overall Objective of the 2-Day Driver Programme: *To ensure that the bus drivers see delivering the best customer experience as a key part of their role, actively want to deliver that and have developed new skills to help them do so.*				
	Module 1					
1	Minus 0-30	**REGISTRATION** Registration, licence check, etc Bus drivers to be greeted & welcomed in a manner which reflects good customer service	n/a	Delegate Register Name badges Colour flags on tables	Mermaid Centre, Blackfriars, London (Main Room + 6 Breakout Rooms)	
	09.00	*Start Day 1*				
2	09:00 10mins	**VOX POP VIDEO & DISCUSSION** ***Objective for Session 2:*** *Video & Discussion to surface the challenges that the bus drivers*	Video, Table discussion	Vox Pop Video	Main Room	

		face when trying to deliver the customer experience. **LF does brief intro:** Hello my name is XXX, I'm joined by colleagues around the room – Intro other Facilitators and Colour Groups. We are here today to think about how we provide a great customer experience for bus users in London. In a moment we'll look at what we're going to be doing for the next 2 days, and give you more context about why we are here... but first we wanted to hear your voices. This is a bespoke course, specifically designed for you. In developing this programme we have visited lots of garages, and spoken to over 100 drivers and garage staff, and we want to start by sharing with you some of things that you said about what it's like to be a bus driver in London.... *Play Vox Pop video (sharing current reality, good and bad), with recorded audio clips of quotes from bus drivers and customers plus it also written on screen* LF asks: - reflecting on vox pop, 'What struck a chord with you?' Brief discussion about vox-pop video at tables (and chance to talk and do brief intros at tables...). AFs to float between the 3 tables for which they are responsible to facilitate where necessary. ***Key Learning:***				

		• All bus drivers face similar challenges. They are not alone. • That the programme recognises the positive aspects of how the bus drivers deliver the customer experience as well as the areas for improvement • Nothing is off limits: the programme is going to deal with the real world as they experience it.				
3	09:10 20 mins	**INTRO – AGENDA - POSITIONING** ***Objective for Session 3:*** *To make the bus drivers aware of the aims, objectives and content of the 2-day programme, why it has been created, and their crucial role in delivering a great customer experience.* LF – 'Hold on to those thoughts, plenty of time later to bring those out again'. **Why are we here?** Ask – how many of you know why you're here? ***Positioning Piece*** This training is for all staff who are on buses, commissioned by TfL and Bus Companies in partnership in response to what customers have said about their experiences and perceptions of bus travel. It's a complete customer experience programme of which you, the drivers, are a huge and vital group, and it is part of a wider programme with the aim of providing a great customer experience. ***Also mention it is CPC accredited*** We know there is some great practice out there already - in	Powerpoint	Powerpoint Sound System	Main Room	

		developing this course we've spoken to lots of drivers and garage staff, we've been to 10 Garages across the Network. Whilst acknowledging the real pressures and challenges of the job (as we heard in the vox pop video) - This is about building on that good work and making the experience even better and more consistent for London's bus users – and about making your working lives easier and more enjoyable as well. LF goes through **aims and objectives** for the 2 days: • Identify the key issues of customer feedback • See the impact of being helpful & acknowledging customers • Recognise the impact on customers of not serving the stop • Be able to deal calmly with situations of customer anger/conflict • Understand the value and impact of making a 'live' PA announcement • Build the confidence and skills to make announcements • Decide what you can do to provide a positive customer experience LF encourages them to **be curious** and to think as they go through the day about the actions they can do to provide great customer service generally LF walks them through the agenda and all safety announcements: • Fire procedures • Toilets • Lunch / Tea / Coffee etc • Quiet Room	Aims & Objectives Slide Agenda Slides			

		• Mobile Phones • Break times • Finish time – highlighting CPC need for 7 hours Highlight techniques/methods we will use: • Slides • Drama (but don't panic!) – intro Tee (audio – see below) • Voting • Table Discussions • Break-out rooms (inc logistics of that, eg colour groups). • Highlight notebooks - encourage them to make their own notes and observations through the day **Highlight behaviour expectations** This is a working day – the same expectations and policies apply in terms of behaving with respect and courtesy to one another. When you go into breakouts – your facilitators will agree with you as a group some 'ground rules' or expectations for how you want to work together. Whilst in this room: It's a big space, lots of you...we will be using 3 roving mics, but need to be aware of listening to one another and not all talking at once. I will do my best to manage things and will indicate which person should speak next. We will deliberately portray situations up here to get you thinking and talking – and you may well disagree with one another on some issues – but let's hear all views, don't judge people – you may well have different processes and ways of doing things at your different companies (there are 10 companies here) – but let's have discussions in an open and respectful way.				

		Emphasise expectations: We have done a lot of research and met over 100 drivers and garage staff but we are not experts in driving - This is about *behaviours* Whilst we acknowledge there are many frustrations/difficulties in your job, many of which are not in your control – and there will be opportunities to raise those – we want to focus on how customer's perceive the experience and what you can do to make that as good as possible. Many of you do a very good job in difficult circumstances – so this is about building on that good work, sharing your knowledge and experience of what works well, and looking at how we can make things even better for customers – moving from good to great. INTRODUCE TEE - when mention Drama Hear Tee's audio *Performed live by actor, but unseen – the driver TEE who will appear in Session 8 later is being 'piped in' live to the room.* ***Key Learning:*** • Bus Drivers have a crucial role in delivering a great customer experience • This programme is about building on the good work that is already going on across the network and taking the customer experience from good to great.				

4	09:30 30mins	**INTERACTIVE VOTING – BASELINE SURVEY PLUS** ***Objective for Session 4:*** *A mixture of fun and serious questions to gauge bus driver opinion on a number of customer feedback areas. The answers to some of the key questions form the baseline for the same questions to be repeated at the end of the programme to review how much the bus drivers' attitude has shifted.* LF leads an Interactive Baseline survey using the voting technology to gain bus driver views on customer service and their role (Most questions are based on Bus Operators Survey Questions) LF Positioning: We want to get your views on your role and see how your colleagues feel about some of these – let's find out what the shared vision is. LF leads a demonstration of how to use the voting technology using the voting pads, using two fun questions. The voting buttons range from 1 to 5 (The Likert Scale) ***(A)*** 5 = Strongly Agree ***(B)*** 4 = Agree ***(C)*** 3 = Neither Agree nor disagree ***(D)*** 2 = Disagree ***(E)*** 1 = Strongly Disagree or ***(A)*** 5 = Extremely Important ***(B)*** 4 = Very Important	Powerpoint Interactive Voting	Interactive Voting tech	Main Room	

		(C) 3 = Moderately Important ***(D)*** 2 = Slightly Important ***(E)*** 1 = Not important At All **5 base questions in the list below are bolded** **Question 1:** London is the greatest city in the world. Vote 1-5 (Agree/Disagree) **Question 2:** How many years have you been a driver? (A) Less than 1 year. (B) More than 1 but less than 3 years (C) More than 3 but less than 5 years (D) More than 5 but less than 10 years (E) More than 10 but less than 20 years (F) 20 years or more **Question 3:** **I feel personally motivated to deliver the best customer service I can.** Vote 1-5 (Agree/Disagree) **Question 4:** Providing a good customer experience is part of my job. Vote 1-5 (Agree/Disagree) **Question 5:** **How important is it to acknowledge customers as they board?** Vote 1-5 (Important/Not Important) **Question 6:** Customers don't see the whole picture and are too quick to criticise.	Voting slides			

		Vote 1-5 (Agree/Disagree) **Question 7:** **How important is it to answer customers questions as best I can in a polite/helpful way?** Vote 1-5 (Important/Not Important) **Question 8:** I feel confident about making PA announcements Vote 1-5 (Agree/Disagree) **Question 9:** **How important is it to let customers know about disruption/diversions in good time e.g. using the PA system?** Vote 1-5 (Important/Not Important) **Question 10:** I feel respected by my manager. Vote 1-5 (Agree/Disagree) *LF to explain that manager could have different meanings to different bus drivers – in effect we are speaking about their line manager/person that they report into/ops manager* **Question 11:** I-bus controllers are generally polite and respectful to me. Vote 1-5 (Agree/Disagree) **Question 12:** **I am proud to be a London bus driver** Vote 1-5 (Agree/Disagree) Throughout these questions, the LF will debrief the answers where necessary/applicable with the bus drivers.				

		Key Learning: • *Drivers to have started to explore their own feelings and beliefs about customer service.* • *Bus drivers to be aware of how other bus drivers in the room feel on work related issues* Position break out sessions. Remind them to take notebooks/pens with them	Slide – move to breakout rooms			
5	10:00 30mins	***BREAKOUT ROOMS – GROUP INTRODUCTIONS*** ***Objective for Session 5:*** *In smaller facilitated groups, for the bus drivers to get to know each other better and build trust so that they feel comfortable to share their thoughts and experience new techniques in future breakout sessions* *Move to breakout rooms for first time* **Overall Aim and Purpose** *For the bus drivers to get to know each other better, to create a "safe" environment" and build trust so that they feel comfortable to share their thoughts and experience new techniques in future* **PREPARE: Questions on flipchart (see below)** **TASK SETTING** *After briefly introducing yourself....* WHAT AND WHY We're going to be spending most of this 2 day workshop working	Discussion, Facilitated exercise	None	Breakout Rooms	

		together in this break-out group and learning from each other. So let's start by getting to know each other a bit better and discussing how we want to work together. HOW The way I want us to do this is something slightly different; I'd like you to work in pairs (split into pairs with one 3 if necessary) and I'd like you to share with each other the following information (prepared on flipchart): • What Company & Garage you are from? • What Route(s) you drive? • How long have you been a bus driver? • 3 Things about you that are nothing to do with your job – things you are passionate about or mean something to you. (eg, family, sport, hobbies, holidays, favourite film, book, music, etc) WHEN AND WHAT THEN AND WHY DOING IT LIKE THIS You have 10 minutes – so that's roughly 5 minutes for each of you to talk to the other about yourself. Listen carefully because here's the different bit: after 10 minutes I'll ask each of you to introduce your partner to the rest of the group. So if I was introducing myself I'd say something like….. I hope that sounds OK. The advantage of doing it this way is that, as well as finding out about each other, everyone gets the chance straight away to do some talking and some listening – rather than some people doing all the talking and others not saying anything. On this programme we're going to want to hear everyone's views because you all have loads of experience and everyone's views and questions count. When we've got to know everyone in the room we'll spend a bit				

		of time discussing how we want to work together as a group. **Other Guidance notes for the facilitator** • When they have introduced themselves come back to yourself and explain a bit about your role as facilitator. • You may want to add up the years of experience in the room **Establish/Agree 'ground rules' or 'group agreement'** Then discuss how you want the group to work together – some combination of asking them and you adding. Preferably put them on a flipchart for subsequent reference. To include things such as: • Respect others' views • Listening – not talking over others • Confidentiality if people share personal or specific examples • Open & honest discussions – want to hear your views and experience • Keeping to time (re-iterate CPC needs 7 hours) • Not using offensive language ***Key Learning:*** • *To get to know and trust the other bus drivers in the breakout group.*				
6	10:30 35mins	***GOOD & BAD CUSTOMER EXPERIENCES*** ***Objective for Session 6:*** *To encourage the bus drivers to see customer service from the customer's viewpoint and to think about and discuss what is good*	Discussion, Facilitated de-brief	Flipchart	Breakout Rooms	

		and bad customer service based on their own experiences. **Overall Aim and Purpose** *To encourage the bus drivers to see customer service from the customer's viewpoint and to think about and discuss what is good and bad customer service based on their own experiences. Throughout the rest of the workshop we will use what they come up with as a reference point for their own approach to providing customer service.* **PREPARE – flipchart with 2 columns: Good and Bad** **TASK SETTING** WHAT AND WHY This is a programme about customer experience: we'll have lots of time to look at customer experience through your eyes as drivers but let's start by thinking about it as customers. We're all customers. So what makes us feel like we've had a particularly good (or bad!) customer experience? If we can be clear about what makes for good and bad customer experience we can use that for the rest of the programme to help us look at situations through the customers' eyes. HOW To start with I want you to think back to a recent time when you experienced particularly good customer service and another occasion recently when you experienced particularly bad customer service. This is you as a customer – NOT related to your job as a driver, NOT related to buses – You as a customer, eg buying something in a shop/cafe/online, ringing your telephone or energy supplier, booking a holiday, etc. [Give your own example.....] Do that now. [give them a minute or two for this]				

		In a moment I'm going to ask you to explain those two stories to a colleague. Work in the same [or can be different] pairs. And when you've both told each other your two stories of good and bad customer service, I want you to write on a post-it one or two words which sum up what made it a particularly good or bad experience – use separate post-its for each, one for the good example and one for the bad. Focus on the behaviour of the person you were dealing with and what they did or didn't do that made a difference. [Refer back to your own example and how you would summarise it] WHEN AND WHAT THEN AND WHY DOING IT LIKE THIS So now spend 10 minutes sharing the stories and writing those post-its. When you're done we'll put the post-its on the flipchart and we'll have about 20 minutes to see if there are common themes that emerge. And by doing it like this, based on our own actual experience we can be sure that we are working for the rest of the workshop on what we as customers feel makes a difference for us not just some text book theory, **Other Guidance notes for the facilitator** • *In the sharing be sure to focus on behaviours* • *Try to draw out the key strands of customer service we will want to come back to in the workshop:* • *That good customer service can happen when things have gone wrong, but have been handled well.* • *The importance of being acknowledged, treated as a person and really listened to* • *The value of information and choices* • *How little it can take to create a positive customer experience*				

		Key Learning: • *To understand that good customer service can happen when things have gone wrong, but have been handled well.* • *To recognise that good customer service is far more satisfying and less stressful than bad customer service* • *To reflect on how little it can take to create a positive customer experience*				
	11.05-11.20	*Comfort Break*				
7	11:20 65mins	***DRAMA SCENARIO 1 – 'DAY IN THE LIFE'*** ***Key Objective for Session 7:*** *To surface a number of issues and challenges that the bus drivers face on a daily basis and to recognise when the bus driver in the scenario delivers a good or bad customer experience.* *Gather in Main Room.* ***The whole of Session 7 is documented in detail in a separate word document, including the full script and extra material for the characters. The document is called 'SCENARIO 1 – DAY 1 – SESSION 7 – DAY IN THE LIFE'*** LF introduces the Drama Scenarios and that they will be interactive in differing degrees. LF reassures the bus drivers they will not be dragged up on stage to perform, but they will need to be interactive and vocal, as they will meet characters who will ask for their advice. Emphasise – scenarios based on research and things we've heard,	Scripted Drama, Table discussion, Facilitated hot-seating and discussion Powerpoint Intro slide for scenario	Powerpoint Props: Driver's Seat, Costumes Roving mics (x3)	Main Room	

		but NOT portraying anyone real. LF introduces the 'parallel world' for all the scenarios. All the 'dramas' are set in a fictional medium sized London bus operator that 'they may never have heard of' called 'Brunel' – Brunel is the new kid on the block and they have a lot to learn from all the experience and years of good practice in the room. We are deliberately showing practice that is not perfect – TEE not at his best perhaps – we do this deliberately to create debate and discussion, and to get you thinking about how things can be done even better. (it's not because we think you are all no good at your jobs). LF introduces the bus driver from the audio earlier – TEE the Driver, has arrived. The session breaks down to the following timings: Drama Scenario 1 - 'Day in the Life' (15-20 mins) • Table discussion/Reflection (10-15 mins) • Hot-seating of characters + LF leading a facilitated discussion about good and not so good practice (35 mins) • LF to reference 'Intention' vs 'Action' The key events and issues of the scenario: 1. Bus driver TEE interacts with allocator at garage when they pick up their duty in the morning. Allocator is unsympathetic when TEE questions his schedule. 2. Bus driver TEE is approached by manager at garage. Manager is sarcastic and mentions they want to see TEE at the end of shift	Hot-seating slide			

		but no suggestion of what about. 3. Bus driver TEE on road. Good interaction with a customer with learning disability. 4. Bus driver TEE shouted at by Bus Station Controller at Bus Station. 5. Bus driver TEE back on road. Heavy traffic. Good interaction with friendly controller. TEE not helpful to a customer who asks for information and won't let them off before next stop when they request. 6. Just arrived at the bus stand, TEE is ordered to go straight back out again by an unsympathetic controller. 7. Bus driver TEE on road. TEE doesn't look or acknowledge customers as they board, he doesn't answer a question in a helpful manner and he pulls away before an elderly customer has sat down. 8. On road with crowded bus.. TEE plays ibus announcement, but no-one moves along the bus. TEE decides not to stop at busy stop and ignores customer who bangs on the door at lights to board 9. Later on the road and still busy, bus driver TEE reacts to an angry customer with verbal aggression. TEE nearly hits a car driver as he pulls away. TEE swears at the other driver. 10. At the bus garage, TEE moans about the job with a colleague. 11. On road at end of shift, TEE is instructed by the controller to				

		'turn' the bus at the last minute. TEE just plays the auto ibus announcement and is unhelpful with a customer who complains. 12. At Garage/Terminus, TEE makes the announcement that the 'bus terminates here'. Tee is unsympathetic to one angry customer and is not helpful with a bewildered tourist even though he feels a pang of guilt. 13. At the Garage, TEE goes for his late meeting with the Manager who tells him about a customer complaint. Tee tries to explain what happened, the Manager half listens and takes the customer's side. TEE leaves very disgruntled. ***Key Learning:*** • To understand that other bus drivers face the same challenges and issues – they are not alone • To see the impact on customers of not being helpful. • To recognise the impact on customers when they are not acknowledged them as they enter • To understand the impact of making a 'live' PA announcement in place of an automated announcement • To recognise the impact on customers of not serving the stop even when the bus is nearly full • To see the negative impact of aggressive behaviour and language on the bus driver's concentration and professionalism • To witness the impact on morale of negative talk between colleagues • To understand the impact to customers when the bus is curtailed and how having empathy with the customer can help the situation				

8	12:25 35mins	**INTERACTIVE QUESTIONS ON MAIN ISSUES/FEEDBACK FROM CUSTOMERS** ***Key Objective for Session 8:*** *To know the key areas of customer feedback that are within the bus driver's control (based on the actual customer data for all TfL Bus complaints). Also to raise awareness amongst the bus drivers of related TfL Bus Customer Experience initiatives* Interactive questions on main commendations. Begin with list of top commendations and ask them to vote for which they think is No 1? Facilitators then read out 3 or 4 recent examples of commendations/praise for drivers – highlighting good practice. Interactive questions on main issues/complaints from customers - highlighting top 9 areas including things not in bus drivers' control. This will bring out the key issues (learning outcomes) that will be explored throughout the rest of the workshop. 1. Participants will be presented (one per table group) with a paper list of issues which they have to rank based on a combination of frequency/annoyance felt. Each group discusses and tries to come up with a ranking. 2. Using voting pads – all individually vote for No1. The result for No1 is revealed (Refusal to Stop/Open Doors), and LF reveals No 2 (Gaps in Service) 3. Based on now knowing No1 & 2, the groups are given 3 minutes to revise their ranking. 4. Using voting pads – all individually vote for No3. The result for No3 is revealed. (Poor/Dangerous Driving)	Powerpoint, Interactive questions & group paper exercise Commendations slide Commendations examples (updated monthly) Powerpoint slides for each stage of this	Interactive Voting tech Powerpoint Commendations examples – printed out Paper template for ranking	Main Room	

		5. Given the first 3, answers, the table groups have to finalise their ranking for the rest. The LF works through each one. The rankings are as follows as per the Top 9 Reasons for Customer Complaints in 2015: 1. Refusal to Stop/Open Doors (13,603) 2. Gaps in Service/Long Waits (10,882) 3. Poor/Dangerous Driving (6694) 4. Offensive Behaviour (6460) 5. Driver Unhelpfulness (inc Announcements) (2898) 6. Incomplete/Curtailed Journey (2636) 7. Failure to Arrive (2286) 8. Time to Board/Alight (1489) 9. Fares Issue (1473) LF highlights key areas of customer feedback based on the listing - and that these are the key reasons for this training and for other wider initiatives within BCE/TfL. LF states that they will be focussing on these key issues for the remainder of the course – but only those things that are within the Drivers' control/influence (apart from Poor/Dangerous Driving). LF mentions wider BCE initiatives – • Tackling Customer Behaviours Campaign (Mr Men & Little Miss characters) –Workplace Violence Campaign will continue LF asks bus drivers what they think about these initiatives – LF refers back to the Vox Pop where driver concerns about	Visuals/slides on wider BCE Initiatives			

		educating customers would have been raised too. **LF introduces 'Steps to Change'** process... how change happens. Emphasise we will be using drama to help 'see it' and thinking about how we 'own it' and 'change it' in the breakouts, via discussions, sharing ideas & experience and practising how to do things differently. Recap agenda and timetable – signposting for afternoon ***Key Learning:*** • To understand what are the key areas for possible improvement, • These are based on customer complaints • To become aware of other customer experience initiatives that are happening	'Steps to Change' slide Agenda slides (x2)			
	13.00-13.45	*Lunch break*				
9	13:45 5mins	**AFTERNOON AGENDA** ***Key Objective:*** To signpost the agenda for the rest of day to the bus drivers *Gather back in Main Room* LF signposts the agenda for the afternoon - and how there will be a link to the key areas/outcomes from the voting survey in the morning	Powerpoint Agenda slide	Powerpoint	Main Room	

10	13:50 50mins	**DRAMA SCENARIO 2 – FORUM – ACKNOWLEDGING, BEING HELPFUL & RUDE BEHAVIOUR.** ***Key Objective for Session 10:*** To address the following workshop outcomes: • Driver not being rude/offensive • Driver acknowledging customers • Driver helpfulness LF introduces the second Drama Scenario. This is an interactive forum that covers the following 3 topics/areas: • Acknowledging customers • Rude/offensive behaviour or language • Helpfulness ***This Scenario is listed in FULL DETAIL in a separate word document, containing the script and full instructions/extra material. It is listed as SCENARIO 2 - DAY 1 – SESSION 11 – ACKNOWLEDGING & RUDE BEHAVIOUR.*** LF explains to the bus drivers how interactive Forum Theatre works. LF then introduces the Female Driver called BEE. BEE plays a situation on her bus where she acknowledges a lovely old lady, but gives a lot of attitude and rude behaviour to another male customer. Because she is terse with him, he becomes more rude with her and wants to report her. BEE is sarcastic in her responses to the male customer and she is not helpful at all. She finishes the scene as she has a verbal altercation with another road user. After the scene plays out – BEE talks to the bus drivers and gets	Interactive Drama, Table discussion, Facilitated discussion Powerpoint Intro slide for scenario	Powerpoint Props: Driver's Seat, Costumes Roving mics (x3)	Main Room	

		their advice and feedback. LF provides input on • **Event + Response = Outcome** (highlight difference between Response and Reaction) • **Transactional Analysis** – Parent, Adult, Child – with reference back to the scenarios we have seen today • **Memorable Phrases and Memory Aids** (with an analogy to 'mirror signal manoeuvre'). Two key points are: • 'Welcome' (attention/acknowledge) • 'I'm Listening' (helpfulness) With this input, BEE replays the scene to a better outcome and a great customer experience, with the bus drivers coaching her in what to say and how to say it, using microphones to be heard. LF pulls together the Key Learning Points at the end of this Session. ***Key Learning:*** • To be able to deal calmly with situations of customer conflict. • To recognise what may be offensive to different customers • To not be fearful that acknowledging customers leads to adverse consequences (time loss, abuse, etc) • To recognise the positive impact on people of personal contact • To see the benefit of engaging with customers and start to believe they can feel happier as a result • To not be fearful that helpfulness leads to adverse consequences	E+R=O slide TA slides (x 4) Memory Aids slide Slide – move to Breakouts			

		• To understand the importance of listening to customers. • To treat all customers equally • To not make assumptions about customers				
11	14:40 60mins	**BREAKOUT ROOMS – WHAT CAN GET IN THE WAY OF ACKNOWLEDGING OR HELPING CUSTOMERS?** ***Key Objective for Session 11:*** To explore and understand what are the barriers and challenges to the bus drivers in delivering the customer experience, and what is and isn't in the bus driver's control. **OVERALL WHAT & WHY** [Position the whole of the afternoon sessions] For most of the rest of the afternoon we're going to be focusing on one of the main areas of feedback from customers – that quite often they don't feel acknowledged by the driver or don't feel they get the help they need. We've already explored a lot of the issues and challenges in the main room with the drama and now we're going to go into it in more depth. It's easy for someone to say to you "be helpful" but it's not as easy as that; you have many pressures and challenges and what's helpful for one customer may not be for another. This workshop is about working with you, from your point of view, to see if there might be better ways of handling some situations and whether you can share good practice with each other and learn from each other. We're going to look at this in 2 main stages. Before the break we are going to focus on what can get in the way of providing the best possible service. After the break we are going to use a bit of drama and skills practice to try out some different ways of doing things. [Refer back to Steps to Change model]	Facilitated Discussion	Flipchart Post-its Pens	Breakout rooms	

		PREPARE: **Question:** "What stops you delivering the customer experience in terms of acknowledging and helping the customers? What are the barriers/challenges?" **Barriers model**: External, People, Me (or you can draw this in the moment) **Circles of Control** (or you can draw this in the moment) **TASK SETTING** WHAT AND WHY [Turn flipchart to pre-written question: "What stops you delivering the customer experience in terms of acknowledging and helping the customers? What are the barriers/challenges?"] So firstly we're going to explore what can get in the way of you acknowledging customers and being helpful. What do I mean by "what gets in the way"? [Explain and draw the barriers model "External factors; people ; me" and give some illustrations under each heading.] HOW To do this I'd like you to work in 3s. Please spend 10 minutes in your 3s (or 4s); discuss the barriers under those 3 headings. When the time is nearly up I'll give you some more post-its and I'd like you to write the 3 main issues you come up with –each on a separate post-it WHEN AND WHAT THEN AND WHY DOING IT LIKE THIS So you've got 10 minutes. When you're done I'll explain what I want to do with the post-its and we'll have about 30 minutes to discuss the barriers you've identified and what , if anything, can be done about them. This way everyone gets to express their thoughts and we'll get a much wider range of views than if we				

		just dive in and look at it as one group. **Other Guidance notes for the facilitator** • *Float around the groups and listen carefully once they start discussing and make sure they are on the right track; if necessary intervene to give them examples to refocus them on the task.* • *After about 8 minutes or so (depending how they are going) hand each group 3 post-its and ask them to write their 3 main barriers* • *When they've done that, explain the circles of control model. Explain that there may be situations outside their control where they can still have an influence on how the customers perceive the experience.* *In turn get a group to put up one of their post-its and then explore with the group (wherever it is put) what (if anything) can the driver do to control or influence the customer experience.* *(you may prefer to get all the post-its up first and then pick the ones that you think are most instructive in terms of how the driver may be able to have more influence that they think)* • *Towards the end of the half hour summarise* ***Key Learning:*** • To understand the barriers and challenges to acknowledging and being helpful to customers • To know what is within their control as bus drivers and what isn't when delivering the customer experience and to want to be as helpful as possible when it is in their control to do so.				
	15.40-	*Comfort Break*				

	15.55					
12	15.55 10mins	**LISTENING SKILLS** ***Key Objective for Session 12:*** To explore listening skills and how they help bus drivers in their interactions with customers AF runs a fun Listening Exercise in pairs to demonstrate how being 'listened to' is a very positive experience, and that 'not being listened to', is not so positive. AF divides the group of bus drivers into pairs. In each pair, one is A, and the other is B. A is instructed to talk about a subject that they are passionate about. B is secretly instructed to actively 'not listen' whilst A is speaking. The A's then start the exercise by talking passionately, and the B's do everything but listen. AF leads a facilitated discussion where they debrief with the bus drivers what both experiences felt like. You can hand out the **Active Listening tips** cards here. ***Key Learning:*** • How to actively listen to customers. • What it feels like not to be listened to	Facilitated Exercise	Oyster Wallets 'Active Listening' cards	Breakout rooms	
13	16:05 60mins	**SKILLS PRACTICE - Helpfulness, Acknowledging Customers** ***Key Objective for Session 13:*** To embed the learning, the bus drivers experience through skills practice, the three following workshop outcomes: • Driver not being rude/offensive	Skills practice/role play, Facilitated feedback & discussion	Flipchart Memory aids cards	Breakout rooms	

		• Driver acknowledging customers • Driver helpfulness **TASK SETTING** WHAT AND WHY Before the break we were looking at what stops you being helpful or acknowledging customers. We are now going to use a bit of drama and skills practice to try out some different ways of actually doing things. The reason we do it like this is that it's sometimes very easy to talk about how you would do something, but actually practising it (or seeing others practise it) brings out specific behaviours and issues. And people learn much better from doing rather than just talking. [Can also refer back to Steps to Change model - 'Change it' comes from practice/habit forming] HOW In a moment, we're going to get some example situations on the flipchart and then we will look at some of them (not all) – using a similar technique to what you just saw in the main room – with one of you being the driver and me being the customer. Different people can play the driver – and your role if you're observing is to help and advise your colleague in a constructive way WHEN AND WHAT THEN So first what I'd like to do is spend a few minutes gathering some typical examples from you - examples of when it can be difficult to help or acknowledge customers – particularly focussing on the kinds of everyday questions/queries that you get from customers...(rather than extreme situations or situations of big conflict, we will come to those tomorrow...) And then once we've got a list, we'll decide which ones are best				

		to play out. *Gather these on flipchart from the whole group – you can suggest things too, have a few examples up your sleeve eg:* • *Does this bus go to XXX* • *Where do I get off for...* • *How do I get to XXX* • *Can I get off here (between stops – but answer is 'no it's not possible')* *You will pick up other useful examples as you run the sessions* *Then pick a situation to play out [avoid examples of extreme conflict / anger and avoid process issues where possible eg. fares]. Look for behavioural examples.* *Before you play out examples, set up a SAFE environment:* • When we're playing these out we will stop and start (I will time out) or you can say 'stop'. • Be supportive to your colleague – it takes a lot of courage to volunteer . • We will focus on what they have **done well** first • And then perhaps think about what they might **do differently**. • This is a chance for you to share your experience of these situations, and your way of doing things. • There is often NOT a complete right or wrong way of handling these things.... but together we'll explore effective ways to do it... • This is about trying to make things easier for you as drivers • But remember – it is also about the customer's experience, and their perceptions (right or wrong) – [you could refer back to the 'good and bad' customer experience exercise here perhaps]				

		• And we'll always keep thinking about T.A. and trying to choose an 'adult' response • And also think about E+R=O... so let's think about the response we 'choose' rather than simply reacting. Give out the **'Memory Aids' cards** either before or after the skills practice At the end of the Skills Practice, AF de-briefs and leads a facilitated discussion with the whole group of bus drivers around: (20 mins) • What was difficult? • Has anyone come up with a way of dealing with the issue? Show us.... or talk us through it. AF widens the facilitated discussion to ***Vulnerable customers/accessibility*** (10-15 mins), and poses the questions to the bus drivers: • How would you have handled it differently if the customer had been 'XXX' (accessibility, vulnerable cust) ***Key Learning:*** • ***The same as for Session 11***				
14	17.:05 5mins	**REFLECTION TIME** ***Key Objective for Session 14:*** For the drivers to have time to reflect on key learning from Day One AF gives the bus drivers Reflection Time, when they can sit and think and write in their Programme Paper Pads about what have	Reflection	None Programme Paper Pads	Breakout rooms	

		been their key learnings from the day and any thoughts, feelings and observations. (possibly some prompt questions to use here) Then move back to Main Room				
15	17:10 5mins	**POSITION DAY 2** ***Key Objective for Session 15:*** To close the day and explain what the bus drivers should expect on Day 2. AF positions Day 2 for the bus drivers. Thanks the bus drivers for their honesty and for being so engaged with the interactive elements. They will meet more characters on the big stage tomorrow, plus they will have more time in the same small group throughout the day.	Facilitator input Powerpoint Agenda slide for day 2	Powerpoint	Main room	
	17.15	*Finish Day 1*				
Sub-total Module 1	*420*					

Course Layout / Summary (v11) - JAUPT

Name of Centre: Mermaid

Name of Course: Bus Drivers' Programme - 'Hello London – Great Journeys Start with You' – Module 2

Delivery Team: 1 Lead Facilitator (LF), 7 Actor-Facilitators (AFs)

Admin/Management: Steps' Project Manager and/or Event Co-ordinator on site, + Admin/Co-ordinator from the venue

Session No.	Timing	Content	Delivery Method	Resources	Location	CPC Ref No.
	Module 2					
		Registration from 8.30				
	09.00	*Start Day 2*				
1	09:00 5mins	**WELCOME BACK – AGENDA FOR DAY 2** ***Key Objective for Session 16:*** Welcoming the bus drivers to Day 2 and sharing the agenda. *Gather in Main Room* LF welcomes the bus drivers back Reminds of Aims & Objectives and shares the agenda for Day 2	Facilitator input Powerpoint Aims & Objectives slide Agenda slides (x2)	Powerpoint	Main Room	
2	09:05 25mins	**MYTH BUSTING – INTERACTIVE QUESTIONS** ***Key Objective for Session 2:***	Interactive questions	Interactive Voting tech	Main Room	

		To get the drivers re-engaged on day 2. And for the drivers to know some key statistics about the London Bus network and to debunk some common myths about what drivers are and aren't allowed to do in providing customer service. LF starts the day with some fun and interesting facts about Buses, plus some positive stats/facts about Buses. LF reintroduces the voting technology to the bus drivers. Dependent on the voting technology, they will be working in their teams – if the technology can record which team has the combined highest score of correct answers, then that team of drivers could win a box of Heroes chocolates The first question is the warm up – the rest are all bus-centric. **Question 1:** It is predicted that the number of annual bus trips will rise from 2.4 billion (now to what figure in 2020/21? (A) 2.6 billion (B) 2.8 billion (C) 3.1 billion (D) 2.9 billion Answer: (A) 2.6 billion **Question 2:** What percentage of journeys on a Night bus are people commuting to and from work? (A) 21% (B) 32% (C) 51% (D) 48% Answer: © 51% *The next three questions come from the TFL Reputation Tracker:* **Question 3:**	Voting slides			

		What percentage of respondents strongly agreed that buses are making it easier for disabled people to get about? (A) 22% (B) 33% (C) 48% (D) 58% Answer: (D) 58% - 33% neither agreed/disagreed and 9 percent disagreed. **Question 4:** What percentage of respondents strongly agreed that buses have friendly and helpful staff? (A) 38% (B) 49% (C) 54% (D) 13% Answer: (B) 49% - 38 percent were in the middle and 13% disagreed. Nearly half thought you were friendly and helpful. **Question 5:** What percentage of respondents strongly agreed that buses make a positive contribution? (A) 63% (B) 53% (C) 72% (D) 48% Answer: (A) 63% - 30 percent were in the middle and 7% disagreed. TRUE or FALSE **Question 6:** Once the doors are closed you cannot open them again **Question 7:** You cannot stop the bus for people to alight in between bus stops **Question 8:** If someone is running for the bus and falls over then I as the driver am liable Could be some discussion/exploration of the myths - and why people believe these things to be true.				

		De-brief/wrap: Idea of this course is about creating more consistency And also looking at where you can use your initiative ***Key Learning:*** • Some key facts about the London Bus network • The facts about a number of perceived limitations on how drivers can help customers which are actually "myths"				
3	09:30 30mins	**DRAMA SCENARIO 3 – FORUM – BUS NOT STOPPING** ***Key Objective for Session 3:*** To address the following workshop outcomes: • Driver stops/opens doors • Driver makes announcements to manage crowding LF introduces the third Drama Scenario. This is an interactive forum that covers the following: • Bus not stopping • Crowded Bus Management Re-state: deliberately not showing perfect practice etc ***This Scenario is listed in FULL DETAIL in a separate word document, containing the script and full instructions/extra material. It is listed as 'SCENARIO 3 - DAY 2 – SESSION 19 – BUS NOT STOPPING/CROWDED BUS.*** LF reminds the bus drivers how interactive Forum Theatre works, although in this scenario, MARTIN will not replay the scene, but they have the chance to interact with him in a different way. LF	Interactive Drama, Table discussion, Facilitated discussion Slide – Intro scenario 3	Powerpoint Props: Driver's Seat, Costumes Roving Mics (x3)	Main Room	

		then introduces the Driver called MARTIN. MARTIN scene is that he has been hauled in by his Ops Manager to be told about a customer complaint, and that he didn't open the doors at the busy bus stop because he felt the bus was full and the other bus customers wouldn't move down inside the bus. Martin had no option to pull away, even though the angry customer outside could see free seats on the top deck. MARTIN shows this scene in the bus. When he returns to the scene with his Ops Manager, who isn't too sympathetic. MARTIN asks the audience what he could do differently. He also asks them whether he should stop in these key situations: • When someone is running for bus • When someone is at the stop but not signalling for the bus • When the bus is genuinely full • When you've served the stop, closed the doors, and then the customer knocks on the door LF gives the bus drivers 5 mins to discuss what MARTIN should do in these situations, and then they have time to feedback to him with their advice. LF should also be inserting key messages around required driver action from TFL, that is listed below in key learning. LF brings Drama Scenario to a close with a wrap up of the key learning. ***Key Learning:*** • To gain clarity on the key messages and required driver action about serving the stop, which are: o Whether to stop when someone is running for the bus	Slide – other issues re bus not stopping			

		○ Whether to stop when someone is at the stop but they don't signal for the driver to stop - ○ How to handle situations where the bus is nearly full or full ○ What to do at a served stop when a customer knocks on door ○ Buggy/Wheelchair Area is already full and more buggy/wheelchair users are at the stop Set up move to breakout rooms	Slide – move to breakouts			
4	10:00 45 mins	**BREAKOUT ROOMS – DISCUSSION – BUSES NOT STOPPING** ***Key Objective for Session 4:*** *Recognise the impact of not serving the stop and address the challenges involved E.G. crowd management, and what is and isn't in the bus driver's control.* **Overall Aim and Purpose** *This is the number one cause of customer dissatisfaction.* *We have raised the issues in the previous forum session. Now we ask them to examine the issues, barriers and challenges to see what can be done even in this really difficult area to improve the customer experience.* *It is not in this instance followed by a skills practice session as the issue is essentially one of:* • *Thinking about what they can do in advance of the problem to allow passengers to get on* • *Making PA announcements (and the skills practice in this is later on)* **PREPARE** Question on flipchart: "What barriers or challenges get in the	Facilitated Discussion	Flipchart Post-its	Breakout rooms	

		way of you being able to stop or open the door for passengers?" **TASK SETTING** WHAT AND WHY We are now going to go deeper into the situation where the bus is full or nearly full and the result is that you can't open the doors to let passengers on or just drive past the stop. Flipchart or state the typical situations we want them to focus on. There are probably two ways we can improve the customer experience in this situation; one is to manage somehow to make room for more passengers and the other is to somehow make passengers feel better about the fact that you couldn't let people on. This is the number one area of customer frustration and we know causes drivers a lot of stress so it would be great all round if we can do something to make things better. HOW What I'd like you to do in your groups [arrange them in new groups of 3 or 4]. I'd like you to address the following question: "What gets in the way of you being able to stop or open the door for passengers?" "We know how challenging these situations can be but from the customers pov what maybe could you do to help customers either to get on or to feel less bad about the situation." [Remind them of the barriers model (external/people/me) and give examples of each] WHEN AND WHAT THEN AND WHY DOING IT LIKE THIS Spend about 10 minutes on this and then as previously I'm going to give you some post-its so you can write down (one per post-it) your top 3 or 4 things that get in the way. Then, using the circle of control model, which we discussed earlier, we'll have a look at				

		each issue or challenge and see if there is anything which is in your control which you can do to improve the customer experience. I really hope you will find this useful and I want us to do it this way, in small groups, so you all get the chance to talk about what you find difficult and then see if there are any good ideas in the room which can be shared that might make the situation a bit easier to handle – better for the customers and less stressful for you. **Other Guidance notes for the facilitator** • After about 8 minutes give each group 4 post-its • In turn get a group to put up one of their post-its and then explore with the group (wherever it is put) what (if anything) can the driver do to control or influence the customer experience. (you may prefer to get all the post-its up first and then pick the ones that you think are most instructive in terms of how the driver may be able to have more influence that they think) • Try to explore the different possible situations eg: a. The bus is actually full and no one is getting off. b. The bus is actually full and one or two are getting off. c. The bus is not full but there are more people at the stop than there are spaces. d. The bus is not actually full but people won't move down e. The bus is not full, there are people at the stop but they are not signalling or looking like they need the bus f. The bus stop is busy with other traffic (either buses or other vehicles)				

		[Try to avoid process issues – eg, stop out of use] • Towards the end of the half hour summarise This leads to a facilitated discussion around sharing good practice – AF poses the questions: • What do you do? • What can you do? ***Key Learning:*** • Understand the barriers and challenges in terms of buses not stopping & crowd management • Know what is within their control as bus drivers and what isn't in terms of buses not stopping & crowd management. • Believe they should always stop unless actually full				
	10.45-11.00	*Comfort break*				
5	11:00 60mins	**DRAMA SCENARIO 4 – FORUM – CONFLICT/ANGRY CUSTOMERS** ***Key Objective for Session 5:*** To address the following workshop outcomes: • Driver able to deal calmly with situations of customer conflict • How to deal with conflict situations by using Transactional Analysis to achieve an adult:adult conversation. *Gather in Main Room* LF introduces the fourth Drama Scenario. This is an interactive forum that covers the following conflict/angry customer	Interactive Drama, Table discussion, Facilitated discussion Powerpoint Slide – Intro Scenario 4	Powerpoint Props: Driver's Seat, Costumes, Buggy, Wheelchair Roving mics (x3)	Main	

		situations: • Bus late • Being 'turned' • Buggy/Wheelchair Re-state: deliberately not showing perfect practice etc ***This Scenario is listed in FULL DETAIL in a separate word document, containing the script and full instructions/extra material. It is listed as 'SCENARIO 4 - DAY 2 – SESSION 21 – CONFLICT-ANGRY CUSTOMERS.*** LF reminds the bus drivers how interactive Forum Theatre works and introduces the Male driver called VIC. VIC is on his bus late in the day when a young person gets on at a stop with a lot of bad attitude. VIC does not react to this well and gets defensive and aggressive in return and the situation escalates, with the young customer calling VIC derogatory names and making threats. The situation is exacerbated when a Wheelchair user approaches and tries to board the bus, however a mother with two children in a super buggy refuses to collapse it to let a disabled wheelchair user on. They start to argue, the young customer's language gets worse and VIC says it is nothing to do with him. To cap it all, VIC announces that the bus is being 'turned'. After the scene finishes, VIC speaks directly to the bus drivers to get their views on how he did. VIC is an honourable person, but gets too emotionally involved. The bus drivers will need to give him a lot of coaching. LF intervenes and offers up some help for the bus drivers and VIC				

		in the following Session… **LF references back to T.A. & E+R=O** LF leads an exploration of how to get to an adult:adult situation in a conflict/stress situations. This happens in a facilitated discussion with the bus drivers. LF references safety benefits – for example, the negative impact on driving when you are stressed. LF then takes the bus drivers back to Drama Scenario 4 with Driver VIC. Using elements/snapshots from this scenario, the LF illustrates different responses that Driver VIC could have chosen using the principles of TA. The original elements/snapshots to be used and adapted using TA are: • When the Young customer enters the bus and gives verbal abuse to the bus driver. Bus driver goes to Critical Parent state whilst Young customer goes to Child state. • When the Disabled customer & Mother customer are in conflict and the Disabled customer starts calling the bus driver in Parent state, the bus driver goes into Child state, becoming truculent. LF summarises with tips for dealing with conflict/aggression that are drawn from the bus drivers. ***Key Learning:*** • Have tactics for turning conflict behaviour into conversation.	Slide – tips for dealing with conflict/anger (adult mode)			

		• Recognise signs of frustration and have a range of calming responses. • Not taking things personally. • To understand how anger and conflict escalate and to start recognising tactics for defusing situations • To recognise that the bus driver needs to take action and not abdicate responsibility when there is a situation between a disabled wheelchair user and a customer with a buggy. Set up move to breakouts	Slide – into breakouts			
6	12.00 50mins	**BREAKOUT ROOMS – SKILLS PRACTICE – CONFLICT SITUATIONS** ***Key Objective for Session 6:*** *To embed the learning, the bus drivers experience through skills practice, the following workshop outcome:* • *Driver able to deal calmly with situations of customer conflict* **Overall Aim and Purpose** *Having looked at conflict situations in the drama we now explore ways in which drivers can manage to deal calmly with conflict so as to achieve a better customer outcome and less stress and potential threat to themselves.* *Some of the discussion will inevitably focus on rules and procedures and some of that is useful but as much as possible we want to focus this on skills they can deploy to create better outcomes, using Transactional Analysis and the Tips and Hints provided.* *We should NOT in this session get involved in discussion of*	Skills practice, Facilitated discussion	None	Breakout rooms	

		extreme situations; drugs, alcohol, weapons ,mental disturbance etc *The focus should be on: eg* • *Anti-social behaviour such as noisy young people* • *Customers who want to get on via middle doors not front* • *Customers with not enough credit on their Oyster card/no contactless* • *Aggressive behaviour - obscene language and accusing – being an 'ist' – racist/ageist for example* • *Misunderstanding about what the driver has said – this is an opportunity to mention hidden disability/ learning impaired (the customer may have a hearing impairment, for example)* **TASK SETTING** WHAT AND WHY Following on from the drama we're now going to spend quite a bit of time exploring situations that you personally find particularly difficult to handle and to see if we can between us find some good tactics for managing them well. Not only is conflict extremely stressful for you but it's amazing how many customer complaints are situations where the customer got on the bus feeling a little bit annoyed and then, because of how that was handled, ended up really angry. So this is an area where you can have huge impact. We're not going to be looking at extreme situations [explain] but more everyday ones like..[give a couple of the examples above] HOW So what I'd like you to do is this: I'm going to put you into 3 groups [do so] so you can share with each other actual situations that you personally found difficult to handle and which led to conflict on your bus. Then as a group pick one of them which you				

		want us to explore further to see if we can find ways to handle it. WHEN AND WHAT THEN AND WHY DOING IT LIKE THIS You've got about 10 minutes to discuss and choose. When you've decided, let me know and I'll ask you to describe it to me. Once I've got all 3 then we'll do the skills practice and we'll have some of you as drivers, I'll be the customer, and the rest of you will help the driver to explore different ways of handling the situation to defuse or avoid the conflict. We'll play out 2 of the situations before lunch, and one after. **Other Guidance notes for the facilitator** • Only once you've taken their brief do you explain that another group will be playing out their scenario. • With each group give them a scenario, get one of them to be driver and ask the rest of the group to coach them. Initially at least discourage other group members from commenting so as to put pressure on each group in term to focus on how to improve situations. • Keep referencing TA and E+R=O and the tips and hints • You can hand out the 'tips for dealing with conflict and staying in Adult' cards here • Try to swap volunteers several times during the scenario, or if they solve it well, run it again playing the customer as a 'different type' (e.g. weepy instead of shouty or 'up' the rudeness) *Before you play out examples, again set up a SAFE environment:* • When we're playing these out we will stop and start (I will time out) or you can say 'stop'. • Be supportive to your colleague – it takes a lot of courage to volunteer . • We will focus on what they have **done well** first				

		• And then perhaps think about what they might **do differently**. • This is a chance for you to share your experience of these situations, and your way of doing things. • There is often NOT a complete right or wrong way of handling these things.... but together we'll explore effective ways to do it... • This is about trying to make things easier for you as drivers • But remember – it is also about the customer's experience, and their perceptions (right or wrong) – [you could refer back to the 'good and bad' customer experience exercise here perhaps] AF draws out the learning through a facilitated feedback and advice session including the bus driver and the rest of the drivers. Give out '**Tips for dealing with Conflict/Anger' cards**				
	12.50-13.35	*Lunch*				
7	13:35 25mins	**SKILLS PRACTICE – CONFLICT SITUATIONS (CONTINUED)** As per session 6	Skills practice, Facilitated discussion	None	Breakout rooms	
8	14:00 30mins	**MAKING ANNOUNCEMENTS** ***Key Objective for Session 8:*** To address the following workshop outcomes: • Driver makes announcements for diversion/held/traffic delay/termination/buggy and wheelchair	Facilitator input, Powerpoint Discussion	Flipchart	Main room	

		LF leads a facilitated discussion with the bus drivers around the following question: • What makes for a good announcement? LF shares **tips** for making announcements LF leads a facilitated discussion with the bus drivers around the following question: • What holds you personally back from making live announcements? LF to reference the difference between announcements that are necessary, i.e. providing detail/information, and those that are discretionary and add value). ***Key Learning:*** • To believe that it's worthwhile to make announcements • To know when it is useful/preferable/necessary to make announcements • To be clear about the comparative merits of ibus and live announcements • To acknowledge some of the barriers that hold them back from making live announcements Set up move to breakouts	Slide with Announcement question Slide with Tips for Announcements Slide with Announcement Question Slide – to breakouts			
9	14:30 60mins	**MAKING ANNOUNCEMENTS – COACHING & PRACTICE** ***Key Objective for Session 9:*** *To help build bus driver confidence **and skill in** making announcements through practice, addressing the following*	Skills practice, Facilitated discussion	None	Breakout rooms	

		programme outcome: • *Driver makes announcements for diversion/held/traffic delay/termination/buggy and wheelchair* **Overall Aim and Purpose** *To help build bus driver confidence* ***and skill in*** *making announcements through practice, addressing the following programme outcome:* • *Driver makes announcements for diversion/held/traffic delay/termination/buggy and wheelchair* *This is probably the easiest area of potential wins for the programme. By making more announcements in their own voice the drivers can create a more "human" experience, give people information and choices, explain what they are doing and allay anxiety.* ***Key Learning:*** • *To have confidence to make announcement* • *To be polite and authentic, using effective wording of announcements* • *To understand the importance of clarity, pace, diction etc* • *To be committed to making more announcement, particularly more live announcements, in future* **PREPARE:** List of 4 announcement situation on flipchart (see below) **TASK SETTING** WHAT AND WHY [Refer to the Customer Service flipchart and point out the value to the customer of information and/or give your own relevant example] As we just discussed in the main room –a live announcement by you has a potentially huge impact on the customer experience. It				

		can give people information so they can make choices or understand what's going on, it can help them to help you eg by moving down the bus and can create overall a more "human" experience. But we do know from our research that many of you are not as confident as some others about making PA announcements so we are now going to have a practice session where everyone will get the chance to build their confidence and to help each other. HOW [Pick 4 situations from the 5 below and list on the flipchart in advance: • Bus On Diversion • Wheelchair Area • Move Down the Bus / take seat upstairs • Delay / Disruption • Curtailment] We're going to work in 4 groups and I'm going to give each group one of these topics. [Do so] I'd like your group to come up with a really well worded announcement to address your topic. You can make up the facts but it must fit in the time allowed (20 seconds) WHEN AND WHAT THEN AND WHY DOING IT LIKE THIS When you've come up with the announcement you're going to practise making your announcement and get feed back and you will then help others with their announcement. You've got 5 minutes to come up with your good announcement. Do be sure to come up with actual the words – don't just discuss it. It's only by practising that you'll build the confidence to do it for real. And even those of you who feel confident – who knows it may be that your colleagues can suggest ways you could make your announcements even better.				

		In fact – before we get started let's have a look at what makes a good announcement.
		[Give a fun demo of how NOT to make an announcement– being unclear, waffling, not introducing who you are etc.
		
		Then draw out in open discussion what makes a good announcement and **show the list of tips. (give out cards here)**
		• Introduce yourself/Get their attention
		• Keep It brief
		• Speak slowly and clearly
		• Use simple language and avoid jargon
		• Make announcements in good time
		• Suggest passenger options
		• Apologise that passengers have been inconvenienced
		• End by saying 'Thank you'
		Then get them started in their groups.]
		
		Other Guidance notes for the facilitator
		• There are different ways of running this. You can use small groups or if you prefer you can get each individual in each group to practise in front of the whole group and facilitate constructive feedback for each
		• If anyone complains about the PA system in the buses not working you can say that as part of this project the Garages have checked that every bus PA is working properly so if they find one that isn't they should have a word with the Garage.
		• When they have practised give them (or coach the group to give them) at least one piece of helpful feedback. You do not need to run through all the items on the card: eg
		  • Clear articulation – move the mouth and lips
		  • Keep the pace steady – don't speed!				

		• Smile as you speak and your tone will lift • Use emphasis where necessary to make your point AF will state that there are some of the bus drivers who are very confident in doing this, and there are others who are less so. This is an opportunity to help and support one another in doing this – giving feedback and coaching to each other as colleagues. As the exercise progresses, one person from each group then joins with one from each of the other groups, forming a new group where they then practice saying their announcements The bus drivers are encouraged to give each other feedback & coaching on their delivery – on the clarity, pace and diction. ***Key Learning:*** • To have confidence to make announcement • To be polite and authentic, using effective wording of announcements • To understand the importance of clarity, pace, diction etc • To be committed to making more announcement, particularly more live announcements, in future				
	15.30-15.45	*Comfort Break*				
10	15.45 35mins	**EMPOWERMENT** ***Key Objective for Session 10:*** To address the following workshop outcome: • Empowerment – Driver feels able to use their initiative to make the best decision in particular circumstances	Facilitator input Powerpoint		Main Room	

		Gather in Main Room. LF references back to 'Day in the Life' scenario – LF leads a facilitated discussion around what would have needed to be different from the Garage Staff? LF informs the bus drivers that the programme was originally run with managers, allocators and controllers. 'Here's what they said' LF references the most common actions/commitments from the Garage courses ('what can you do to support and enable drivers to provide excellent customer experience?') LF tells the bus drivers; This is what you should expect from your Manager/Garage staff. ***Key Learning***: • Belief that management want the bus drivers to take responsibility for decisions. • Belief that management will support the bus drivers in a sensible decision even if there are unintended consequences.	Slide – Choices within Constraints Slide – What Managers/Garage staff said			
11	16:20 30	**REFLECTION TIME** ***Key Objective for Session 11:*** For the drivers to have time to reflect on key learnings . **Overall Aim and Purpose**	Reflection, Facilitated discussion	None	Breakout rooms	

		It is important for the drivers to have time to reflect on key learnings. *This may feel quite unfamiliar for some but can be very powerful as reinforcement of the "OWN it" and the start of the "LIVE it" phases.* **PREPARE: Stop, Start, Continue on flipchart** **TASK SETTING** WHAT AND WHY In this last half an hour I just want to look back over the last two days and give you some time to think about what you are taking away from the course and what it is that you would like to try and do differently as a result of the course. You are much more likely to actually start doing something different if you've heard yourself commit to the change and for that reason…. HOW ……I'm going to ask you to reflect on your own for a couple of minutes, and then get you into pairs to share what you've been thinking and what you might be able to do differently as a result of this course. Ref **Stop, Start, Continue** as a guide – esp continue with and build on the things that you already do well You do NOT need to share whatever you come up with with the rest of the group. WHEN AND WHAT THEN AND WHY DOING IT LIKE THIS Before you do it, let me just remind you of what we've covered over the 2 days [recap the course by subject areas covered]: • Good & Bad experiences as customers				

		• Day in Life scenario • Customer feedback – commendations and complaints • Helpfulness and acknowledging customers – Barriers and Practice • T.A..... E+R=O • Mindset: Welcome & I'm Listening • Bus Not Stopping – barriers, and practice • Dealing with Conflict – ref TA and E+R=O again – skills practice • Announcements – value of these, impact on customers.... and skills practice So spend some time now reflecting, and then in a couple of minutes I'll ask you to get into pairs and just share with the other person for about 5 minutes what you've found interesting about this programme and what you'd like to try and do differently as a result. **Other Guidance notes for the facilitator** • Do NOT let them get into general discussion of the course before they have done their pair discussions. It's important for them to talk privately first. • Once they have talked in pairs you can invite comments to be shared with the whole group but on a purely voluntary basis. AF gives their final words to the bus drivers in their group, and thanks them for their participation.				
12	16:50 20mins	**FINAL INTERACTIVE VOTING & FEEDBACK** ***Key Objective for Session 12:*** • For the drivers to have time to reflect on key learnings		Powerpoint, Interactive voting tech, Feedback	Main Room	

		• Through interactive voting on the same baseline questions from the beginning of Day 1, to measure how the bus drivers' views have changed LF encourages people to think what else they can do to focus on creating a great customer experience. Reflect back on • Aims & Objectives • Key themes/learnings of the day - key things we have covered. Next steps – explain Looop and that we need email addresses LF leads the Final Interactive Survey. Gives a reminder to the bus drivers of how to use the voting technology. The questions are the repeat of some baseline questions) **Question 1:** **I feel personally motivated to deliver the best customer service I can.** Vote 1-5 (Agree/Disagree) **Question 2:** Providing a good customer experience is part of my job. Vote 1-5 (Agree/Disagree) **Question 3:** **How important is it to acknowledge customers as they board?** Vote 1-5 (Important/Not Important) **Question 4:** Customers don't see the whole picture and are too quick to	Aims & Objectives slide Slide - re Looop Slides - Interactive questions	forms		

		criticise. Vote 1-5 (Agree/Disagree) **Question 5:** **How important is it to answer customers' questions as best I can in a polite/helpful way?** Vote 1-5 (Important/Not Important) **Question 6:** I feel confident about making PA announcements Vote 1-5 (Agree/Disagree) **Question 7:** **How important is it to let customers know about disruption/diversions in good time e.g. using the PA system?** Vote 1-5 (Important/Not Important) **Question 8:** **I am proud to be a London bus driver** Vote 1-5 (Agree/Disagree) LF feeds back to the bus drivers on the results from this course survey and any changes from the baseline scores on Day 1 There will also then be 3 questions here re evaluation/feedback on this course • How would you rate the overall quality of the facilitators and the course? • How would you rate the relevance of what we've covered to your role? • How helpful do you think this will be in your day to day work with customers?	Slides – Interactive Feedback Qs	Feedback forms		

		LF to flag up that there are also written comments forms on each table if people wish to add other comments/feedback.				
13	17:10 5 mins	**FEEL GOOD VIDEO & THANK YOU** ***Key Objective for Session 13:*** To end the programme on a positive 'high' note. Wish them well. Finally, show the Feel Good video from DW to create an upbeat ending The LF thanks the bus drivers for their time and their active participation. Drivers pick up goodie bags on way out	 Video Goodie bags	Feelgood Video	Main Room	
	17.15	*Finish Day 2*				
Sub-total module 2	*420*					

Supplementary Report prepared by Mike Weston, Passenger Transport Consultant for the Independent Review Committee on Hong Kong's Franchised Bus Service

Transport for London's Proposed Bus Safety Standard

October 2018

Contents

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1. CONTEXT

This supplementary report has been commissioned by the Independent Review Committee (IRC) on Hong Kong's Franchised Bus Service to provide feedback on Transport for London's proposed Bus Safety Standard following its formal launch on Tuesday 16th October at the Millbrook Proving Ground, Bedfordshire, UK. The Committee has already received a report which provided further understanding on the organisation and structure of the London bus franchising system.

This report has been prepared by Mike Weston an Independent Consultant with over 30 years' experience within the bus industry including senior roles at Transport for London (TfL) most recently as Director of Buses.

Section 2 of the report gives an overview of Transport for London's proposed Bus Safety Programme which was launched in February 2016 and background to the development of the proposed Bus Safety Standard (BSS). Section 3 provides further information on the various elements of the BSS whilst section 4 highlights other issues of note from the launch on the 16th October. Section 5 provides an executive summary.

The previous report by the author on the organisation and structure of the London bus franchising system dated September 2018 provided more detailed background on the TfL Bus Safety Programme. This supplementary report will focus in more detail on the proposed Bus Safety Standard.

2. BUS SAFETY PROGRAMME

2.1. Introduction

In February 2016 TfL, partly in response to increased public and stakeholder pressure, launched its Bus Safety Programme the key elements of which can be summarised as follows:

Core Elements	Recent Additions
Bus Collision Data Analysis	Reducing Customer Injuries
Transparency	Fatigue Management
Contract and Performance Management	Safety Innovation Fund
Vehicle Design	Working in Partnership
Sarah Hope Line	
Bus Driver Training	

The Bus Safety Programme included a commitment, under the vehicle design element, to develop a "Bus Safety Standard" to ensure that the safest buses are driven on London's roads. This Bus Safety Standard incorporates several elements of the Bus Safety Programme identified above.

TfL see the BSS as a key element for the London bus network achieving the Mayor's Vision Zero target by 2041 and the more ambitious target of no one killed in, or by, a London bus by 2030. The Mayor's Vision Zero target is that no one will be killed or seriously injured on London's roads by 2041.

TfL used the event on the 16th October to launch the proposed BSS which they believe will provide the substantial proportion of the casualty reduction savings required to meet their casualty reduction targets and contribute towards the Vision Zero target.

Sections 3.2 to 3.6 describe the elements which will make up the proposed BSS.

Following presentations on the BSS by TfL and the Transport Research Laboratory (TRL) the delegates at the launch, which included operators, vehicle manufacturers and other suppliers were split into smaller groups and were able to hear more in-depth presentations on each of the standards including practical demonstrations of some of the proposals.

2.2. Development of the Bus Safety Standard

TfL appointed TRL to undertake a significant amount of research and to provide appropriate technical input to help develop the proposals. The TRL delivery team included both engineers and human factor experts. The development of the BSS has been based on an evidence led approach to both the costs and benefits of each option. TRL also adopted a collaborative approach consulting with bus manufacturers and operators on both technical feasibility and timescales.

TfL buses already meet all the regulatory requirements plus some of its own additional requirements, such as fire suppression and daytime running lights. The aim of the BSS is to provide additional features to enhance the safety of buses including drivers, customers and third-party road users. During the presentations is was suggested that the complete BSS could reduce fatalities by 75% and serious injuries by 66%.

During their presentation TRL stressed that the programme had been research based with time spent understanding the problem and undertaking detailed analysis of police incident reports. The above, plus a detailed literature review, was undertaken prior to the identification of technical solutions.

A report summarising the detailed data analysis undertaken by TRL of historical incident data was published after the event by TfL and titled "Analysis of bus collisions and identification of countermeasures"[1]. The report provides the evidence base for the recommendations to define the vehicle safety interventions that will be integrated into new buses to improve bus safety. This report firstly analysed the police files into the investigation of serious incidents and then used the in-depth collision details to assign, using engineering judgement, countermeasures that might help to avoid or mitigate the severity of each collision. Finally, the countermeasures that had been assigned were analysed to quantify the number of fatalities that they might prevent and to develop a prioritised list of countermeasures to be considered as part of the Bus Safety Standard.

It is worth noting that TfL have adopted a rigorous approach to the assessment of each potential option using cost/benefit analysis to target the interventions which will give the greatest return for each £ spent in terms of injury/accident reduction. TRL also stressed that considering the cost of individual solutions was important as part of the assessment so that cost/benefit analysis could be undertaken.

[1] TRL Report Analysis of bus collisions and identification of countermeasures 10th October 2018 http://content.tfl.gov.uk/analysis-of-bus-collisions-and-identification-of-countermeasures.pdf

2.3. Delivery & Implementation of the Bus Safety Standard

As part of the launch of the BSS it is recognised that this specification will evolve and develop as technology, especially around autonomous vehicles, continues to develop.

In terms of manufacturers and operators introducing the new standards described in section 3, TfL will issue a requirements specification setting out how the feature or requirement should function. For each feature or requirement there will also be an agreed assessment process which will be undertaken for each vehicle/manufacturer type to ensure that manufacturers' solutions meet the overall TfL requirement. TfL have adopted this approach to ensure that the requirements are not supplier specific as it would not be acceptable for TfL, as a public body, to have specifications which favoured only one supplier. Also, this approach will help drive competition amongst suppliers helping to reduce costs.

Requirement specifications for each of the proposals will be published shortly and will include guidance notes for the assessment process.

Although it is currently envisaged the standard will apply to all new buses from 2019 onwards (around 700 per annum) consideration is also being given to the potential to retro-fit existing buses possibly as part of their mid-life refurbishment which takes place after around 7 years.

There was no mention of seat belts during the launch event and this will not form part of the new Bus Safety Standard.

3. The Bus Safety Standard

3.1. Structure of the Bus Safety Standard

The BSS will consist of several measures which can be categorised under the following headings:
- **Driver Assist** (helping the driver to avoid or mitigate the severity of incidents)
- **Partner Assist** (helping the other road users involved to avoid a collision)
- **Partner Protection** (reducing severity of injuries for road users outside the bus in a collision)
- **Occupant Protection** (reducing the severity of the injuries for people on board the bus)

The following table summarises the proposed measures under the above categories:

Driver Assist	**Partner Protection**
Advanced Emergency Braking Intelligent Speed Assistance Improved Direct and Indirect Vision Pedal Application Error Runaway Bus Prevention	Vulnerable Road Users Frontal Crashworthiness
Partner Assist	**Occupant Protection**
Acoustic Conspicuity Visual Conspicuity	Occupant Friendly Interiors Slip Protection

3.2. Specific Requirements

The following sections give a summary of the individual proposals, but further information is available in the Bus Safety Standard Executive Summary produced by Transport for London as part of the launch event[2]. Further detailed information will also be made available on the TfL website as individual standards, and their associated assessment processes, are developed.

[2] Transport for London Bus Safety Standard Executive Summary http://content.tfl.gov.uk/bus-safety-standard-executive-summary.pdf

3.3. Driver Assist

Automated Emergency Braking (AEB)

AEB is a system that uses forward-looking sensors such as radar and cameras including the fusions of data from more than one sensor, to identify a risk of an imminent collision.

It will typically first warn the driver of the risk and, if the driver does not act, then it will apply braking automatically to avoid the collision or to reduce the collision speed and therefore the potential for injury. A bus fitted with an example of this system was demonstrated to delegates at the launch event.

During the launch it was recognised that further development work is required on this feature to reduce the potential number of false activations (a false positive) especially as buses present a unique challenge compared with other road vehicles as most passengers are not using seat belts and may even be standing. The roadmap recognises this requirement for further development work and therefore envisages this feature being delivered from 2024. During the live demo it was also recognised that in terms of positive activations and the avoidance of a major incident there is potential for an increase in minor on-board injuries, but this would be off-set by a reduction in the number of fatal and serious injuries outside the bus.

Intelligent Speed Assistance (ISA)

Intelligent Speed Assistance (ISA) is a system based on a using a digital map of a city's roads containing speed limit information. The system interprets the speed limits and prevents the driver from accelerating the bus above the limit.

This feature is considered especially helpful to drivers as the number of 20mph zones increases across London.

700 buses will have this facility by the end of financial year 18/19 and it will become a requirement by the end of 2018.

Direct and Indirect Vision

Improved Direct and Indirect Vision will aim to incorporate improvements that expand the area around the bus that can be seen by the driver. Improvements could be achieved by better direct (eye-line) vision through the windows, or indirect vision via the use of mirrors, or blind spot information systems and Camera Monitor Systems (CMS) in the future.

The aim is to improve drivers direct and indirect vision above the current legal minimum standards.

Pedal Confusion Prevention

Pedal confusion refers to situations where a driver presses the accelerator when intending to press the brake thus leading to an unintended acceleration.

Pedal confusion mitigation could encompass a variety of measures to help a driver prevent or recover from an unintended acceleration incident. These incidents are very rare but carry a risk of very severe outcomes when they do occur.

In terms of prevention measures several options are being explored including improving foot placement recovery such as brake "toggling" which requires a driver to depress the footbrake before pulling away from a bus stop. In cab indicator lights incorporated into the dashboard display which show green when accelerating and red when braking are also being considered.

If such an incident occurs intervention, perhaps via Advanced Emergency Braking, could also be incorporated in the future.

TfL will also require CCTV cameras to be fitted in the footwell to provide evidence in case of an incident.

Runaway Bus Prevention

Runaway Bus Prevention is a system of interlocks to prevent the bus from rolling away if circumstances lead to the driver forgetting to apply the parking brake when leaving their seat. These incidents are very rare but, as with pedal confusion, carry a risk of very severe outcomes when they do occur.

Some London operators already have such features, but TfL will set this as a requirement from 2020.

3.4. Partner Assist

Acoustic Conspicuity

Acoustic conspicuity is an acoustic vehicle alerting system (AVAS) to make quiet running (e.g. electric and hybrid) buses as identifiable as a standard diesel bus, to help Vulnerable Road Users (VRUs) detect the presence of a bus and the collision risk it represents before starting to cross the road.

This has been recognised as an increasing issue as quieter hybrid and electric buses are delivered onto London's streets. Forthcoming EU regulations will make acoustic conspicuity a requirement although TfL will be introducing this 2 years ahead of the deadline. TfL are keen to issue a consistent specification and therefore ensure a standard noise which is easily recognisable is used across the bus fleet.

Visual Conspicuity

Visual conspicuity is about making the bus more noticeable to other road users especially pedestrians. Solutions could include additional marker-lights on the bus plus the use of reflective tapes to make an approaching bus more obvious. The TfL vehicle specification already requires the use of day time running lights.

3.5. Partner Protection

Vulnerable Road Users Protection (VRU Crashworthiness)

Pedestrian friendly front end design could incorporate a variety of features designed to better protect pedestrians and other VRU in the event of a collision. This includes changes to the geometric front-end design of the bus, impact protection and energy absorption assessment, and runover prevention measures such as an airbag device located under the bus which is activated if the bus comes into contact with a pedestrian. These requirements will also include the impact performance of wing mirrors and their potential replacement with camera monitoring systems.

3.6. Occupant Protection

Occupant Friendly Interiors

The TRL research recognised that more attention to interior design in terms of hand pole position and fixtures used, for example avoiding exposed nuts, can reduce the number of passenger injuries in the event of a collision.

An assessment of the protection provided to passengers on board the bus will be undertaken as part of this requirement. A visual inspection of the interior during the design process aims to help design out potentially injurious features and encourage better positioning and selection of features.

Slip Protection

This element of the BSS will set a minimum requirement for anti-slip flooring and the requirement for a quantified assessment of the floor's performance.

3.7. Bus Safety Standard – Implementation Roadmap

TfL recognise that given the pace of development of technology and that some options are currently more mature than others it will be necessary to introduce the Bus Safety Standard in phases. Consultation with the industry during the development of the roadmap will help ensure that the timescales are realistic but challenging. In addition to a "required" date for each feature TfL will also have a "preferred" date to encourage early adoption. It is assumed that operators who offer additional vehicle features before the required date will receive additional marks as part of the route tender evaluation process.

A roadmap was announced at the launch event which envisages broadly three introductory phases:

- Phase 1 2019
- Phase 2 2021
- Phase 3 2024

The full roadmap is available on the TfL website[3]

[3] TfL's Bus Safety Roadmap for new build buses http://content.tfl.gov.uk/bus-safety-road-map-for-new-build-buses.pdf

4. Other Information

4.1. National & International Applicability

At the launch TfL stressed the potential applicability of their new BSS in other regions including the rest of the UK and international markets. They believe there will be potential benefits to both TfL and other jurisdictions from the wider adoption of the BSS as this will help drive economies of scale for suppliers thus reducing the cost to both TfL and others.

It is clear from previous discussions with TfL and from the launch event that a great deal of research and analysis has gone into developing the BSS from which others can benefit. However, it is probably important that some local assessment is undertaken of each of the proposed features to ensure they are applicable to, for example Hong Kong, and that the same benefits and costs would apply in the Hong Kong market.

The launch brochure referred to in section 3.2 also thanks TfL's delivery partners which include Alexander Dennis Ltd and Wrightbus Ltd. The presence of these two bus manufacturers in the Hong Kong market should make the potential transfer of some or all these features more cost effective and practical.

4.2. The Bus Safety Innovation Challenge Fund

TfL also used the event on the 16th October to launch the new Bus Safety Innovation Challenge. TfL see the BSS as a specification which will evolve over time and is keen to encourage and guide the industry and its supply chain to develop further innovative ideas to improve safety of buses further.

Unlike the previous Safety Innovation Fund which was only open to bus operators this fund, which will be launched in early 2019, will also be open to bus manufacturers and their supply chain. As part of the application process evidence will be required describing the safety system and its effectiveness. This approach will help TfL target its funding at the projects and innovations more likely to reduce or eliminate fatalities and injuries on London's bus network.

5. Executive Summary

The BSS has used independent assessment to ensure both costs and benefits are clearly understood. This is clearly an ambitious programme which has involved a lot of research to understand the benefits.

TfL is keen to share the best practice it has obtained from this exercise partly to benefit other regions in terms of their safety but also to create economies of scale amongst the various suppliers thus making its implementation more cost effective.

In terms of the Hong Kong franchised bus market it would clearly be appropriate, potentially through the bus suppliers who supply both the UK and HK markets to review the applicability of the various initiatives identified in section 3 to the HK market.

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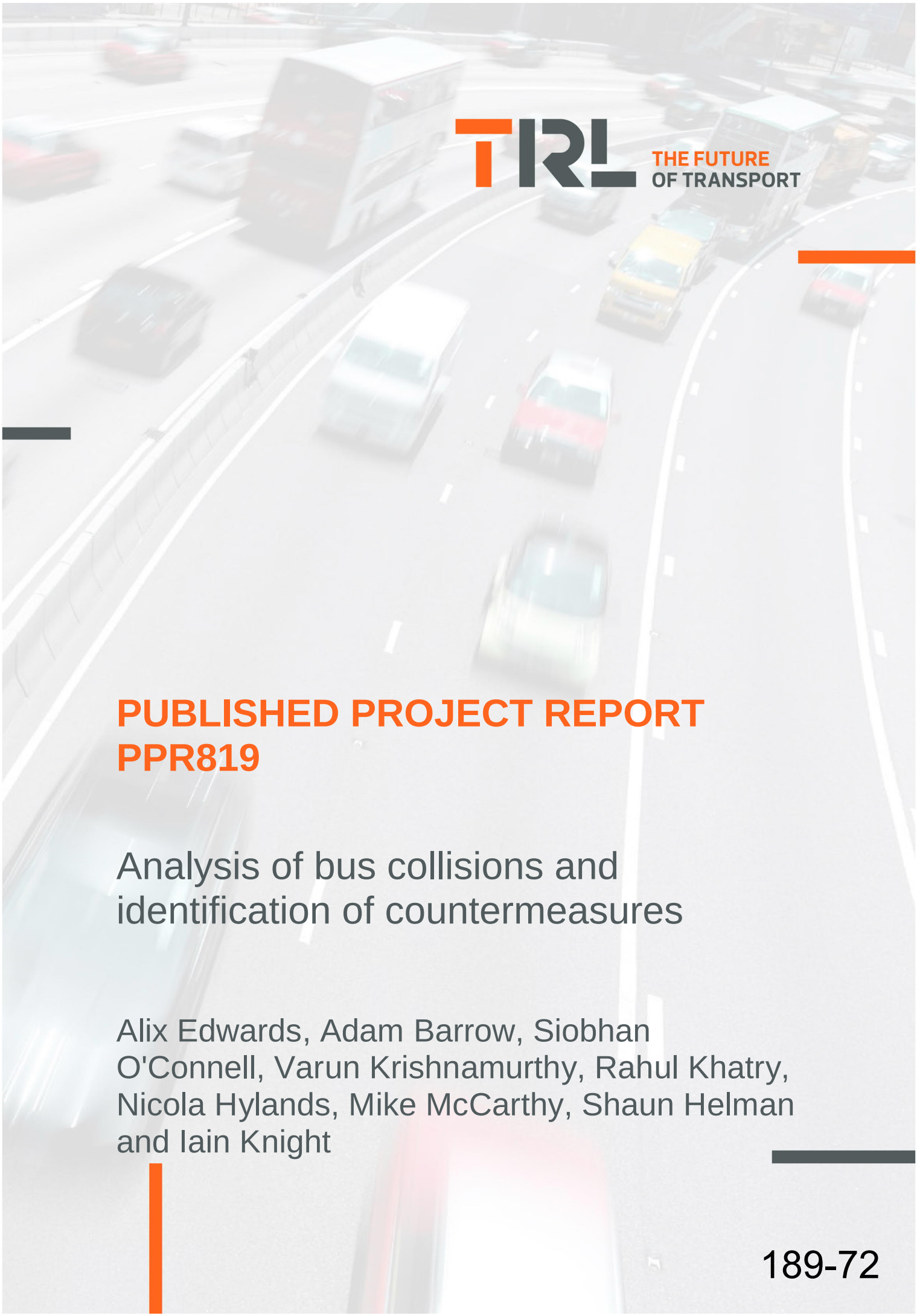

THE FUTURE OF TRANSPORT

PUBLISHED PROJECT REPORT PPR819

Analysis of bus collisions and identification of countermeasures

Alix Edwards, Adam Barrow, Siobhan O'Connell, Varun Krishnamurthy, Rahul Khatry, Nicola Hylands, Mike McCarthy, Shaun Helman and Iain Knight

189-72

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Disclaimer

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List of Abbreviations and Terminology

Abbreviated Injury Score **(AIS)**
Advanced Driver Assistance Systems **(ADAS)**
Advanced Emergency Braking **(AEB)**
AfterMarket **(AM)**
Automated Emergency Steering **(AES)**
Closed Circuit TeleVision **(CCTV)**
Collision Avoidance System **(CAS)**
Collision Investigator **(CI)**
Emergency Braking System **(EBS)**
Front Underrun Protection **(FUP)**
Heavy Goods Vehicle **(HGV)**
Heavy Vehicle Crash Injury Study **(HVCIS)**
Intelligent Speed Assistance **(ISA)**
Large Passenger Vehicle **(LPV)**
LIght Detection And Ranging **(LIDAR)**
Metropolitan Police Service **(MPS)**
Nearside = left/passenger/kerb- side in the UK
Offside = right/driver/road- side in the UK
On The Spot **(OTS)**
Original Equipment Manufacturer **(OEM)**
Road Accident In Depth Studies **(RAIDS)**
Transport for London **(TfL)**
TRL Limited **(TRL)**
Truck Crash Injury Study **(TCIS)**
Vehicle and Operator Services Agency **(VOSA)**
Vehicle Restraint System **(VRS)**
Vulnerable Road Users **(VRUs)**

1 Executive Summary

Transport for London (TfL) is working through a programme of research designed to develop a Bus Safety Standard (BSS) with the objective of reducing the frequency of collisions involving buses in London and the associated bus casualties. This report is the first phase of that research and is focussed on examining casualties involving buses and their potential countermeasures in detail.

Data from Stats19, the Police Fatal Archive (police fatal files) the Road Accident In Depth Studies (RAIDS), and the Heavy Vehicle Crash Injury Study (HVCIS), plus research and evidence from literature, stakeholders, and experts in the field, have all been combined to examine bus collisions. The first step was to analyse the distributions of bus collisions, their configurations, circumstances, and the associated casualties. According to Stats19, around two-thirds of injuries occur on buses without a collision; for example from slips, trips and falls. Bus operator data supplied to TfL indicates this is even higher at 76%. Whilst the focus of this work is on the casualties occurring from collisions, the countermeasures proposed for the BSS do overlap. In collisions involving buses, bus occupants are the most frequently injured. However, in bus collisions, pedestrians account for the greatest share of fatalities and serious injuries. The pedestrians involved are mainly crossing the road from the nearside, leaving only a very short time available for the bus driver to react. Overall, collisions involving buses show a declining trend in frequency, both at UK and European levels, and the Bus Safety Standard will help to continue this reduction in collisions and casualties.

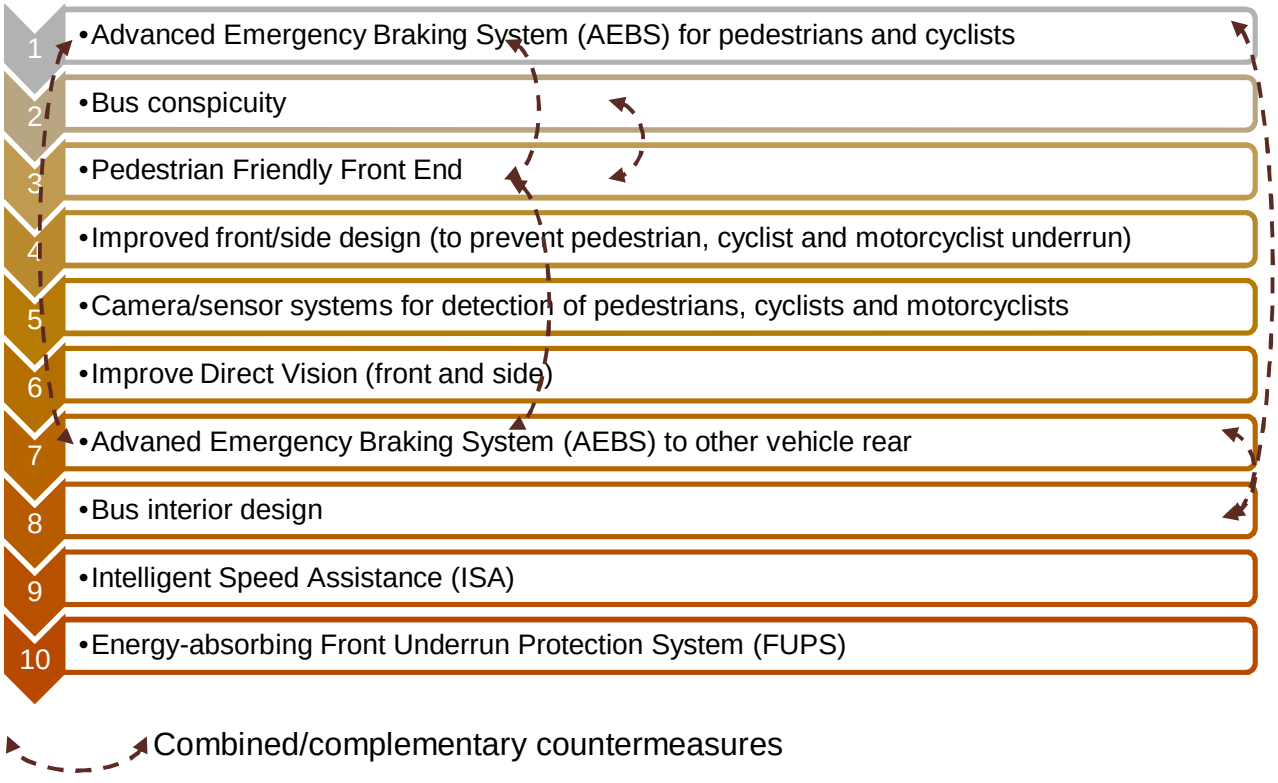
The second step was to then use the in-depth collision details to assign, using engineering judgement, countermeasures that might help to avoid or mitigate the severity of each collision. The approach was based on the Haddon matrix and assigned countermeasures in the pre-crash and crash phases. Causation factors and Countermeasures were classified as related either to the vehicle, human or environment. The causation factors were mainly human or environmental, because vehicle based causes such as defects or blind spots were rare. However, the countermeasures assigned were mainly vehicle based. There are a number of reasons for this but it is at least in part because where human error was involved in the cause of the collision, it was most frequently on the part of a pedestrian or other road user rather than the bus driver. Thus, any behavioural countermeasure applied to that group must effectively be applied to the whole population and would be difficult to target specifically at the bus problem (i.e. pedestrians also walk out in front of other vehicle types too). It would normally be expected that ‘human’ countermeasures would be targeted at the bus driver. However in these most common pedestrian situations, there was little extra the bus driver could reasonably be expected to do to avoid the collision.

Finally, the countermeasures that had been assigned were then analysed to quantify the number of fatalities that they might prevent and to develop a prioritised list of countermeasures to be considered as part of the Bus Safety Standard.

The countermeasure with the greatest count of relevant cases was Advanced Emergency Braking System (AEBS). It is important to note that the full list included detailed notes about potential countermeasure effectiveness, and where any

countermeasures should be implemented in combination with others. For example, it was proposed that AEBS should be implemented alongside improved interior design of the buses, in order to provide the best protection for any standing occupants that might be at risk of injury during pre-crash braking. Also, AEBS should be implemented in combination with pedestrian friendly front end structures, particularly on the front corners of the buses, such that should the AEBS fail to detect a pedestrian in time to avoid a collision, then protection could be provided to help mitigate the severity of any injuries. It is also important that any AEBS should be designed to minimise false activations, and to control/minimise any repair and calibration costs.

The priority list represents the top ten bus coumtermeasures recommended for the BSS, and is summarised below. These were prioritised on the basis of: numbers of fatalities (combined from a range of sources), system effectiveness and system applicability, with the final list ordered by the frequency count for the police fatal files becasue this was judged most relevant for the BSS. The arrows on the priority list below indicate combined/complementary countermeasures that address the same collisions, or in the case of bus interior design and AEB, those that might be considered as part of the risk migation straetgy for standing passengers. In addition, if changes are made for the sake of bus conspicuity, then front end design might be affected, so these two measures are also combined. ISA is relatively low on the list because there were few cases where excess speed showed up in the small sample of 48 police fatal files; however, it has been mandated on the basis of trials showing that it is effective in reducing speeding.



In terms of reducing fatalities in London the prioritised list indicates that AEBS, improved bus conspicuity, and improved pedestrian friendly front end design are the top three measures. The next phase of the BSS by TfL is a program of work to develop the test procedures required to assess the measures, to alter the Bus Vehicle Specification text and produce relevant guidance notes, and to develop the business cases and a road map for implementation of the measures. The BSS is an extensive program of work to be implemented by TfL and will require collaborative engagement and support from the bus manufacturers and operators as changes are made to buses in order to reduce fatalities on London's roads.

2 Introduction

Transport for London (TfL) has decided to implement a Bus Safety Standard as part of their strategy to reduce collisions involving buses and to mitigate the severity of injuries. This will control parts of the design and specification of the vehicles, including elements of primary, secondary and tertiary safety. Primary safety is concerned with preventing a collision from occurring (or reducing its severity); for example by reducing speed, braking or steering to avoid a collision. Secondary safety is focused on preventing or reducing the severity of injuries in a collision; for example with improved restraint design, or softened structures. Finally, tertiary safety is concerned with getting help to injured parties as quickly as possible in order to improve injury outcomes.

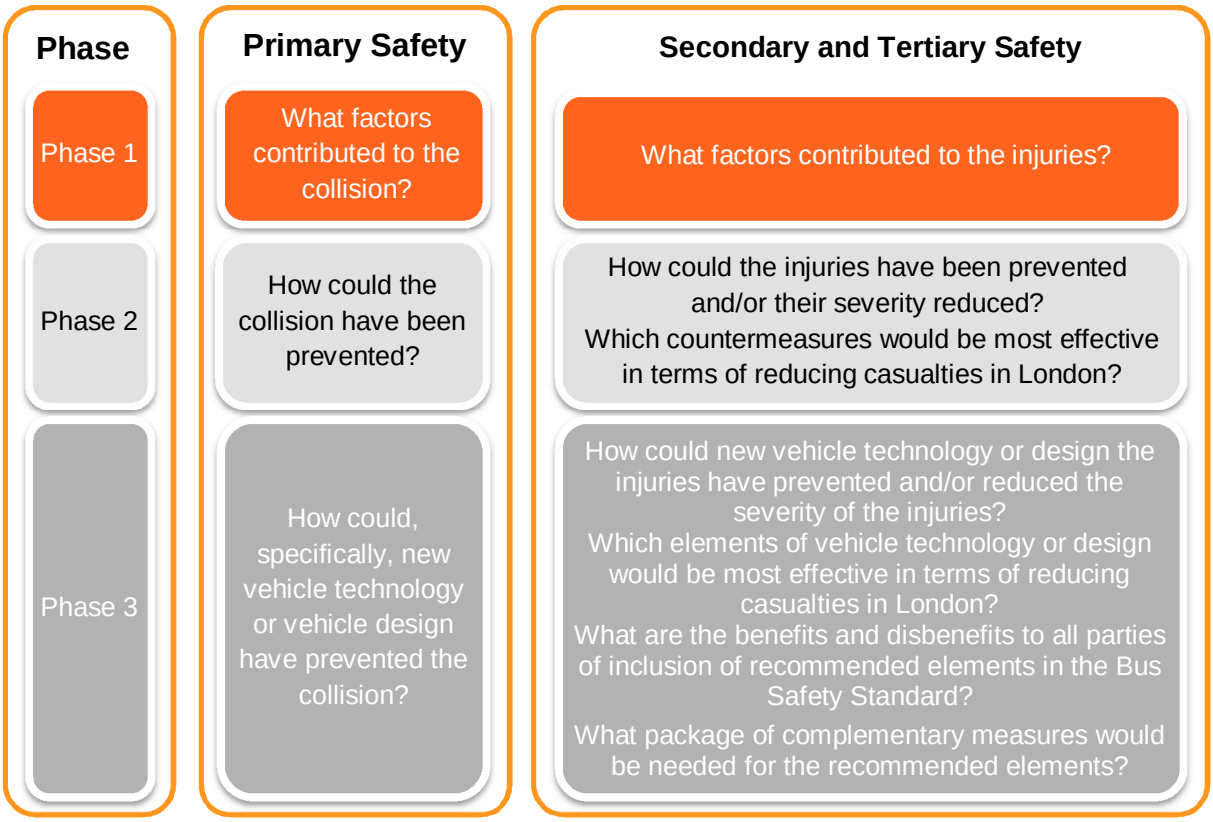
This report sets out the evidence being used to inform the first stage of TfL's work to develop a new Bus Safety Standard (BSS). The report provides the evidence base for robust recommendations to define the vehicle safety interventions that will be integrated into new buses in order to improve bus safety. The BSS is planned for implementation from December 2018 so that all new buses introduced after that date will meet or exceed the Standard.

Where feasible, the data considered injuries of all severities, including slight injuries. However, due to the nature of the datasets available (e.g. police fatal files), the findings were focussed on the fatalities associated with bus collisions. The data was analysed to understand how the accidents and casualties could be most effectively avoided or mitigated. This was achieved by examining the frequencies of countermeasures applied to the collision sample.

2.1 Work Plan

The research into bus collisions and the relevant countermeasures was split into three phases. The first phase was concerned with defining the factors that could have contributed to the collisions. The second phase examined how the collision might have been prevented or mitigated by primary safety countermeasures, or how the injuries might have been prevented or reduced by secondary safety countermeasures; and which of these countermeasures would be most effective in London. The third phase was concerned with vehicle design and technology countermeasures and which of these might have prevented or reduced collisions and injuries. The phased research is described below in Figure 1.

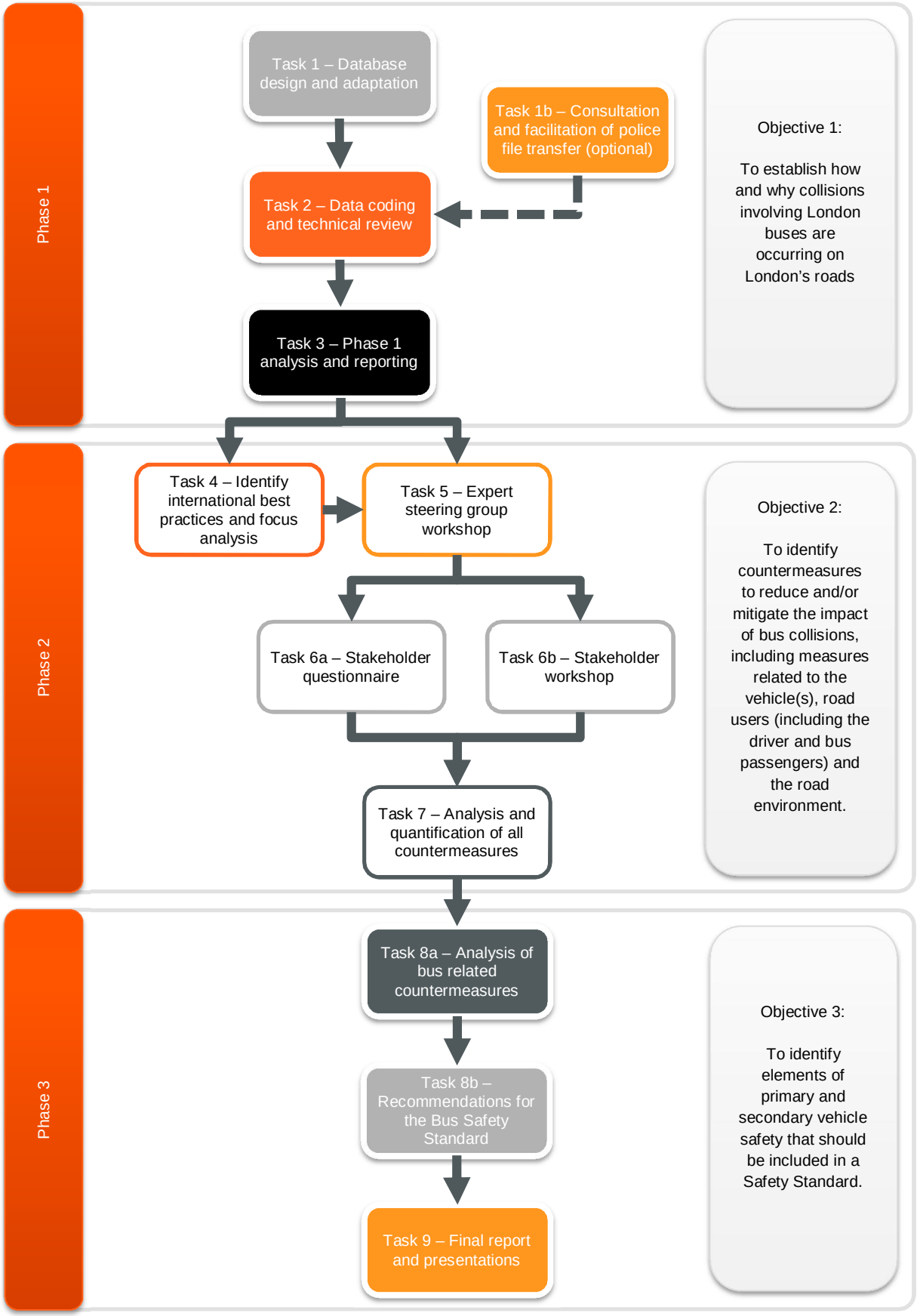
Figure 1: Three phases of research into bus collisions and casualties, and the relevant countermeasures for buses in London.



The methodology is based on the successful delivery of research performed in previous projects for TfL examining pedestrian collisions (Knowles *et al.*, 2012) and motorcyclist collisions (Smith *et al.*, 2013) and has proven to be appropriate and robust. However, buses are unique vehicles in terms of their primary and secondary safety risks. For example, they almost exclusively operate on set routes in generally urban environments in London, making frequent stops at designated points on the route and are exposed to a different combination of risk factors compared to other road users. Furthermore, their secondary safety risks are unique as they can have high numbers of unrestrained and standing occupants; plus other features such as stairs, which are a feature rarely found on other vehicles.

As a result, the causation factors for these collisions occurring in London are very different to other collision and vehicle types and the primary and secondary safety countermeasures are likely to be highly specialised and unique to buses. In previous and ongoing in-depth collision studies, TRL has investigated in excess of several hundred buses and coaches involved in fatal collisions as a part of Road Accident In Depth Studies (RAIDS), the On The Spot (OTS) study, and the Heavy Vehicle Crash Injury Study (HVCIS). Using the experience from these previous studies and incorporating TRL's in-depth collision research expertise has provided an improved methodology to address the added complexities of buses with respect to vehicle design, potential countermeasures and collision dynamics. Specifically, Figure 2 presents the methodology applied:

Figure 2: Project task breakdown.



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3 Phase 1: Collision Analysis

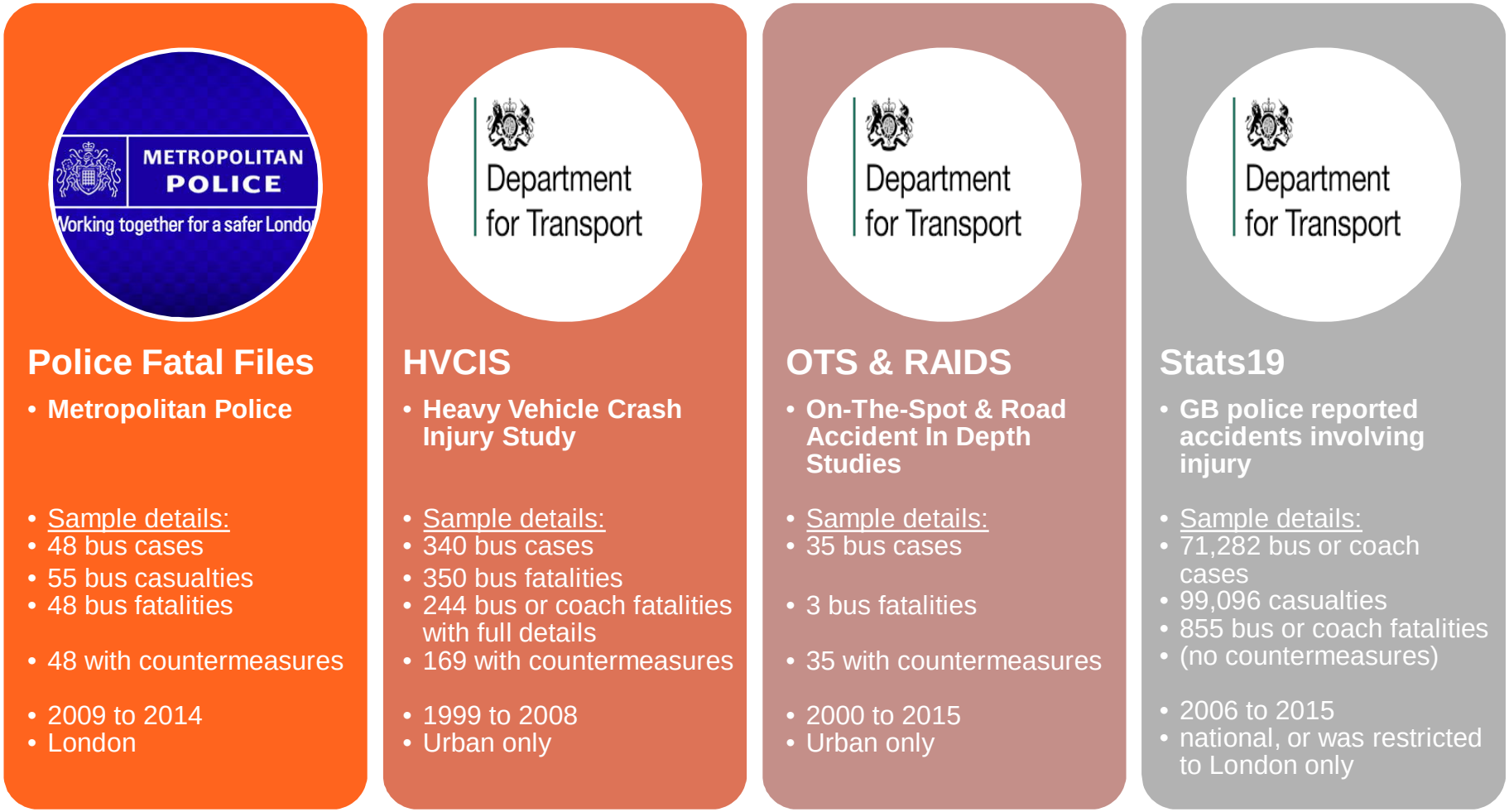
City buses have distinctive characteristics which distinguish them from other vehicle types. These characteristics include their size, routes, travel speed, schedules and frequency of stops (Chimba *et al.*, 2010). Buses are large, often have stairs, often have standing passengers, and often travel near and around pedestrians; that is their purpose in serving customers. However all of these features can contribute to the types of collisions that they are involved in and the injury outcomes. The focus of phase one of this research was to examine the bus casualty and collision data, in order to describe the types of injuries and collisions that buses are involved with in London and GB nationally.

3.1 Methodology

The purpose of this research was to establish what factors contributed to the collision and injuries; phase one of the research. The approach is broadly based on Haddon's matrix (described more fully in section 4.1) which considers the vehicle, human, and environmental countermeasures that can be used in the different phases of a collision to improve the outcome. The approach is broad in order that the countermeasures are not limited to just those applicable to the vehicle or technology solutions.

The process of determining which countermeasures will be effective begins with a full understanding of how a collision occurred. This can be broken down by considering the risks posed by the people, vehicles, and roads. To identify the collision and injury trends for buses there were various datasets available for analysis; these are described in more detail as in Figure 3 and the following sections.

Figure 3: Comparative summary of data sources: Police fatal files, HVCIS, OTS & RAIDS, Stats19.



3.1.1 National Data Sources

Stats19 is Great Britain's database that records police reported traffic accidents[1] (collisions) that result in injury to at least one person (Department for Transport, 2009-2014). The police collect details of all incidents which they attend or become aware of within 30 days which occur on the highway, in which one or more person is killed or injured, and involving one or more vehicles. The database primarily records information on where the collision took place, when the collision occurred, the conditions at the time and location of the collision, details of the vehicles involved, and information about the casualties. Approximately 50 pieces of information are collected for each collision (Department for Transport 2007). Data from 2006-2015 was analysed.

It is important to note that because the collisions are police-reported, the database is likely to be biased toward the more severe collisions. Stats19 does not include the bumps and shunts that occur frequently between vehicles and are only reported to insurers, if at all, and therefore suffers from some under-reporting issues; i.e. Stats 19 does not cover damage only collisions, only personal injury. However, since this analysis is concerned with buses, the under-reporting is likely to be minimal (although very difficult to actually quantify), because the police are more likely to be called when public transport is involved (unless for a very minor collision such as a wing mirror clipping a pedestrian), and because a bus collision is more likely to require the police to assist with traffic management at the scene.

The DfT Transport Statistics GB (2006-2015) is another source of data relating to bus travel. This was used in combination with the Stats19 data to calculate bus collision rates.

3.1.2 Fatal Files

If a fatality or a life-changing serious injury occurs as the result of a road collision, police carry out a detailed investigation. Police road collision files for Greater London are held by the Metropolitan Police Service (MPS). This project involved specific analysis of files held by the Metropolitan Police about fatalities that had occurred in collisions involving buses. There were 48 fatal collision files that were analysed for the period 2009 to 2014 inclusive, which represents the total available. The Collision Investigator (CI) report, scene plans, photographs, witness statements, and Closed Circuit TeleVision (CCTV) evidence were all examined and interpreted. There were 30 post mortems that were also reviewed for investigation.

The evidence from the fatal files was coded into a database by the TRL expert investigators. The database was hierarchical in nature, covering the sections described in Figure 4, noting that the fields described are examples and the list is not exhaustive. The database only recorded anonymous information and no information that identified an individual. Only the factors relevant to describing the collision and

[1] Stats19 specifically uses the terminology 'accidents', however the term 'collision' has been used throughout this report.

subsequent injuries were included. Abbreviated Injury Score (AIS) coding was also used to code the injuries described in the post mortems in a standardised manner by using the internationally recognised 7 digit code to describe the location of injury, type of injury and injury severity. Any countermeasures that could be identified during investigation of the fatal file as being relevant to the case were also noted, along with a confidence in their effect.

Figure 4: Fatal files database structure; example fields.

Environment	•Description, weather, location, road surface etc
Bus Details	•Bus driver, bus description, seating etc
Other Road Users	•Other road user type, description etc
Fatalities	•Injury description, location etc
Contributory Factors	•Contributory factors and indication of the likelihood of relevance etc
Phase	•Pre impact through to collision, vehicle interactions and movements, lines of sight etc
Injury Evidence	•Description of evidence, location
AIS Injuries	•7 digit code describing location, type and severity of injury
Countermeasures	•Selection of relevant countermeasures for human, vehicle, environment and other factors, likelihood of effect etc

The police fatal files database was then analysed. This database is only a small sample of 48 cases, so it is difficult to draw statistically significant conclusions. However, the database does provide considerably more detail on what actually occurred during the collisions, what factors contributed to the causes, and what measures might have had the potential to prevent the collisions or reduce the severity of the consequences. This data has been used both in this section for analysis of bus collisions, and to feed into the countermeasures lists in section 5.1.

3.1.3 HVCIS

The Heavy Vehicle Crash Injury Study (HVCIS), collected detailed information on collisions involving heavy goods vehicles, light commercial vehicles, large passenger vehicles, minibuses, agricultural vehicles and 'other motor vehicles' (OMVs). The project consisted of two main elements:

- Retrospective analysis of police fatal files (HVCIS fatal files) for collisions involving vehicles of interest. The researchers used the detailed information collected by the police to determine potential countermeasures which could have avoided or reduced the severity of the collision.
- The Truck Crash Injury Study (TCIS) which collected detailed information from investigations undertaken by the Vehicle and Operator Services Agency (VOSA) for both injury and non-injury collisions in 15 areas covering England, Scotland and Wales.

The HVCIS bus collision data represented a larger sample than the police fatal files. However it consisted of data relating to older buses, and could only be limited to 'urban' collisions with no mechanism to limit it to London only. This data has been used both in this analysis of bus collisions, and also to feed into the countermeasures lists in section 5.1.

3.1.4 OTS & RAIDS

The On The Spot (OTS) study collected crash data at the scene, enabling data to be collected as soon as possible after the crash had occurred and before vital evidence had been removed. Data was collected for all vehicle types and collision severities (2000 to 2010).

The Road Collision In-Depth Studies (RAIDS) brings together different types of investigation from earlier studies into a single programme, combining existing data with new in a common and comprehensive database. The study began in 2012 and captures data in two types of investigation:

- On-scene investigations are done at the time of the collision while the emergency services are still present - these focus on the vehicle, the road user and the highway issues and can include non-injury crashes and those with relatively minor vehicle damage.
- Retrospective investigations examine vehicles that have been recovered from the crash site having suffered more serious damage and where the occupants have attended hospital due to their injuries.

There were 35 OTS and RAIDS cases involving bus collisions, and with sufficient detail to allow analysis. These have been used to generate the case summaries in section 4.4 to allow a greater understanding of the types of bus collisions occurring and their countermeasures. This data has also been used to feed into the countermeasures lists in section 5.1.

3.1.5 IRIS data

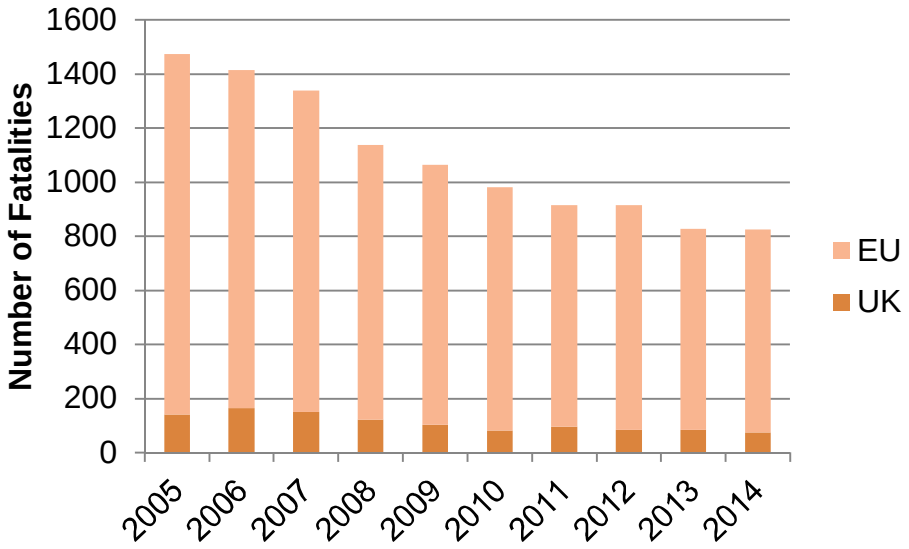
IRIS is TfL's incident management system, made up of bus incidents that are reported directly by bus operators. It covers all incidents, including 'damage only' (where the only damage which occurs is to the bus itself or surrounding objects). The data is published on the TfL website every quarter. All data is gathered from London Bus operating companies using an in-house data logging system which every London bus operating company has access to. Bus companies are required to report incidents regardless of blame and severity. The logging system is intended to provide data for statistical reasons to support safety evaluation. Only initial information relating to incidents is provided to TfL by bus operating companies on a prima facie[2] basis. Incident investigations are carried out by the operating companies involved who retain resultant information. The IRIS dataset combines slips, trips and falls and other personal injury events such as knocks against objects to create separate category called "Onboard Injuries". Data for the year 2016 was referenced from the Bus Safety Data release (Transport for London, 2017); no further analysis or investigation of the data was possible for this dataset.

[2] prima facie = based on the first impression; accepted as correct until proved otherwise

3.2 Bus Collisions in a European Context

Over the ten year period from 2005 to 2014 the number of fatalities involving buses or coaches in both the EU and the UK fell by almost 50% (ERSO, 2016), as shown in Figure 5. This is good progress with respect to the reduction of bus fatalities and the Bus Safety Standard is aimed at continuing this trend.

Figure 5: Number of fatalities in collisions involving buses or coaches. Source: CARE database, data available in May 2016.

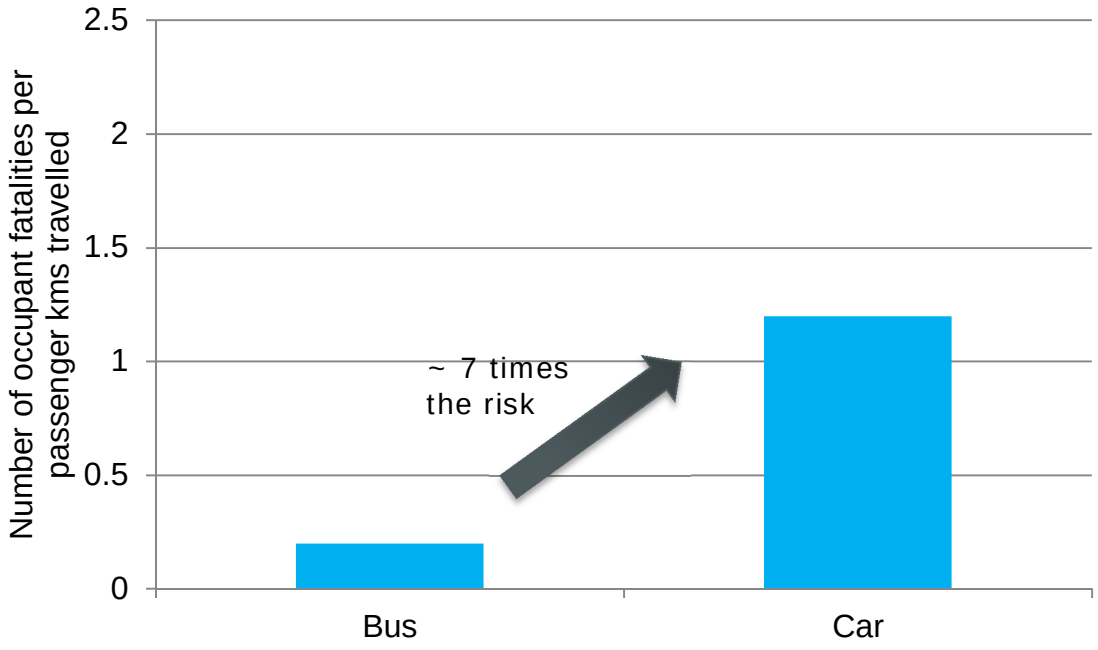


3.3 Bus Collision Rates

An important part of the analysis is to put bus safety into context at a national level by carrying out a risk comparison of buses against other forms of transport. Public transportation is considered to be safer than other motorised modes of transport (Chimba *et al.*, 2010); it is often stated that buses are the safest form of road passenger transport. However the following discussion highlights that using this is perhaps not the case, depending on what measure is used.

By comparing the number of bus occupant fatalities per passenger kilometres travelled for buses and cars, it is shown in Figure 6 that car occupants have a risk approximately seven times greater (per km) than bus occupants. However, it should be reiterated that the above figures relate only to the deaths of the occupants of the specific vehicle considered.

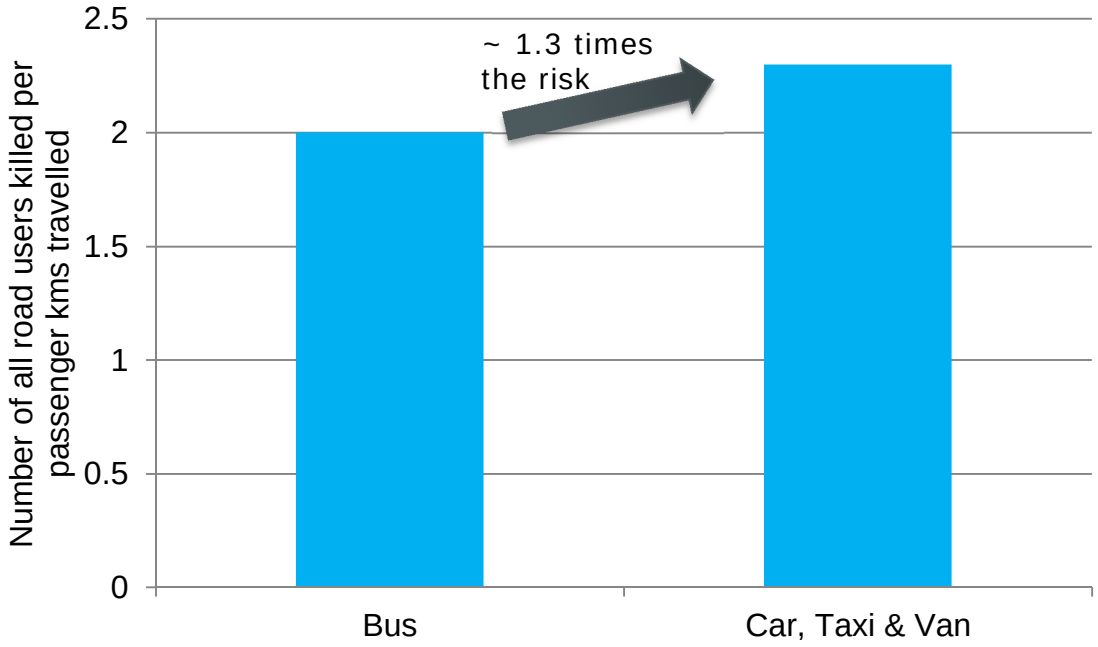
Figure 6: Occupant fatalities per passenger kilometres travelled (expressed in terms of fatalities per passenger kilometre for that vehicle group). Source data: Stats19 (2006-2015) and transport statistics GB (2006-2015).



If the fatalities in the entire collision are considered for each vehicle of interest, then the difference between car and bus travel is much smaller, because it accounts for casualties outside the bus. Considering all fatalities involved in the collision in terms of road user fatalities per passenger kilometres travelled, car, taxi & van collisions have approximately 1.3 times the risk of collisions compared to collisions involving buses. It is important to note here that the data used in Figure 6 and Figure 7 is not directly comparable. This is because Figure 6 is from collision rate data directly published by DfT, whereas Figure 7 (for all road users) is data published on passenger travel combined with analysis of Stats19. The passenger data is only

presented as a combined category of car, van and taxi, so the collision statistics were grouped in the same manner. Therefore, part of the 1.3 times increase in risk is actually due to the inclusion of vans and taxis within the grouping of cars.

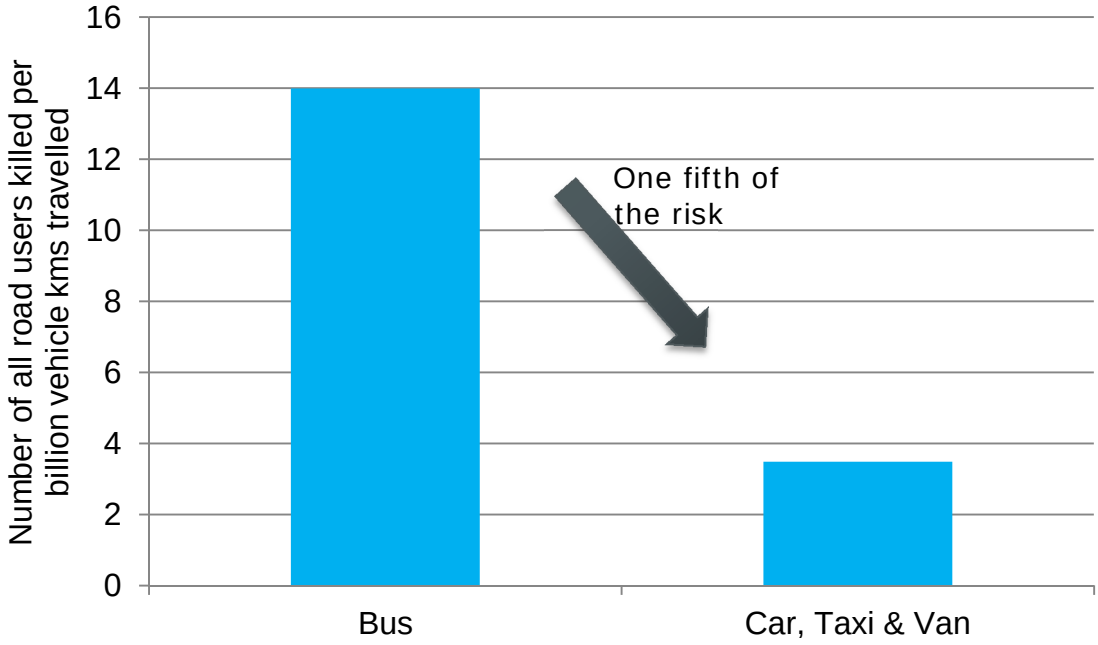
Figure 7: All road user fatalities in collisions involving the vehicle group indicated (expressed in terms of fatalities per passenger kilometre for that vehicle group). Source data: Stats19 (2006-2015) and transport statistics GB (2006-2015).



However, when considering the vehicle kilometres travelled (rather than passenger kilometres), the transport statistics reveal that bus collisions have a greater fatality rate, as shown in Figure 8. As before, this is a combination of the transport statistics with Stats19 collision analysis. The car, taxi and van group have approximately one-fifth of the risk in comparison to buses. Part of the reason that buses have more fatal crashes per kilometre travelled is probably due to factors related to usage/exposure. City buses are all in urban areas at low speeds doing relatively low mileage, yet regularly negotiating complex junctions and interacting with pedestrians, cyclists and motorcyclists. Coaches travel long distances on motorways, but there are relatively small numbers of them on the road, so this motorway use is likely to have a relatively small influence on the overall fatality rate. Part of the reason will also be that buses have more passengers; however analysis of casualty type in Appendix A.2 shows that they are infrequently killed so this is only a small factor.

Viola et al. (2010) showed that the association of buses and pedestrian casualties, although statistically measurable, was entirely a result of exposure to risk. This is because buses tend to operate in environments with the greatest density of pedestrian traffic and operate in bus lanes next to the footway, where pedestrians will step out from; it is this that explains the higher numbers of pedestrian casualties on bus routes.

Figure 8: All road user fatalities per billion vehicle kilometres travelled. Source data: Stats19 (2006-2015) and transport statistics GB (2006-2015).



In a specific London analysis, the Cycle Safety Action plan from TfL indicates that buses have a disproportionate share of the fatal and serious injuries in London, with a ratio of 2.3. Where the ratio is above one, these modes are overrepresented in casualty statistics. This means that they are involved in a large number of collisions resulting in a cyclist KSI relative to their traffic share - although it may be that they are involved in a small number of collisions overall (Mayor of London & Transport for London, n.d.).

3.4 Collision and Casualty Analysis

Appendix A provides the full details of the analysis of collisions and casualties in London; this section provides a brief overview of the findings.

On a national level, statistics for GB show that casualties from bus collisions are reducing. Considering only bus fatalities, this group are reducing only fractionally less in London than nationally. Making a similar comparison between London and GB, the reduction in casualties from collisions involving buses is much lower (13%) than for the national equivalent (38%); mainly due to a substantially smaller reduction in slight injuries which represent the bulk of the injuries occurring.

Both nationally in GB and in London, when bus collisions occur they most frequently result in injured bus occupants. However, when considering the fatalities only, pedestrians are the most frequently killed in bus collisions. Pedestrians account for around two-thirds of the fatalities in bus collisions in London.

When pedestrians are killed in collisions with buses, detailed analysis of accident reconstruction databases reveals that they are most often killed when crossing the road. In the majority of cases the pedestrian collides with the front of the bus, when crossing from the nearside[3]. The expert accident investigators were able to reconstruct the collisions (where sufficient data was available) to enable and understanding of the precise timing of the collision. For a vehicle the speed and distance are the most important factors; but because a pedestrian can change direction and move off from stationary very suddenly, the reaction time is the most important factor for whether a system might be effective. The time to collision is often very low (less than a second), for example in the case when a pedestrian steps out from the kerb. However, in about 40% of the police fatal files, the pedestrian became visible more than 1 second before impact; which is potentially within the operational scope of Advanced Emergency Braking (AEB); more information on AEB is given in section 4.2.1.1.

After pedestrian fatalities, the car occupants are the next largest fatality group in bus collisions. Car occupants are also most often killed in impacts with the front of the bus. From the sample of detailed accident cases that were reconstructed, belt usage by the car occupant is an important factor for these crashes.

It is also very important to note that, according to Stats19, over half the injuries on GB buses occur without a collision. For London this is even higher, with over two-thirds of injuries on buses occurring without a collision. The IRIS data from TfL shows an even higher proportion of injuries occurring without a collision, at 76%. The Stats19 data revealed bus occupants were recorded as either standing, seated, alighting or boarding at the time of their injury, and in London the majority were standing at the time of their injury.

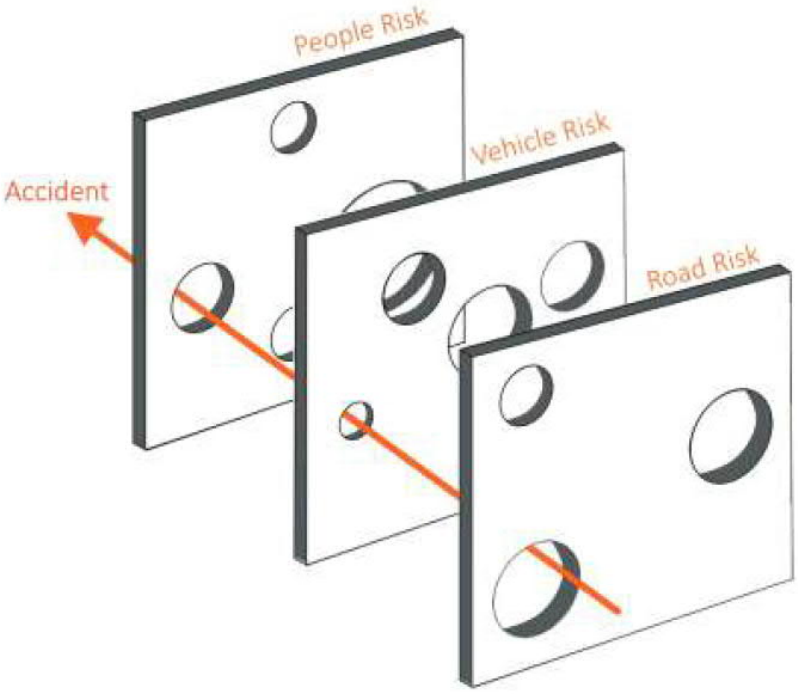
[3] **Nearside** = left/passenger/kerb- side in the UK

3.5 Collision Causation

Collision causation is a complex topic; there are typically many factors that contribute to the occurrence and severity of a collision. The particular combinations of circumstances combine in time and space to cause a collision. Without any one of the contributing factors, the collision would not happen. Indeed, most drivers have experienced first-hand, circumstances that have not led to a collision, but could have done so had the situation been only slightly different.

Another way to visualise this issue is by considering the 'Swiss cheese model' of hazards first proposed by Reason (1990), as shown in Figure 9. This model proposes that failures (in this case collisions) occur only when all specific risks align to result in a collision. If one aspect is not conducive to the occurrence of the collision, it is prevented.

Figure 9: Swiss cheese model of collision causation. Adapted from (Reason, 1990)



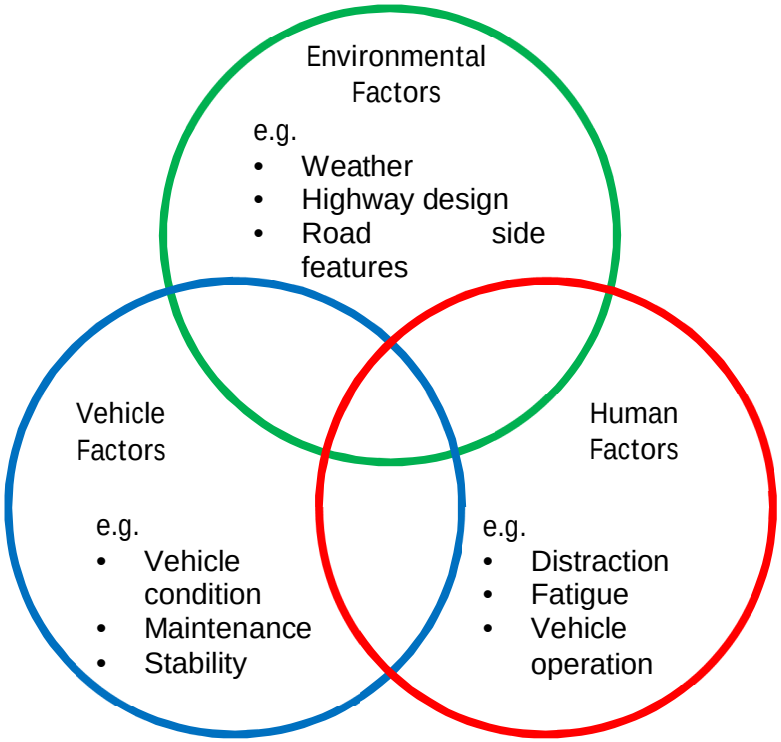
The majority of collisions have multiple causation factors. These causation factors can be grouped according to whether they relate to the human (driver), vehicle or road environment as displayed in Figure 10 and the factors may also be overlapping. These causation factors provide a useful way to analyse the high-level causation factors associated with a collision.

Road users are continually subjected to a combination of these people, vehicle or road factors. A collision occurs when a factor, or combination of factors in any category, influence a road user (or group of users) with the result that a collision occurs. The occurrence of a collision and the severity and outcome of that collision

can be influenced by any number of factors at any stage during the collision. Therefore, changing any element of the collision circumstances, or the factors influencing the road users, can completely change the outcome of a collision and even prevent it from occurring.

For example, consider a collision in which a fatigued driver drifts across the centre-line and into the adjacent lane, striking an oncoming vehicle and resulting in a fatal collision. If identical circumstances occur but there was no oncoming vehicle before the driver corrected the lane departure, the collision would not occur. If the vehicle was equipped with a lane departure warning system, the collision may have been prevented despite the oncoming car, or the severity of the contact reduced as the driver reacted to the warning.

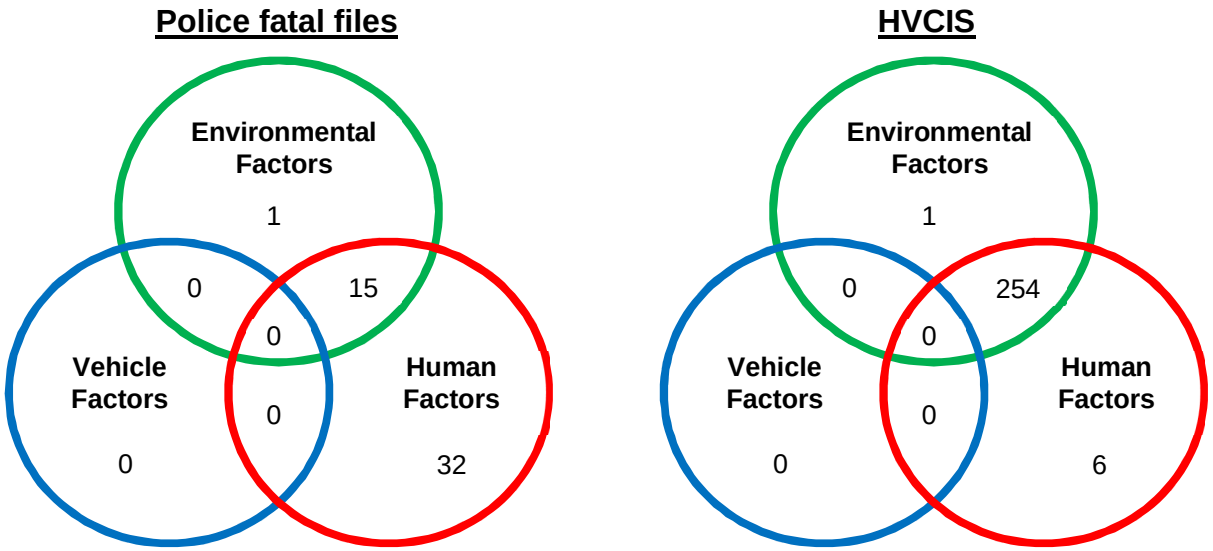
Figure 10: Fatal bus collision causation factors.



The distribution of the frequency of these factors is given for the police fatal files (left) and HVCIS (right) in Figure 11. In both cases there were no vehicle causation factors. For the police fatal files the most frequent causation group was human factors, whereas in HVCIS it was human and environmental combined.

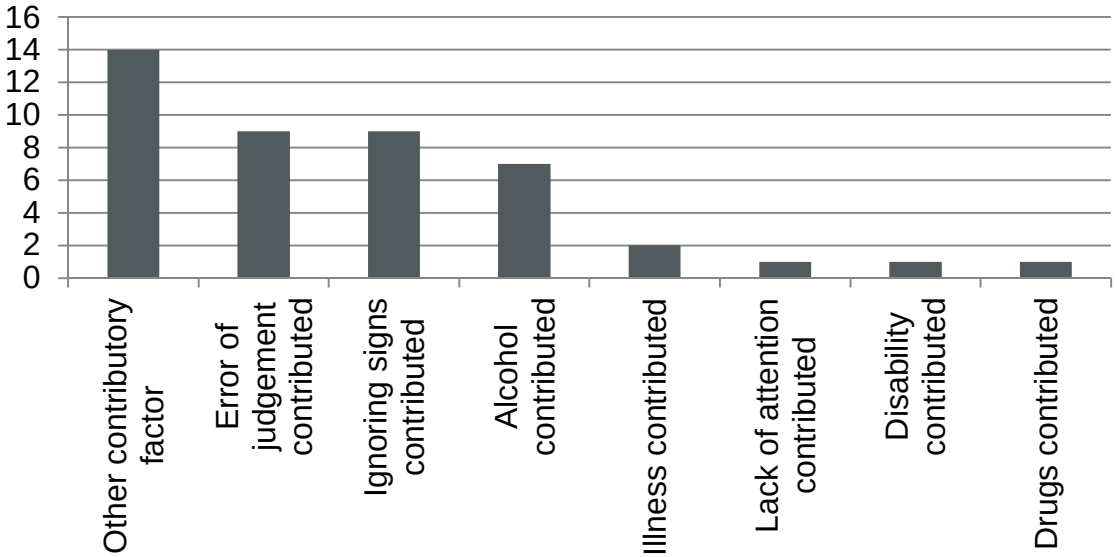
The majority of causation factors for the police fatal files were human factors, with another large group that were human and environmental. There were no vehicle factors contributing to the fatal collisions. The one environmental factor was for an incomplete case with limited information compared to the other files. The factor was low sun and the driver over shot a junction. The human causation factor was coded as unknown, due to lack of information. There were eight cases with the bus driver coded as vision obscured. In three cases this was due to vehicle geometry, three by parked vehicles, two by other objects, and one by sunlight.

Figure 11: Venn diagram classification of causation factors. Source data: Police fatal files (left) and HVCIS (right).



The HVCIS data records 'contributory' factors for a collision. These may be multiple factors that have contributed to the collision, and are similar to the causation factors; however the limitation is that they are given in isolation without links to any evidence or explanation. The analysis of HVCIS data reveals a range of causation factors that were recorded for the bus collisions, as shown in Figure 12 for the human factors only. The 'other' factors were the largest group, but due to lack of information it is difficult to use it to inform the assignment of countermeasures. The 'error of judgement' and 'ignoring signs' groups were the next most frequently assigned groups of human contributory factors.

Figure 12: Human contributory factors. Source data: HVCIS.



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The in-depth reconstruction of the fatal files also allows analysis of the precipitating factors leading up to the collision, as well as the causation factors. The precipitating factor is the main failing that led to the collision, whereas the causation factors may be multiple factors that contributed to why that failing happened. For example, the precipitating factor could be driver distraction, and the causation factor could be that the vehicle drifted out of lane.

3.5.1 Bus drivers

The precipitating factors are described in Figure 13 and for the majority 33 of the 48 police fatal files there were 'none'; i.e. there was no precipitating factor on the part of the bus driver. In fact, for 22 of those 33 cases the pedestrian entered the carriageway without due care. For example, in one case the driver was quickly checking his rear-view mirror, and then when turning back was confronted by a pedestrian stepping into the carriageway from behind an advertising sign on the footway, so the driver had no time to react.

For the remaining 15 cases there was some precipitating factors for the bus drivers, although six of them were 'other'. Failing to avoid a pedestrian/vehicle, and failed to stop were the more frequent of the remaining factors as shown in Figure 13.

Figure 13: Precipitating factors for bus drivers. Source data: Police fatal files.

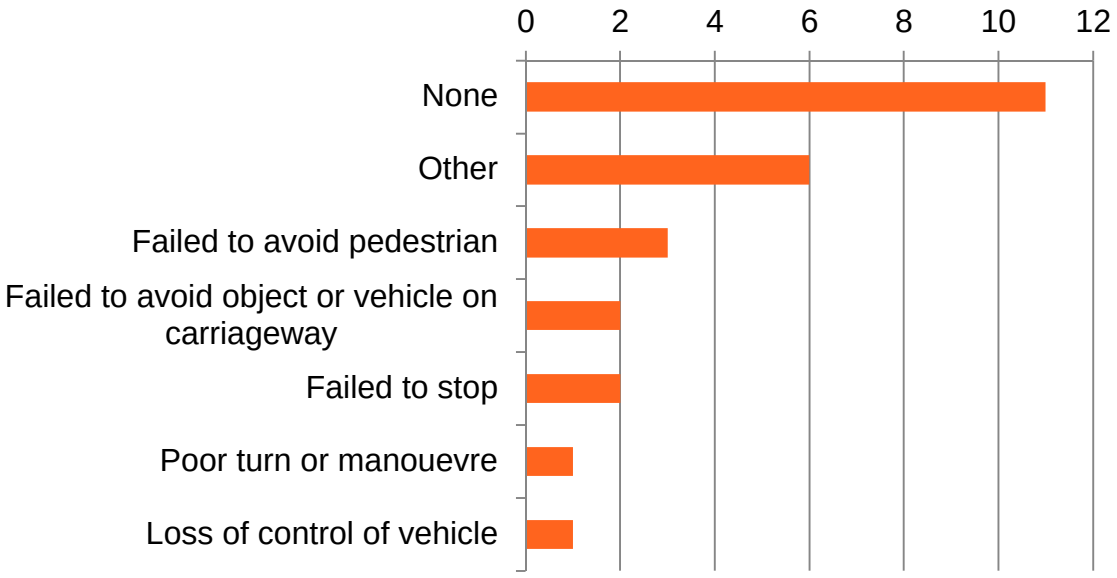


Figure 14: Causation factors for bus drivers. Source data: Police fatal files.

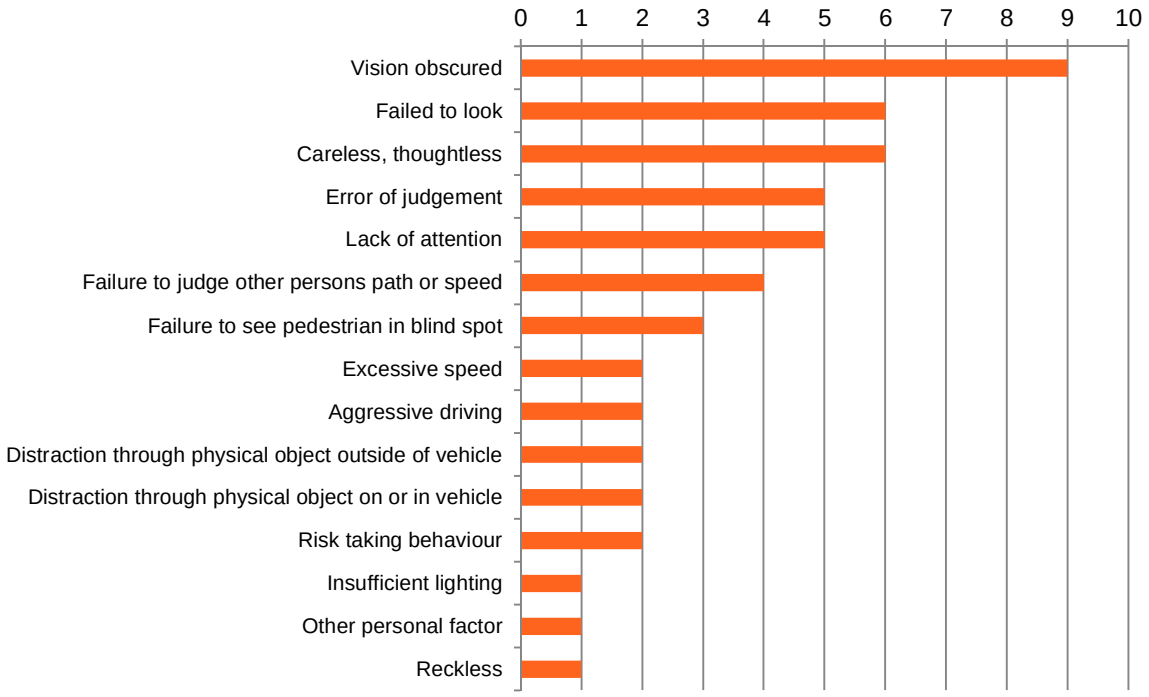


Figure 14 describes the distribution of the specific causation factors where the bus drivers were found to have contributed to the collision for the police fatal files. The most frequent causation factor was obscured vision, with vehicle geometry and parked vehicles being the most frequent cause as previously described. It would appear that an AEB system would be a beneficial countermeasure in addressing the top six of these causation factors, perhaps indicating the importance of AEB as a countermeasure.

3.5.2 Other road users

For the police fatal files, in the majority of the other road user cases the pedestrian entered the carriageway without due care (28 cases) as shown in Figure 15. There were an additional four cases with no precipitating factor as the fault of the driver.

For the causation factors shown in Figure 16 for the police fatal files the majority were concerned with poor judgement in some form by the driver: carelessness, error of judgement, risk taking, lack of attention, failed to look, reckless, alcohol; all these have a frequency greater than 10. Obscured vision is much lower down the list for other road users then for bus drivers, and consists of obscuration by parked vehicles (two cases), other features (two cases) and the vehicle in front (one case).

These cases and their causation factors are more challenging for the Bus Safety Standard to address, because that Standard can only address the buses, and not the other road users.

Figure 15: Precipitating factors for other road users. Source data: Police fatal files.

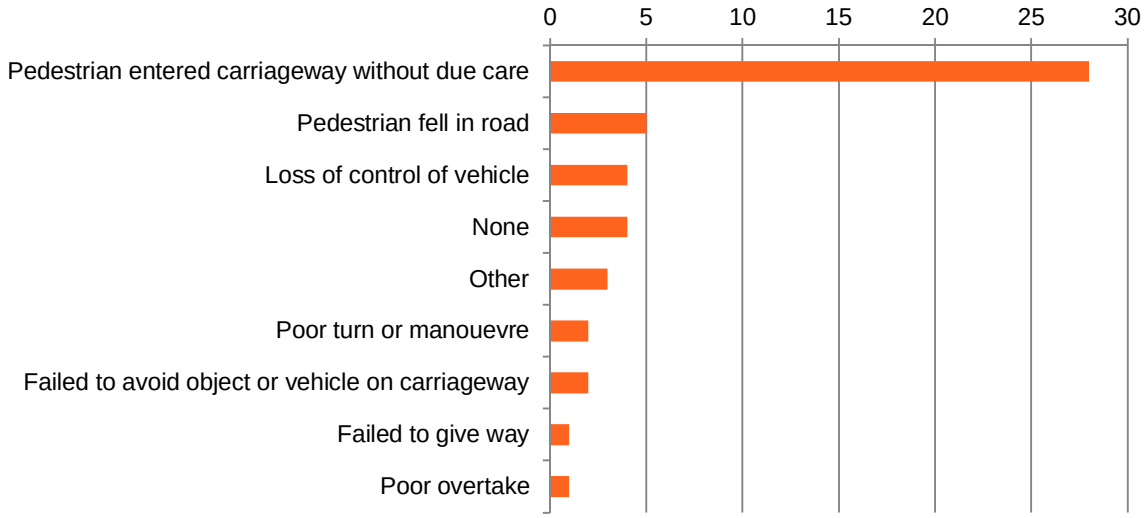
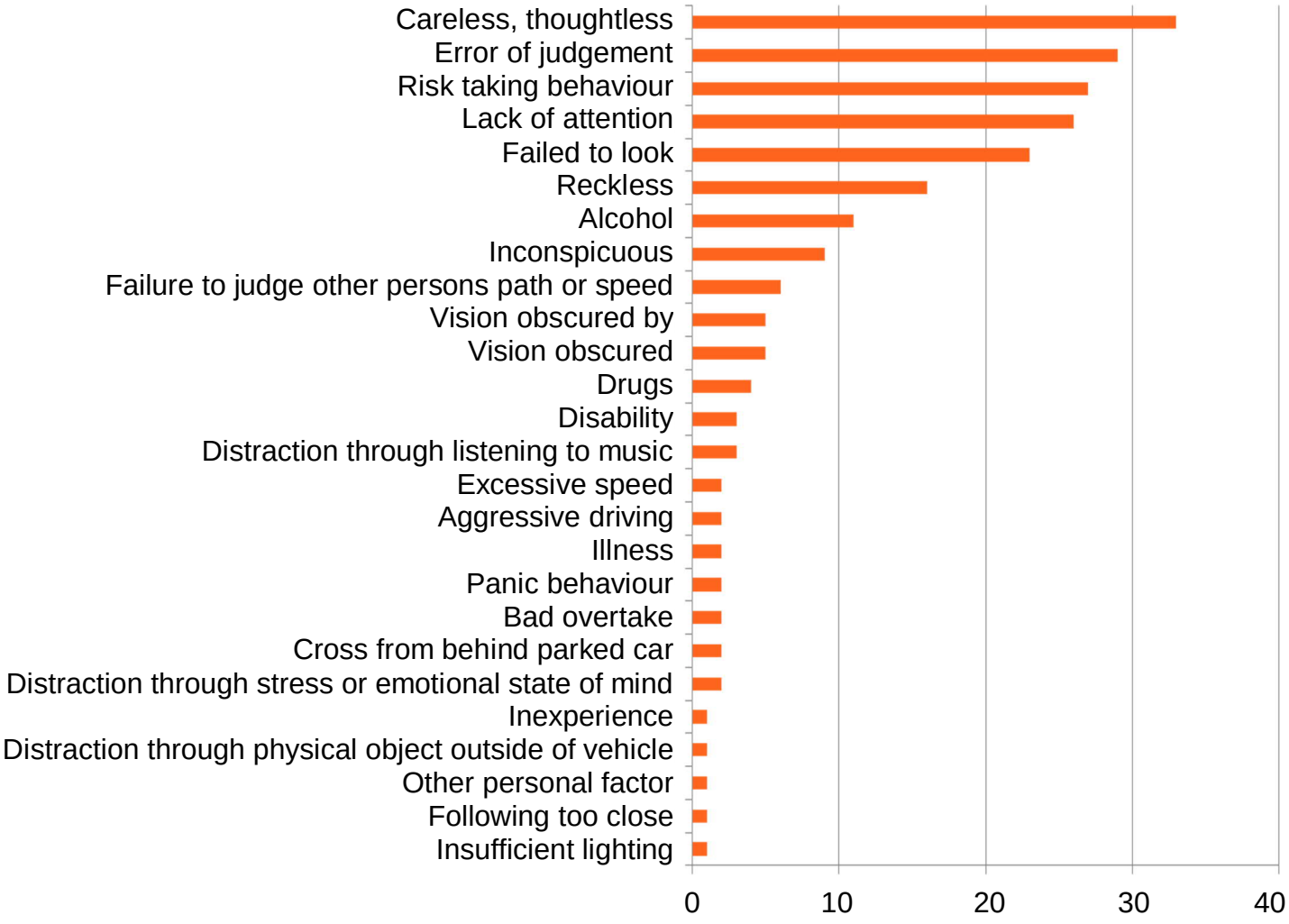


Figure 16: Causation factors for other road users. Source data: Police fatal files.



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3.6 Stakeholder Input on Collision Data

A questionnaire was shared with attendees at the Stakeholder workshop in November 2016. The stakeholders included bus manufacturers and operators. They were given a presentation about the findings in section 3 on bus collisions nationally, and the in-depth investigation of fatal files, alongside some initial work on countermeasures. The questionnaire text was as given in Appendix A. Responses were received from 6 organisations; four bus operators and two bus manufacturers. Half the respondents were prepared for their responses to be published, half were not. Thus, results have not been attributed to any individual respondent and in the presentation of summaries of results; efforts have been made to avoid presenting information that would allow the response to be attributed to a particular stakeholder.

Three of the four operators regarded collisions involving bus occupant injury to be the highest priority for them. Two of the four contributors considered car occupants to be the second highest priority. The explanatory comments showed that this was partly because the respondents were basing their view on the frequency of collisions rather than severity; the ranking provided by stakeholders and described above would be broadly consistent with the objective data for collisions of all severity. However, some responses highlighted the corporate fact that bus passengers were their core business and should be their highest priority. One bus manufacturer followed a similar approach. One bus operator and one manufacturer ranked the problems in line with the frequency of fatalities, with pedestrians most important.

Four respondents cited pedal cyclists as another important group mainly because of their high media profile, complaints from them about bus driving and potential implications for future contracts, rather than the frequency or severity of collisions.

The respondents views on the relative safety of buses and other vehicles and on bus operations in London and the rest of the UK was very mixed and covered the full range. Some thought buses safer than other vehicles; others thought them the same or worse. London was generally viewed as a more demanding environment for buses than most other places but whether this resulted in worse safety, the same, or even better safety was mixed.

Reasons considered for differences in the observed reductions in slight injury collisions in London and the rest of GB were highly varied, including both more or less ‘claims culture’ and/or claims fraud, higher levels of collision reporting in London or other regions, slower speeds in London etc.

In terms of injuries to bus occupants where the bus itself suffered no external impact, respondents generally thought the most important cause was braking in order to avoid a collision, and one respondent broke this down to list the following sub-cases in order of priority:

- Vehicle pulling into the path of a bus
- Pedestrian deliberately stepping in front of a bus to cross
- A pedestrian stepping off the kerb to walk around street furniture
- Cyclists weaving in and out of traffic

In addition to this, the following were also noted as mechanisms

- Bus moving off while occupant was moving to seat/climbing stairs
- Problems when opening or closing doors, getting limbs caught, and tripping up steps
- General slips & trips over steps or wet floors
- Passengers not holding on, or climbing the stairs when the vehicle was in motion

3.7 Summary of Bus Collisions Analysis

This section of the report has examined the bus collision evidence and the following are the key findings:

1) In a European context, bus collisions have reduced by almost 50% in the period 2005 to 2014.
2) Comparing fatalities per billion vehicle kilometres travelled, the group comprising cars, taxis and vans have one-fifth of the risk compared to buses; however exposure and usage differences are likely to be important factors in this difference.
3) GB statistics show that casualties from bus collisions are reducing; fatality reduction on London's buses is only fractionally less than nationally. When only London is considered, the reduction in casualties from collisions involving buses is much less (13%) than for the national equivalent (38%).
4) In bus collisions, occupants of the bus are the most frequently injured casualties.
5) According to Stats 19 over two-thirds of the injuries on buses occur without a collision. IRIS data from TfL indicates that 76% of injuries are onboard injuries.
6) Pedestrians are the most frequent bus fatalities accounting for around two thirds of the fatalities in London.
7) Pedestrians are most often killed by buses when crossing the road, and most often in collisions with the front of the bus crossing from the nearside. The time to collision is often very low (less than a second), but in about 40% of the police fatal files the pedestrian became visible more than 1 second before impact; potentially within scope of AEB.
8) Car occupants are also most often killed in impacts at the front of the bus; belt usage by the car occupant is an important factor for these crashes.
9) Human and environmental factors were the most frequent causation factors.
10) In over half the police fatal files assessed, the bus driver was not assigned a precipitating factor because the pedestrian entered the carriageway without due care. However in other cases the drivers failed to avoid a pedestrian/object/vehicle or failed to stop.
11) Loss of control of the vehicle was the biggest precipitating factor for the car occupant fatalities in the police fatal files.

4 Phase 2: Identification of Countermeasures

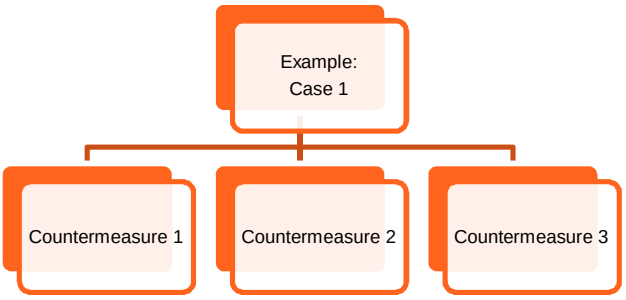
4.1 Methodology for assignment of countermeasures

The process of determining what countermeasures will be effective begins with a full understanding of how a collision occurred. This can be broken down by considering the risks posed by the people, vehicles, and roads. A risk from any of these areas can allow a collision to happen, so reducing the risk involves identification of countermeasures that will address those specific aspects of the collision.

Haddon's Matrix is the most frequently used concept in the injury prevention domain, and it is summarised in Table 1 below. This considers the vehicle, human, and environmental countermeasures that can be used in the different phases of a collision to improve the outcome. The approach is broad in order that the countermeasures are not limited to just the vehicle or technology solutions. The countermeasures were based on existing and near-future technologies and strategies. Investigators assigned countermeasures to each case based on their ability to avoid the entire collision, and/or to reduce the severity of the collision. A key point is that the assignment of countermeasures was an indicator of potential effect in describing a maximum count of relevant cases; it was not designed to represent the precise expected performance of a given system. For example, there are many different AEB solutions available with different performance capabilities such that the counts do not represent these precise systems and their individual expected effects; instead the counts represent a 'flag' that an idealised AEB system had the potential to improve the outcome of the collision.

Table 1: Haddon's matrix approach to assignment of countermeasures in a road collision.

	Human	Vehicle	Environment
Pre-Crash	Improved driver training Driver awareness	Better maintenance Primary safety (e.g. AEBS, ESC, Alco-lock)	Improved road surface Improved highway layout/design
Crash	Use of safety systems (e.g. helmet or seat belt)	Secondary safety Presence & performance of safety systems	Road side hazards Barrier performance
Post-Crash	Incident response eCall systems (e.g. Vauxhall OnStar)	Fuel system Safety pyrotechnics Vehicle design standards	Infrastructure performance (e.g. access for emergency services)



It is also important to note that there can be multiple countermeasures assigned per case, and these may be from the same or different categories (human, vehicle, and environment) too. There may also be more than one injured person per case that might benefit from the implementation of a countermeasure.

4.1.1 Experts Steering Group

In order to examine the relevant countermeasures (phase two of the research), an Experts Steering Group was established. The Experts' role was:

- to review the countermeasures used in other countries and with other similar vehicle types such as Heavy Goods Vehicles (HGVs)
- to review the countermeasure analysis performed in Phase 1
- to make recommendations of cross-domain countermeasures that could be applied to the types of collision that were identified from Phase 1
- to review any other countermeasures based on our experts' knowledge of the effectiveness of various countermeasures
- to highlight areas of understanding that are missing in the evidence provided

Safety interventions have been considered for buses, other vehicles (including pedal cycles) and surrounding infrastructure through reading appropriate literature, discussions of the Experts Steering Group, and analysis of the cases. The following section considers countermeasures that are technologically ready now and also those that could be feasible in the future.

There are several stages before a collision occurs where different safety systems can intervene. In Table 2 examples of vehicle safety interventions for both buses and other vehicles have been categorised according to what time in a collision sequence they prevent the occurrence or mitigate the damage of a collision. These examples and more have been described in further detail in the following section.

Table 2: Safety Systems in a collision sequence. Source: adapted from Flodström and Strömberg (2011)

Phase:	**Preventative**	**Dynamic**	**Avoidance**	**Mitigation**	**Impact**	**Post Crash**
Sequence:	Normal Driving	Danger phase	Collision Imminent	Collision Unavoidable	Collision	Post-collision
Activity:	State of driver and situation	Driver can avoid	Vehicle can avoid	Minimise severity	Minimise damage/injury	Rescue and save
Countermeasures:	Alco-lock Driver alertness/ drowsiness monitoring Improved direct and indirect vision Night vision Intelligent Speed Assistance **(ISA)** Passenger seatbelts Softer internal bus structures Advanced Driver training Improvement of bus stops Improvement to junctions	Pedestrian warning Vehicle collision warning Bridge collision warning	Advanced Emergency Braking (AEB) AEB for pedestrians and cyclists	AEB Pedestrian and cyclist AEB	Airbag Belt tension Softer front end Nosecone structure Underrun airbags	E-call Bus raising system Improved injury awareness

4.2 Vehicle Countermeasures

The vehicle countermeasures identified in this research are from a range of sources including:

- Literature review – with evidence included where possible;
- Expert Steering Group – with experience and expert opinion described;
- Experience from other vehicles – e.g. experience of a system on cars or HGVs that can be learnt from; and
- 'blue sky thinking' – ideas for the future that are perhaps not yet implemented, but that could be considered for BSS in later phases.

4.2.1 Vehicle Countermeasures in the Pre-Crash Phase

4.2.1.1 Advanced Driver Assistance Systems (ADAS)

Collision Warning Systems

Collision warning systems use camera or radar technologies to alert the driver to a potential collision with a pedestrian, cyclist or other vehicle with the intention that the driver reacts and avoids the collision.

TRL carried out a study into the detection of pedestrians and cyclists near buses and evaluated two detection systems. The first utilised both radar and camera technologies in order to detect cyclists undertaking the rear quarter of the bus. The second system used cameras and image processing algorithms to detect both pedestrian and cyclists and had a wider detection area, covering both the nearside and front of the bus. TFL is in the process of developing a test procedure to categorise similar systems fitted to HGVs and to rate their performance; the conclusions would likely be relevant to buses too, however the work is as yet unpublished.

As part of the Active Safety Collision Warning Project, Washington State recently equipped 38 transit buses with the ROSCO-Mobileye Shield+ System to help drivers avoid and mitigate imminent collisions and protect pedestrians and cyclists. This Collision Avoidance System (CAS) offers a variety of features including pedestrian and cyclist collision warning, forward collision warning, headway monitoring warning, lane departure warning and a speed limit indicator. Dashboard alarms flash when pedestrians enter into the driver's blind spots. The project will involve comprehensive examination of the total costs of the most severe and costly types of collisions and will evaluate potential for CAS to reduce the frequency and severity of these types of collisions, and reduce the associated casualty and liability expenses. Preliminary analysis has shown that the potential exists for the cost of equipping an entire bus fleet with collision avoidance technology (CAS+AEB) to be recovered by preventing one pedestrian or bicycle collision (Lutin, 2016). Alternatively, if the system were to reduce the risk of collisions by 35%, the cost of it would be recovered in one year (Washington State Transit Insurance Pool, 2015). Data from the five-month trial

period is currently being analysed by the Smart Transportation Applications and Research Laboratory at Washington University.

Mobileye technology is currently being used on trucks in Ealing Council as part of the Cycle Safety Shield System. During trials the Safety Shield System was found to have potentially stopped 15 serious collisions happening between a HGV and pedestrians and cyclists (Slobodova, 2016). Ealing Council has since rolled out the collision avoidance system across its whole contractor fleet (Ealing Council, 2016). The system is also being successfully used on a number of other UK fleets, including the Amey Group's vehicles and Sainsbury's supermarket delivery trucks. As part of the European Road Safety Pilot Project Richmond Council and Ealing Council have partnered with Cycle Safety Shield to trial incident prevention software. The preliminary results of this project have been released in the form of safety score graphs which have shown an improvement across all vehicle types, however, there is no information at this time on how this score is calculated or what raw data it is formed of (SafetyShieldSystems, 2017).

The majority of collision warning systems alert only the driver to a potential collision. A team from the University of Pennsylvania are developing a system that also alerts pedestrians that they are in danger of being hit by a bus. The system is comprised of a directional speaker, projecting an audio warning from the bus towards the pedestrian (Burka *et al.*, 2014). It activates automatically and is not driver activated or on all the time.

Bridgeclear offer an integrated bridge warning system for buses which utilises the driver's CCTV monitor to display warnings of low bridges. To ensure the driver is not distracted by unnecessary warning the system will only display bridges which are lower than the height of the bus (BridgeClear, n.d.).

Collision Avoidance Systems

Signals from the collision warning systems can be used to trigger systems such as Advanced Emergency Braking (AEB) or Automated Emergency Steering (AES) to allow the vehicle to automatically avoid a collision event.

AEB systems utilise radar, camera and/or LIght Detection And Ranging (LIDAR) based technology to avoid collisions or to mitigate the impact by detecting imminent collisions and applying the brakes automatically. As yet AEBS is not available on buses; it is mainly fitted on cars and some vans, and AEBS is just entering the HGV market too. The first implementation on cars was for RADAR based systems, and these typically have a long range (e.g. 120m-200m) meaning that they can operate over a wide range of speeds up to 75mph or 120km/h. On cars, the LIDAR systems have a shorter forward range so these systems are only operational in lower speeds (e.g. up to 31mph or 50km/h). More advanced systems include pedestrian and sometimes cyclist detection, and these typically use cameras on cars in order to identify a pedestrian. The cameras may be used in isolation or used in 'sensor fusion' with a RADAR for example. RADARS are typically mounted in the front of the car, behind the grille or bumper cover; whereas a LIDAR or camera system is mounted in the cars front windscreen near the rear view mirror. The fitment of these sensor does incur some additional repair costs, which may be a factor to consider for bus operators. If the sensor is damaged in a crash situation where AEB is not relevant

(e.g. during parking when AEBS is typically not active under 3mph or 5km/h), then the additional cost of repair and calibration is incurred. Similarly, if a stone chip means that the windscreen has to be replaced then there must be a suitable process to ensure the correct operation of the AEBS with the new screen. Experience with cars indicates that these sensors can increase costs, but for buses the emphasis should be on implementation of systems and processes designed to minimise and control these costs from the outset.

However the effectiveness of AEB is highly dependent on the situation. Pedestrians and cyclists crossing situations are characterised by much shorter times between the moment when a threat can first be identified and the moment of impact; a pedestrian for example can change direction or move off from standing much more rapidly than a vehicle can. Although slow driver reactions and inattentiveness can be a factor in some crashes, using the system to reduce the reaction time compared to even an alert human driver is one of the main benefits. Thus, it is considered appropriate for an AEB system to react differently to a crossing pedestrian compared with a stopping vehicle ahead. As such, sensors need to be capable of a much greater degree of object classification than is required for front to rear crashes only. Effects will be much smaller where pedestrians are running fast than where walking. Effects will be smaller where obstructions (e.g. emerging from between parked cars) limit the ability of the system to track the pedestrian.

EU regulation 347/2012 (EU, 2013) sets out the requirements for vehicles to have AEB systems installed (although note this is vehicle to vehicle AEB rather than pedestrian AEB). In the past, cost benefit analysis demonstrated that the mandatory application of AEB effective only in vehicle front to rear collisions would generate more costs than benefits on M_3 Class A, Class I and Class II[4], and articulated buses of category M_3 of Class A, Class I and Class II. As a result, buses of over 5 tonnes with 22 or more seated/standing passengers are currently exempt from the obligatory installation of AEB systems.

Bus specific emergency braking systems are emerging as both Original Equipment Manufacturer (OEM) and AfterMarket (AM) solutions. DCS Technologies has developed a Pedestrian Avoidance Safety System (PASS) which is an active safety system that decelerates a vehicle automatically in a potential pedestrian collision event. DCS Technologies claim that the PASS technology will react up to 20 times faster than a human. It is stated that the system can be retrofitted to existing fleets or applied to new purchases. However, they are a US company and the regulatory situation is different in the US. In Europe, applying an AEB system as a retrofit would involve changing a type approved system (the brakes) which would be a notifiable alteration to the vehicle and would require regulatory approval. Effectively, it would have to show that it complied with type approval regulations. It is not known if the system would comply and the process can be burdensome for aftermarket manufacturers.

[4] M3 = Vehicles designed and constructed for the carriage of passengers, comprising more than eight seats in addition to the driver's seat, and having a maximum mass exceeding 5 tonnes. For further detail see Annex II of http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32007L0046.

An example of an OEM product, an Emergency Braking System (EBS) is currently under development by Alexander Dennis. The system has already undergone testing and basic level calibration in an Enviro200 MMC and is expected to go into production by the end of 2017. The system utilises a forward-facing cyclist, motorcyclist, pedestrian and vehicle detector that applies the vehicle brakes automatically (Deakin, 2016).

Some stakeholders have suggested that while AEB has the potential to decrease the frequency and severity of collisions with other vehicles and pedestrians outside of the bus, it may cause added injury risk to bus occupants, particularly those standing at the time of the automated braking activation. From the collision files it has been noted that in one case the driver actively decided to brake conservatively to protect standing bus occupants. Operators say they are apprehensive about adopting AEBS because if passengers are hurt as a result of harsh braking from the system they fear that they, the operator, may be held liable. However, the benefit of the system is in a reduced reaction time between the pedestrian becoming an identifiable hazard and full braking being applied. The system does not increase the maximum level of braking the vehicle can achieve; a driver initiated emergency stop will be just as harsh as the quickest AEB stop. The system is designed to give only the deceleration needed to avoid the collision, so if in an identical situation a human driver applied less braking in order to protect occupants it would result in a collision. Depending on the collision object, this may well be much worse for the occupant than slightly heavier braking. Furthermore if the collision avoidance system can react faster than a human, there is a potential that less harsh braking will be required to avoid a collision. The only unarguable additional risk from AEBS in this context is the risk of occupant injury if the AEBS is falsely deployed; i.e. the bus would not otherwise have been braking at all. If the AEB activates where there is no imminent threat of a collision, then any injuries to occupants will have been directly caused by that false activation. Any risk associated with braking could be mitigated if the bus interior was adapted to further protect the occupants or standing is prohibited. Implementation of the AEBS must focus on minimising the risk of false activations. AEBS is quite mature now on cars, and experience from the Expert Steering Group indicates that false braking activations are very rare, although false warnings occur a little more often. The aftermarket warning only systems on buses for identifying pedestrians and cyclists in blind spots are perhaps showing more evidence of false warnings; however an implementation of AEBS would be required to be more robust and to minimise false activations.

Given that AEBS is not yet implemented on buses on the roads, it would be difficult to make it mandatory on the short term. However a suggestion from the Experts with experience of design and delivery of test and ratings systems is that the BSS might be used to encourage fitment in the short term as an incentive; AEBS could be made mandatory in the longer term.

Adaptive Cruise Control (ACC)

Whilst AEBS is designed to activate in emergency situations, ACC is designed for normal driving. The system regulates the speed of the vehicle to maintain a safe distance from the vehicle ahead, by using acceleration up to a maximum speed limit, combined with braking at low levels. ACC was not coded as a countermeasure by the collision investigators, so it has not been possible to include it in the countermeasures analysis. ACC is often combined with AEBS on cars where is now quite widely available. On cars ACC typically uses a RADAR mounted in the front grille, and as such is also subject to the repair and calibration cost concerns described for AEBS.

ACC on cars typically has at least three distance settings for the distance to the vehicle ahead. Experience from the Expert Steering Group, although not quantified, is that ACC might be beneficial in training drivers to keep a safer distance from the vehicle ahead, and to reduce tailgating behaviour. A further suggestion was that a system could be implement with algorithms tuned to provide a tailgating warning. Further research would be needed to verify the potential effectiveness of ACC for such driver training purposes.

Automated Emergency Steering (AES)

In the future, Automated Emergency Steering (AES) systems could help to mitigate the near side pedestrian impacts that pedestrian AEB might not be able to by adjusting the steering to avoid the pedestrian. Mercedes currently offer an Evasive Steering Assist system which activates when the driver initiates an evasive steering manoeuvre. The system adjusts the steering torque to guide the driver away from danger in a controlled manner whilst also facilitating the straightening up of the vehicle (Mercedes-Benz, 2016). Nissan have developed a future concept of combining AEB with AES to provide an autonomous system that can make the most effective choice between steering and braking to avoid or mitigate the risk of a collision (Nissan, 2016). These types of systems could offer some benefit for collisions at the corners of buses, where there is little time for an AEB system to react, and only a small steering input is required. However, they were not on the countermeasures list for coding, since they are in the very early stages of development, none are available on buses yet and vehicle manufacturer stakeholders have indicated that the lead time for their application to buses would be substantial; therefore they were not included in the priority list (although AES could perhaps be considered in a second phase of the Bus Safety Standard). This technology may benefit from wider lanes on roads to allow the bus more room to steer clear of a pedestrian. However, people do tend to utilise available space, so the risk is that pedestrians might just start walking in the road and using the space that is designed for buses; thereby eroding the benefit.

Intelligent Speed Assistance (ISA)

ISA systems detect the speed limit and either warn the driver when they are driving faster than the speed limit (supportive ISA) or actively aid the driver to abide by the speed limit (intervening ISA). TRL carried out a trial of intervening ISA on two London bus routes at the beginning of 2016 (Greenshields *et al.*), and the driver

could not turn the ISA off. The ISA system was supplied by Zeta Automotive Ltd. and utilised GPS data matched against an on-board map and speed-limit database and electronically intervened to prevent further accelerator input when the speed limit was reached or exceeded. The system was not connected to the vehicle brakes. Results from the trial showed that compliance with the speed limit improved after buses were equipped with ISA and only a marginal increase in journey time was recorded.

Current ISA systems limit vehicle speeds to the maximum speed limits on roads; however this speed may not be suitable for the given conditions. In the future, ISA systems are anticipated to be able to assume or detect the risk on a particular road and then limit the speed of the vehicle accordingly.

4.2.1.2 Improved Field of View

Direct Vision

In some cases, safety features such as thick A-pillars and side mirrors can create blind spots that limit the driver's view; particularly of pedestrians, as shown in Figure 17. The use of smaller mirrors or adjustments to the placement of the mirrors can improve the driver's direct vision.

Figure 17: A bus driver's view of a pedestrian crossing with three different mirror configurations: inverted mount (left); medium mount (centre); high mount (right) (Leverette, 2013).

According to EU regulations buses must be equipped with mirrors but in the future the replacement of mirrors with a camera and display system could further reduce the issue of mirrors creating blind spots.

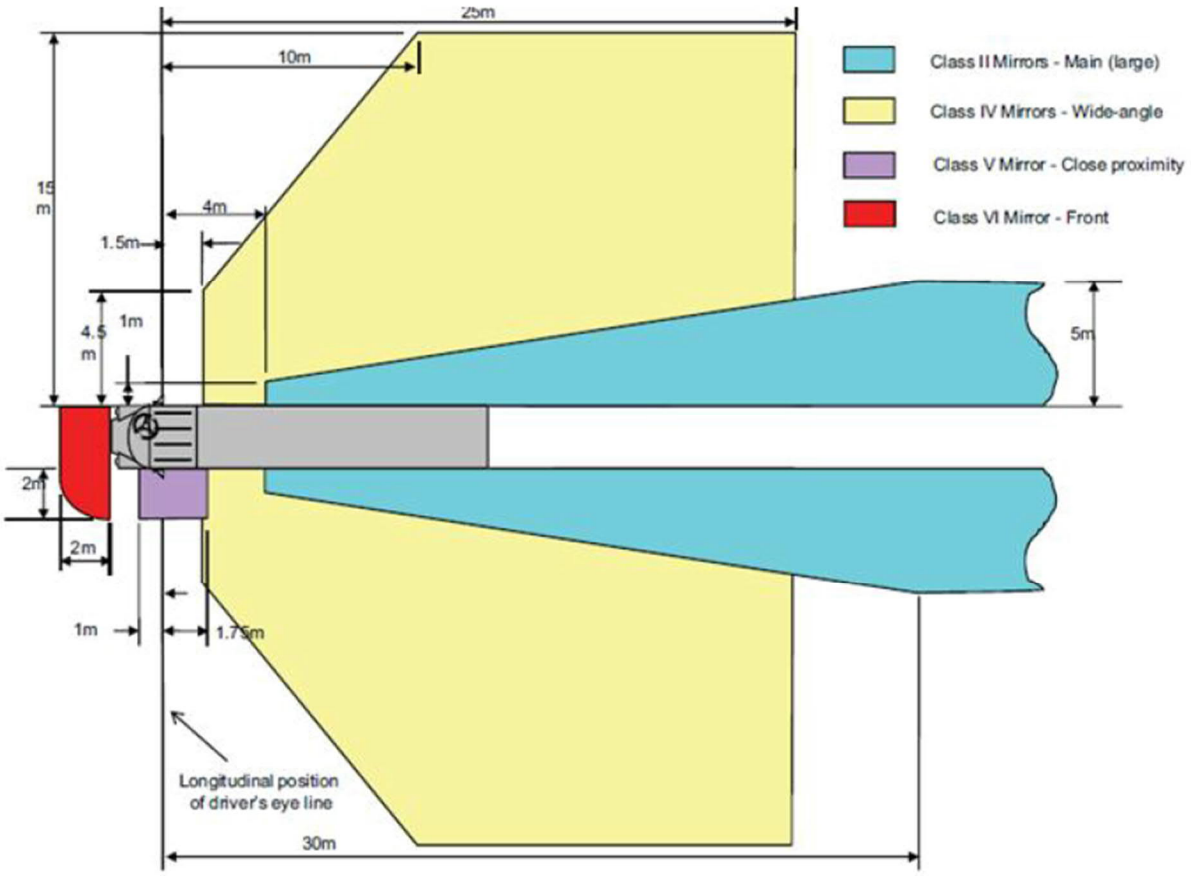
Assault screens may cause reduced direct vision to drivers. There are currently two main types of assault screen design, one which meets to the centre of the windscreen and one which meets the A-pillar. Often the Perspex assault screens become scratched and restrict the driver's direct vision. Redesign of the assault screens, more regular replacement of the Perspex or the elimination of the screens may help to increase the driver's vision. A specification for assault screens could be included in the new Bus Safety Standard.

Indirect Vision

According to EU Directive 2003/97/EC Class M3 vehicle (exceeding 5 tonnes and comprising more than 8 seats including the driver) only require Class II mirrors; one on the driver's side and one on the passenger's side. The installation of wide angle Class IV, V and/or VI mirrors has the potential to greatly reduce the blind spot areas surrounding the bus. Figure 18 shows the field of vision supplied by the different classes of mirrors on a HGV. However the introduction of extra mirrors has the potential to increase the driver's workload and may lead to attention being taken away from direct vision. This issue of increased driver workload had been raised in several studies into improved vision for HGVs. The mean glance time for a single mirror has shown to be just over a second and the time to travel between mirrors is approximately 0.32- 0.34 seconds, resulting in a total time of 4 to 6 seconds to check all mirrors in a HGV (Woolsgrove, 2014). Summerskill *et al.* (2015) noted that by the time a driver has examined all the mirrors and then made observations through the windows the road situation may have changed. They suggest further research should be carried out to establish the best combination of mirrors which enable optimal visibility and workload.

An alternative approach to improving the driver's field of vision is to implement cameras around the vehicle to provide the driver with a wide angled view of each side of the bus. The images from each camera can be blended and stitched together to provide a 360° bird's eye view around the bus in real time on a dash mounted monitor. When the driver uses the indicator to change lanes or turn the monitor will automatically display the appropriate view, from the front view, to the left or right side view. It would turn off at speeds over 10mph for example, in order to minimise drive distraction; and it should turn on by default in reverse gear too. Cameras mounted on the top of buses may need image recognition algorithms adapted due to difference in appearance of pedestrians from the high angle view. The field of view of the camera systems will also need to be assessed to reduce blind spots to a minimum. The introduction of an extra screen to monitor may also increase the driver's workload, however there is no need to have multiple screens for multiple cameras because the images can be integrated into one view using suitable algorithms. Summerskill *et al.* (2015) proposed that additional research should take place to investigate if and how additional technologies should be added to a vehicle in a manner which does not increase the workload upon the driver.

Figure 18: Field of Vision Requirements (2003/97/EC)



Night Vision

Collision data collected in Canada has shown that many pedestrian fatalities and injuries occur at night or under low-light conditions. The authors suggest implementing adaptive headlights that orientate light in the direction the vehicle is turning as well as better illumination of bus stops (Canadian Council of Motor Transport Administration, 2013)[5].

Nambisan *et al.* (2010) conducted a study on automatic pedestrian detection devices and found that smart lighting proved to be effective in increasing pedestrian safety on dimly lit roadways. The smart lighting system formed part of the road infrastructure rather than a device fitted to a vehicle or worn by a pedestrian. The

[5] Note that Stats19 data reported by the Metropolitan and City of London Police forces suggests approximately 67% of pedestrian fatalities, 68% of serious pedestrian injuries and 71% of slight pedestrian injuries from collisions involving buses occur during daylight. This suggests that there is a slightly increased severity of bus pedestrian collision at night time. Whether there is an increased risk of any type of collision depends on the split of bus mileage by daylight and darkness, which is unknown.

device detects pedestrians stepping out into the road and shines a light on them so they are easily seen by other vehicles. The device was shown to increase the pedestrians' operational behaviour as well as the vehicles' likelihood of yielding to the pedestrians.

The Blaze Laserlight is a bicycle mounted light that alerts vehicle drivers to the presence of a cyclist. TRL carried out a study to test the visibility of the Blaze Laserlight in low light and after dark around a bus and found that the blind-spot areas around the vehicles were significantly reduced and the percentage of maximum visibility at night improved from 72.4% with just the existing LED lights to 96.2% with the Blaze Laserlight (Greenshields *et al.*, 2016).

4.2.2 Vehicle Countermeasures in the Crash Phase

4.2.2.1 Crashworthiness

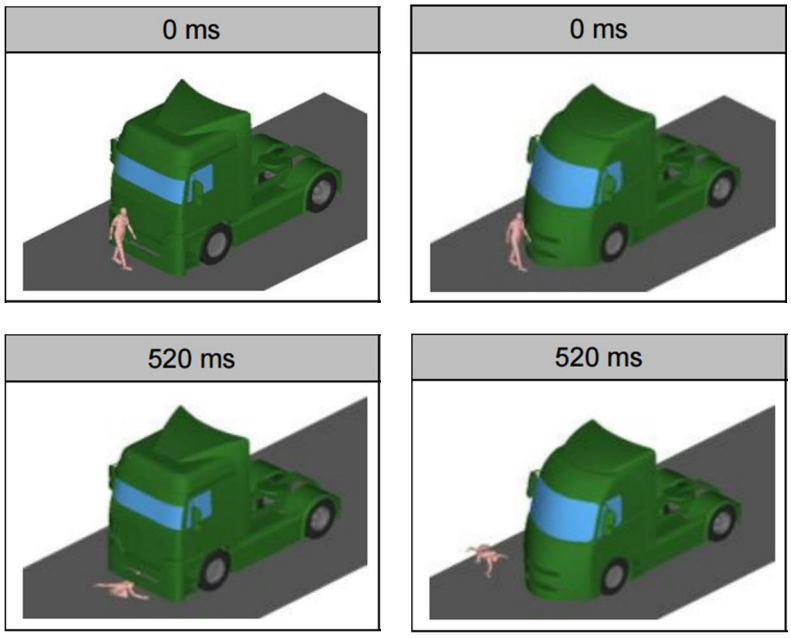
Pedestrian-Friendly Frontal Structures

During pedestrian collisions, the initial pedestrian contact with the vehicle obviously creates a significant risk of injury. The centre of the force applied by flat-fronted bus structures is usually above the centre of gravity of the pedestrian causing them to be rotated around their feet towards the ground, potentially with quite high forces depending on the exact geometry. This adds a significant risk of injury from the secondary contact with the ground. When the collision occurs, the pedestrian will be accelerated almost instantly to the speed of the bus. Once lying on the ground, they will decelerate again at a rate dependent on the coefficient of friction between the pedestrian's clothes and the ground. If the bus is not braking hard at this point, there is a high chance that the pedestrian will be run over by the bus, with the obvious potential for catastrophic injury.

A frontal structure more like a car bonnet provides an initial impact point lower than the pedestrian's centre of gravity so the pedestrian is rotated around their centre of gravity with the head moving towards the windscreen of the vehicle rather than directly towards the road. Depending on the exact geometry of the person and vehicle this can make the initial contact with the vehicle more severe. However, this can be mitigated by making sure that the part of the vehicle involved is sufficiently soft to minimise the chance of injury. Once full contact has been made with the vehicle and the pedestrian has been accelerated to the same speed as the vehicle they will fall down to the floor under the effects of gravity only, reducing the potential for secondary injury in contact with the ground. If the vehicle does not brake, it will stay underneath the pedestrian. If it does brake the pedestrian will slide forward on the bonnet and fall to the ground ahead of the braking vehicle. In either case, the probability of being run-over by the vehicle is relatively low.

A nosecone is a tapered front end structure that is intended to help protect pedestrians in exactly this way. The concept was first developed for HGVs in the Advanced PROtection SYStems (APROSYS) project (Feist *et al.*, 2008) and further developed by Welfers *et al.* (2011) to optimise the aerodynamics and safety performance and is shown in Figure 19.

Figure 19: Simulation of a 50th percentile male collision with a reference tractor unit (left) and the optimised tractor unit (right). Source: Adapted from Welfers *et al.*, (2011)



It can be seen that the pedestrian is overrun by the flat fronted tractor (left) but is deflected off to the side by the optimised tractor (right), preventing overrun.

A study commissioned by the DfT examined the effect of length of HGV nosecones on the potential number of lives saved. A 1m nosecone was estimated save 10 pedestrian fatalities per year in GB and 2 pedal cyclists (DfT, 2010). The number of bus related fatalities is less than HGV related fatalities[6] but the application of nosecone structures on buses would still be expected to reduce the number of fatalities.

The nosecone structure may also provide the driver with better protection from frontal impacts. The maximum permissible length of a 2 axle bus according to Annex 1 of EU Council Directive 96/53/EC is 13.5m (EU, 1996). TfL buses range in length from 11.2m for the new route master style buses to 12.6m for Alexander Dennis Enviro 300 single deck buses (TfL, 2016c) (Alexander-Dennis, 2012). In theory, this leaves approximately 1m of length for a nosecone front end structure without encroaching on the passenger space, but analysis would be required to confirm what constraints the manoeuvrability criteria also contained in Directive 96/53/EC might place on the amount of additional length that can be put ahead of the front axle.

[6] Stats19 records 408 pedestrian fatalities in 2015, of which 55 occurred in collisions involving an HGV and 30 in collisions involving a bus or coach.

There might also be operational issues with longer buses, e.g. bus garage parking capacity, routing and turning profiles.

A nosecone structure would also adjust the driver's position as they would be further away from the front of the bus. This may affect the driver's direct vision and change the blind spot areas. As such, any 'nosecone' structure would best be implemented as an integrated frontal structure on new models of buses and would be difficult to retrofit.

Another type of front end structure is a safety bar fixture. This is an alternative to the above in that it can be retro-fitted to a vehicle rather than built in during the design stages. For example, it could be a steel and foam safety bar, added to the front of the vehicle. A steel and foam safety-bar concept was developed for HGVs by the APROSYS project and was regarded to have no significant effects on manoeuvrability and was estimated to save around 4 lives per year in Great Britain. The safety bar concept was shown to reduce primary impact loads and injury risks, but does not provide the lateral deflection of the pedestrian as the nosecone does (Feist and Gugler, 2009). Robinson and Chislett (2010) suggested a similar concept of applying an energy absorbing front to the large passenger vehicles (LPVs). The authors describe that by fitting an energy absorbing front to the LPV, the distance over which a pedestrian can be decelerated is increased which allows the pedestrian to be protected at higher impact speeds. This would be more effective in combination with a measure to reduce the probability of a runover. For example, AEBS has the potential to achieve this because even if the system was unable to avoid a pedestrian, then it should help to ensure the vehicle is braking at the moment of impact such that the pedestrian would be less likely to be run over.

Through UK based cost benefit analysis, Robinson and Chislett (2010) was found that a safer front for LPVs was one of the countermeasures most likely to provide a positive return on investment and also had the potential to reduce the number of LPV related fatalities annually by 15 (based on casualty levels recorded in2006-8) and the number of serious injuries by annually 134, with an annual KSI cost saving of £45.7 million. By comparing these figures to the average annual total number of UK fatalities and injuries between 2006 and 2008 caused due to a collision with the front of a LPV, this equates to a reduction of approximately 23.8% of fatalities and 44.9% of serious injuries.

Another form of pedestrian friendly end is to implement softer structures. By using softer materials then a greater energy could be absorbed, and so help to mitigiate the injury severity. Bus A-pillars, wiper points and toughened windscreen are all high stiffness components that can contribute to increased risk and severity of head injury. Softer frontal structures can help to decelerate pedestrians over a longer time period and reduce injury risk. The inclusion of pedestrian airbags could help to shield these stiff structures and further increase the deceleration period of the pedestrian. Airbags need approximately 10ms to inflate so the bonnet would have to be designed in such a way to allow sufficient inflation time. A simpler countermeasure would be to use top hung windscreen wipers, instead of bottom mounted ones; although this might cause maintenance problems in an operational sense.

4.2.2.2 Occupant Safety

A study into Enhanced Coach and Bus Occupant Safety (ECBOS) performed parametric computer modelling of frontal city bus crashes. A baseline scenario of an M2 vehicle impacting a mature tree at approximately 45km/h was created and then further models were made with one parameter varied at a time. When the seat back padding stiffness was decreased by 33% significantly lower head injuries occurred (HIC decreased by 62%) meaning potential serious or fatal head injuries could be avoided. When a lap belt was added into the simulation the HIC valued decreased by 19% and the femur and pelvis loading were significantly reduced (TUG, 2004).

Palacio *et al.*, (2008) used a Madymo human model to simulate a standing passenger in an accelerating bus. It was found that horizontal metal seat handles were particularly hazardous and should be replaced with vertical ones hung from the roof of the bus. It was recommended that passengers should not stand in the bus aisles, but in a padded, designated standing area where there is no hazardous bus furniture items such as rows of seats which may increase this risk of injury. Palacio *et al.*, (2008) also suggest that lower stiffness rubber flooring should be used to minimise injuries such as knee fractures which are commonly associated with impacts with the bus floor.

From discussions at the Experts' Steering Group it was established that configuration of the interior of buses is specified by TfL. This means it may be feasible to drastically change the interior if clear benefits to bus occupants are identified; however any interior changes must be balanced with capacity needs. Many potential modifications were considered for example, increasing the diameter of handrails and poles could help to spread the impact with a passengers head, for instance, over a larger area which may help to reduce injury severity. Frangible[7] poles could also reduce injury risk as their stiffness would be much lower than traditional metal poles.

To help prevent falls on stairs of double decker buses a gate could be installed at top and bottom of the stairs that only opens when the bus is stationary. To help reduce injuries caused by falls down stairs the edge of the steps could be rounded and the stairwell could have added padding. There is also potential for the stairs to be turned around by 180 degrees, although it is unclear if this would provide any benefits.

The use of seatbelts could help to reduce injuries caused by braking situations. The introduction of rear facing seats could also assist passengers in staying in their seats during braking situations. To prevent whiplash type injuries rail style high backed seats should be used, however, passengers may be opposed to facing backwards. There might also be practical implementation concerns for operators, if a mix of front- and rear-facing seats reduced seating capacity.

Compartments for standing passengers could be implemented to minimise the distance travelled by the passenger during harsh braking. The compartments would need to be constructed with low stiffness, softer materials. Considerations would

[7] Frangible mean easily broken into frangments

need to be made to ensure good accessibility and visibility into/through the compartment so passengers feel safe and comfortable to use them. Using compartments on the buses might affect passenger flow on the vehicle, and operators have operational concerns about using this approach, so it is not recommended at this time.

4.2.3 Vehicle Countermeasures in the Post-Crash Phase

The most obvious countermeasure in the post-crash phase is eCall, which is an automatic emergency call system for motor vehicles. It dramatically shortens the time it takes for emergency services to arrive. Carmakers will have to install the technology in all new car and van models from 31 March 2018 onwards according to EC regulation 758 (EU, 2015). Buses are not currently required to fit the system, although a review is required by March 2021 to describe the achievements of eCall fitted to cars and vans, and to report on whether the legislation should be extended to heavy goods vehicles, buses and coaches, powered two-wheelers, and agricultural tractors. According to some estimates, eCall could speed emergency response times by 40 percent in urban areas and by 50 percent in rural areas (ERTICO, n.d.). However eCall was not assigned as a countermeasure in any of the cases.

4.3 Human Countermeasures

There are also a range of human countermeasures that might help to avoid, and/or to mitigate the severity of injuries. These human countermeasures are outlined below, starting with the pre-crash phase.

4.3.1 Human Countermeasures in the Pre-Crash Phase

4.3.1.1 Training in vehicle systems and use

In almost all areas of road safety, better training and education are suggested as central pillars in the fight to reduce injury. There is one respect in which this is uncontroversially true; users of vehicles should be trained how to use them and the technologies they contain. In this sense, road transport is no different to other, more heavily regulated modes such as air travel, and a single example from this domain will serve to illustrate the point.

In 1989, on the 8th January, a Boeing 737-400 crashed on the M1 motorway, just short of the runway at which it was attempting to make an emergency landing at East Midlands Airport (the so-called 'Kegworth air disaster'). The aircraft had experienced a fault in its left engine. The pilots subsequently shut down the still functioning right hand engine, rather than the damaged left engine, and this ultimately led to the crash. The decision to shut down the right engine arose from a number of factors, one of which was that the pilots had not received any training in the 400 series of the Boeing 737 aircraft in relation to managing engine malfunctions; their knowledge of how to handle such malfunctions in the previous series of the aircraft led them to take the incorrect action, due to several changes introduced by the manufacturer. One of the recommendations of the ensuing accident investigation was that the Civil Aviation Authority should require that pilot training on engine malfunctions should be updated (Air Accidents Investigation Branch, 1989).

For reasons illustrated by this case study (albeit in a different domain) it is self-evident that with all new safety features implemented in buses in London, there should be sufficient training in place to ensure that drivers feel comfortable and confident in using them, and, crucially, actually know how to use them. The precise form that this training should take will depend on the systems used, their complexity, and the extent to which they require active driver input. It has been apparent in previous projects involving applying safety systems such as ISA and collision avoidance systems that at first drivers can be reluctant to embrace the technology, but after a short while they become familiarised with it and can see the benefits (Greenshields et al., 2016).

4.3.1.2 Training and Education for Drivers in Safer Driving

In contrast to the self-evident need for training in the use of bus safety systems for drivers, the case for wider training and education for bus drivers, focused on safer driving, is not as clear.

One reason for this is that the evidence for the effectiveness of training interventions, specifically for bus drivers is scarce. Thus it is not clear what form such training

should take if it is to be effective (although see Section 5.1.3 for a discussion of hazard perception training – an area that would benefit from more detailed research as to what should be included in any approach).

Another reason is that the wider literature on driver training is equivocal at best in terms of its support for the effectiveness of training as a safety intervention. When systematic reviews of training and education for young and novice drivers are considered, a good deal of evidence suggests that it is ineffective (Vernick *et al.*, 1999); see (Helman *et al.*, 2010) for a recent review). A Cochrane systematic review also concluded the same for advanced and remedial post-licence driver education (Ker *et al.*, 2003).

When considering the work-related road safety literature, (Grayson and Helman, 2011) concluded that only a handful of training and education interventions had been properly evaluated; a later update of this review by (Helman *et al.*, 2014) concluded that nothing had changed. Aside from the obvious need for good management of work-related road risk, see (Health & Safety Executive, 2014) and the CLOCS inititiave in London, based on the work of (Delmonte *et al.*, 2013); those working in the area seem to lack any agreed approaches to improve safety.

In short, any approach to training bus drivers in ‘safer driving’ should proceed under modest expectations of effectiveness at best, until specific interventions have been shown to deliver specific benefits in good quality evaluations. A recent review of the literature to identify the most promising candidates may be a useful first step.

4.3.1.3 Training and Education Relating to Pedestrians

The most commonly assigned countermeasure assigned in a study of pedestrian fatalities in London between 2006 and 2010 was ‘improved pedestrian awareness of other road users’. In pedestrian collisions involving buses/coaches specifically the most common contributory factor was found to the ‘failed to look correctly’ and so therefore the authors suggested the implementation of education/publicity measures highlighting the importance to looking properly in particular. Pedestrian training could also include the dangers of being impaired by drugs and alcohol, developing strategies to minimise the risk of being involved in a collision and increasing general road safety knowledge (Knowles et al., 2012).

From discussions at the Experts’ Steering Group it was highlighted that training pedestrians and other roads users was lacking in direct evidence that it can reduce the frequency and severity of collisions. Thus the same issue exists with this group of road users as is the case in the the driver training and education literature. Thus we would recommend that any training interventions considered are done so on the basis of evidence, or are evaluated. One promising line of enquiry might be training and educating pedestrians regarding their lack of conspicuity and visibility at night; for example (Tyrrell *et al.*, 2004) showed that this is something pedestrians overestimate, and something that shows promise in terms of training interventions to overcome this misunderstanding.

Another option suggested by the Experts’ Steering Group (and echoed in the Human Factors and Behaviour Change Workshop – see Section 5.1.3) is that to deal with pedestrian risk, a safe systems approach should be adopted and the focus of

countermeasures should be on vehicle/environmental interventions. For example, the implementation of high visibility strips, extra lights on the front of buses or the replacement of the upper windscreen on double decker buses with a more visible material may help pedestrians to see the bus and reduce the likelihood of them stepping out in front of a bus. Again, research may be needed to understand the best way to achieve this.

4.3.2 Human Countermeasures in the Crash Phase

The point made in Section 4.3.1.1 regarding appropriate training on vehicle safety systems applies to the crash phase, should any such systems designed to reduce crash severity be in use. Obvious examples include things such as seat belts and air bag systems.

The importance of using such systems should be clarified through communication and appropriate health and safety policies focused on driver safety. As with wider training and education, any interventions used to try and encourage uptake of such systems as seat belts should be based on evidence where possible, and evaluated properly to ensure that levels of effectiveness are known.

4.4 Environment Countermeasures

4.4.1 Bus stops

Stopped buses can create line of sight hazards for both pedestrians and other road users. The Canadian Council of Motor Transport Administrators advise that bus stops are best located away from crossings to deter pedestrians from crossing right in front of or behind a bus (Canadian Council of Motor Transport Administration, 2013).

The CCMTA also recommend that fencing is installed between the road and pavement to help guide the pedestrians away from crossing near the bus stop and towards a safer crossing location (2013). However in the London road environment extensive guardrailing is not practical, and the workshop revealed mixed opinion on this option; so guardrailing is not recommended at this stage.

Bus stops also pose a risk to cyclists as the buses and cyclists often end up crossing paths as the bus pulls in and out of the stops. Bus stop bypass cycle lanes reroute the bicycle around the nearside of the bus in a separate cycle lane and could reduce the potential for cyclists and buses crossing paths (Talbot *et al.*, 2014).

4.4.2 Junctions

A study into pedestrian related bus collisions in Philadelphia suggested that at junctions the installation of left- or right-turn protected signal phases at busy junctions could reduce collision frequency (Park and Trieu, 2014). Furthermore the installation of pedestrian protected crossing phases and longer time to cross could also reduce collision frequency. With regard to cyclists, the addition of advanced stop lines at junctions allow cyclists to get ahead of other vehicles to a safer location, however this can result in the cyclist undertaking other vehicles to reach the advance stop line or can place the cyclists in the blind spots of large vehicles. The combination of advanced stop lines with technologies such as the BlazeLight could work effectively together to improve cyclist visibility as well as road location (Talbot *et al.*, 2014).

4.5 RAIDS & OTS Case Studies

Case study reviews of urban bus collisions are summarised for all the cases included in OTS and RAIDS phase 1 databases. Cases are summarised by analysing the circumstances, collision scenario, physical conditions and contributing factors. Based on these inputs, countermeasures are assigned to each case that might help to prevent or to reduce the severity of each collision, based on the specific circumstances of that collision. The master bus countermeasures list, from which the countermeasures were selected, is provided in Appendix C.

4.5.1 Case selection criteria:

Cases summarised were selected based on a case selection criteria explained below:

Table 3: Case selection criteria for the OTS & RAIDS case summaries.

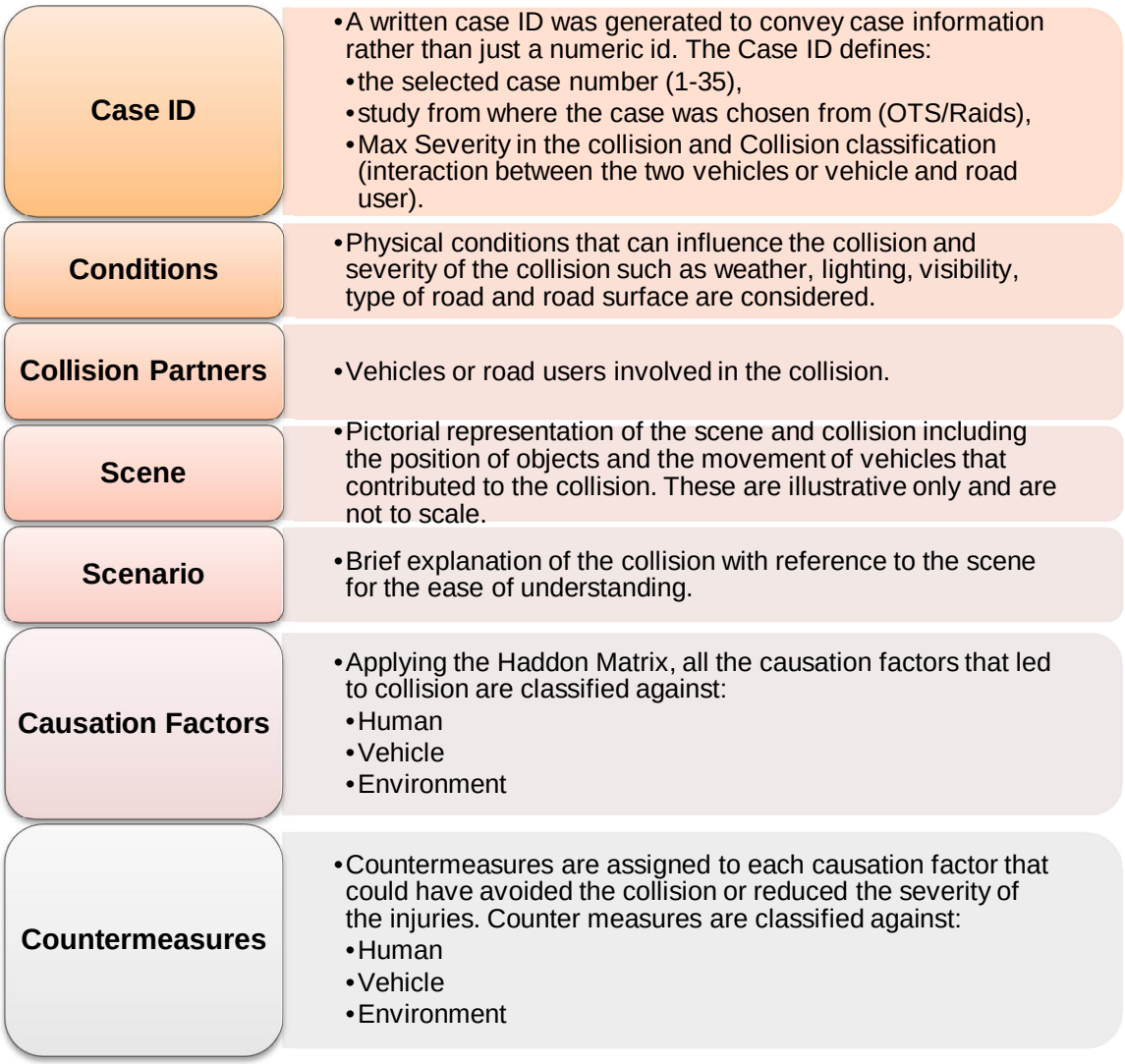
Area	Bus collisions in urban areas only
Vehicles involved	All collisions involved at least one bus (Coaches were excluded)
Injuries	At least one slight, serious or fatally injured road user (includes pedestrians, cyclists and motorcyclists)

Using the case selection criteria, the case search resulted in a total of 47 cases (41 OTS and 6 Raids). Out of these 47, 35 cases were selected for further analysis based on more relevant scenarios, collision configuration and causation factors.

4.5.2 Creation of case summaries

Each case was examined in detailed by an expert investigator reading through the case files. The case was summarised on a one page format with a focus on explaining the key details as described in Figure 20:

Figure 20: Key details used in the OTS & RAIDS case summaries.



4.5.3 Case Summaries

The legend for the case summaries is given first in Figure 21, thereafter followed by an example of a completed case summary, Figure 22. The full set of 35 case summaries is provided in Appendix C.

Figure 21: Legend for OTS & RAIDS case summaries.

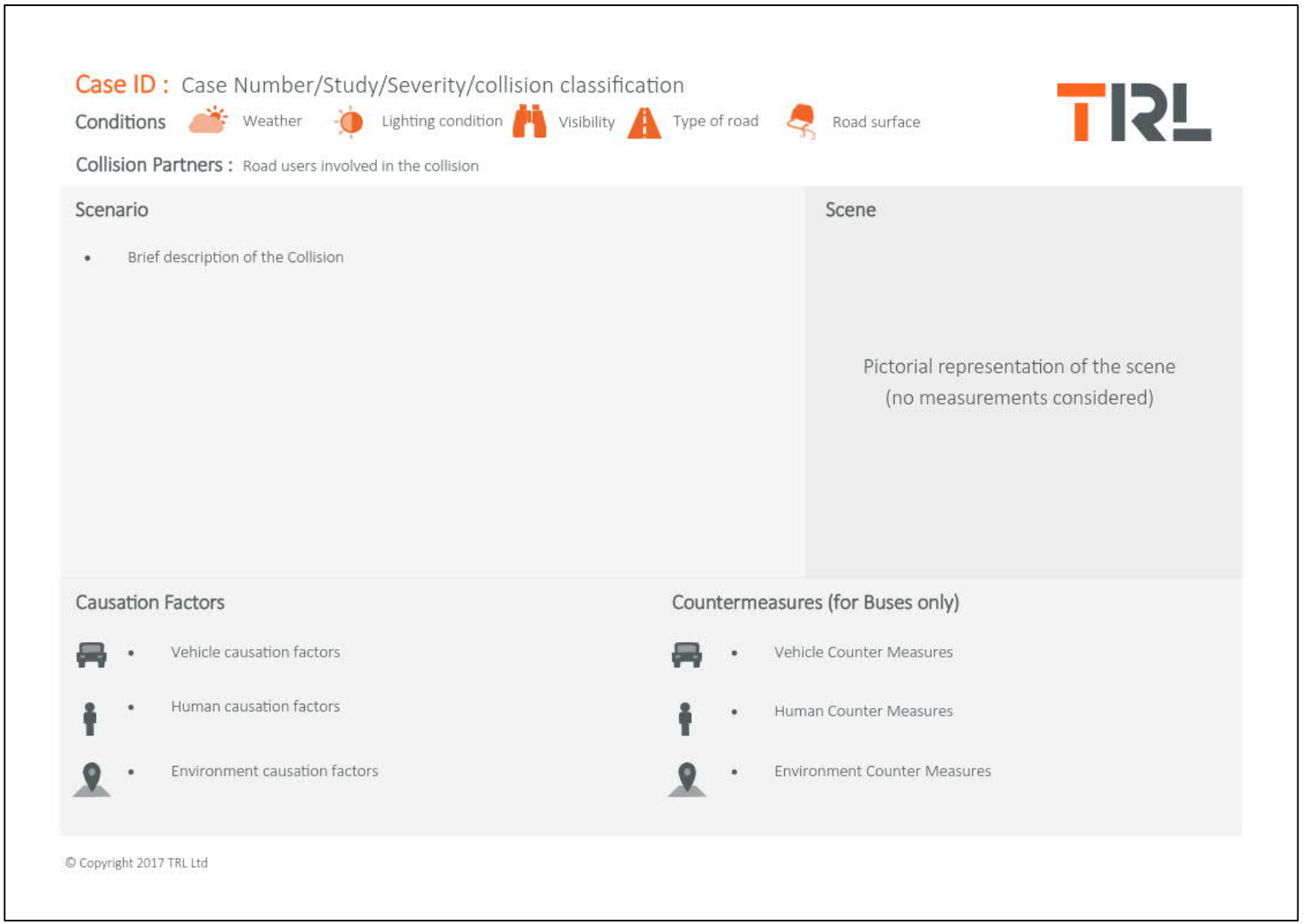
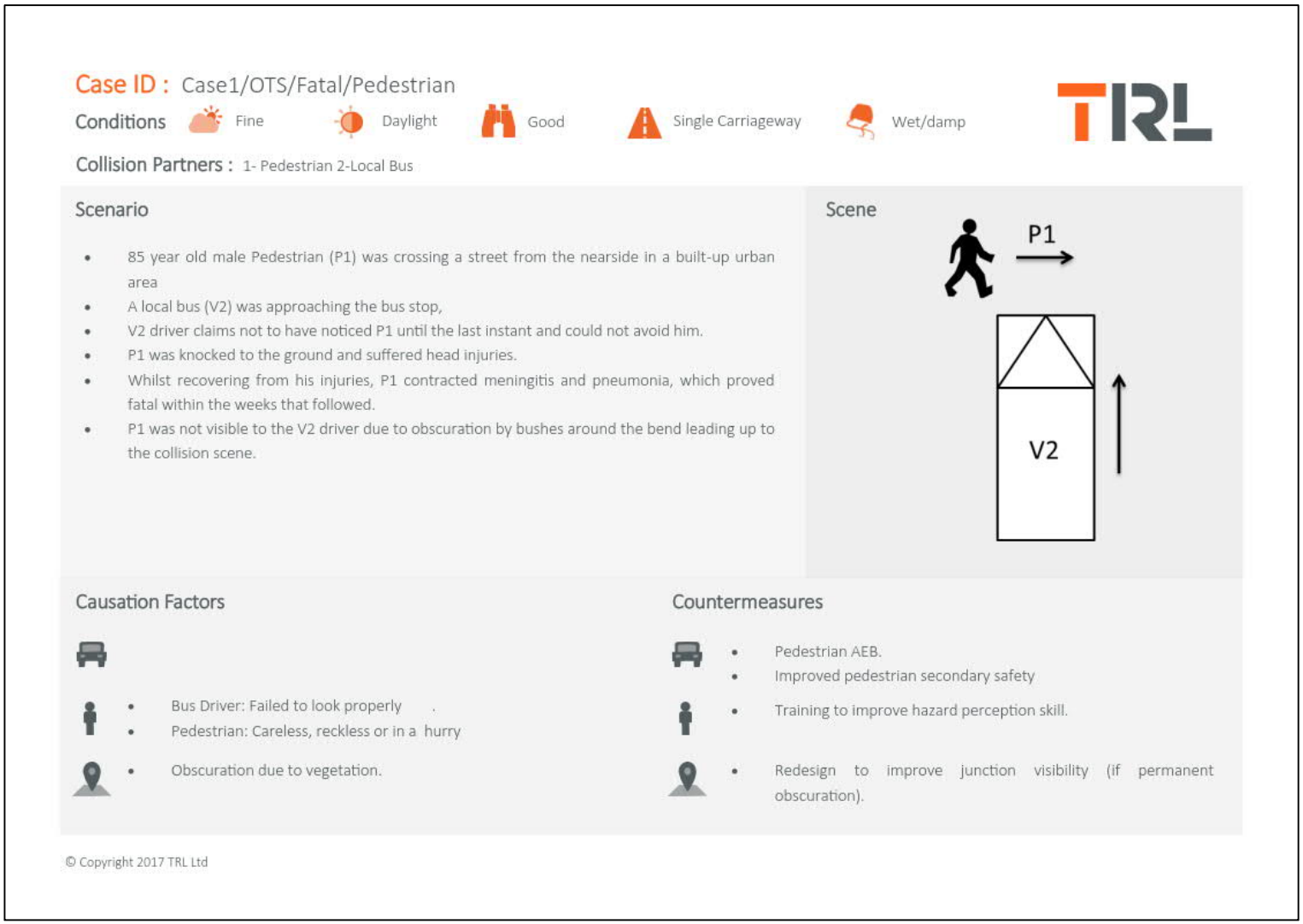


Figure 22: Example Case Summary (Case 1).



4.6 Summary of identification of countermeasures

There are a variety of countermeasures designed to help avoid or to mitigate the severity of injury in bus collisions. Countermeasures can include countermeasures designed to address the pre-crash and crash phases. Some examples include:

- Advanced Driver Assistance Systems (ADAS)
- Pedestrian-friendly frontal structures
- Improved field of view
- Occupant safety
- Human factors
- Environment factors

The effectiveness of the countermeasures varies depending on the specific situations and site locations. Combinations of countermeasures applied together may prove more effective than isolated countermeasures.

5 Phase 3: Countermeasures Analysis

The investigators have assigned countermeasures that might help to either prevent or to reduce the severity of the collisions, based on the specific circumstances of each collision. It is important to note that multiple countermeasures may be assigned to each case.

5.1 Stakeholder Input on Countermeasures

5.1.1 Stakeholder questionnaire

A questionnaire was shared with attendees at the Stakeholder workshop in December 2016. The stakeholders included bus manufacturers and operators. They were given a presentation about the findings on bus collisions nationally, and the in-depth investigation of fatal files, alongside some initial work on countermeasures (Section 3 Phase 1: Collision Analysis). The questionnaire text was as given in Appendix A. Responses were received from six organisations; four bus operators and two bus manufacturers. Half the respondents were prepared for their responses to be published, half were not. Thus, results have not been attributed to any individual respondent and in the presentation of summaries of results; efforts have been made to avoid presenting information that would allow the response to be attributed to a particular stakeholder.

There was general agreement that CCTV, telematics and driver monitoring would have been significant influences on safety improvements in recent years. These were sometimes recorded as vehicle improvements and sometimes as driver improvements. There was also a general consensus that bus driver training had improved and that this would have been a positive influence. Other measures were less consistently referred to; several respondents cited better brakes on the bus and one or two to improved vehicle layout, seat design, interlocks and acceleration limiting. When it came to bus operation the only factors cited by more than 1 operator were improved route risk assessment and allocating specific buses to specific routes. Others getting a single mention included staff at stands, radio contact with driver, improved maintenance and more realistic schedules. However, in the case of the latter, another respondent suggested evidence with respect to schedule changes was mixed.

The results in relation to infrastructure measures were also mixed. Improvements to siting/accessibility of bus stops was cited twice as was an increase in bus lanes, though one respondent made an exception of contra-flow bus lanes which they considered an increase in risk. In general, it was considered car and HGV safety had improved but that motorcycle safety hadn't and, with the exception of cycle lanes, nor had cyclist safety.

When considering the potential new countermeasures listed in the questionnaire, the response provided was numeric (5 best, 1 worst) with text justification. It was apparent that there were differences in response between manufacturers and operators; responses from operators were likely opinion-led rather than evidence-led. All respondents tended to have a preference either for measures that aimed to avoid

the collision (active), but might interfere in normal driving; or those that didn't intervene at all in normal driving, could not avoid collisions but could reduce the severity of injuries received (passive protection). The responses are summarised in Table 4.

Table 4: Summary of survey responses for estimated countermeasure effectiveness.

Countermeasure	Average effectiveness		
	Operator	Manufacturer	All
Blind spot warning	3	4	3.33
Advanced Emergency Braking (AEB); Bus to Vehicle Rear	4.5	4	4.33
AEB for pedestrians and cyclists	3.25	4	3.50
AEB Left turn	2.75	3	2.83
Automated Emergency Steering (AES)	2.5	2	2.33
Pedestrian friendly front	3	2.5	2.83
Runover prevention structure	3	2	2.67
Direct vision	3.75	3	3.50
Interior design	3	2.5	2.83
Average Active	3.27	3.4	3.27
Average Passive	3.19	2.5	2.96

Broadly, the respondents considered that AEB for vehicle to vehicle collisions and pedestrian frontal collisions would be quite effective, as would blind spot warnings. However, AEB for left turns was considered less effective. One operator suggested a fatigue monitoring/warning system as an addition to the list that they considered would be highly effective. The bus manufacturers tended to prefer the active safety measures to the passive measures, whereas overall the operators were more even. However, it should be noted that one of the four operators thought that all except vehicle to vehicle AEB would be highly ineffective rating all active measures apart from this as one and all of the passive countermeasures as five. In the absence of this result, the remaining operators would have favoured active measures in a similar proportion to the bus manufacturers.

A variety of subjective explanations for the scoring were received. For active systems they were generally thought to have much potential but concerns were expressed about the number of false positives, the potential for warnings to be distracting, and how drivers would feel about control taken away. The left turn

problem was considered less frequent than frontal and ‘more for trucks’. In relation to the passive measures, the comments were varied. Some thought them highly effective, capable of preventing lots of KSIs. Others were more sceptical, suggesting the benefits might be limited because performance was already good, avoidance was preferable to injury mitigation and integrating into design and operation could be complex.

All but one bus operator considered that the feasibility of countermeasures was a matter for manufacturers and did not respond. The two vehicle manufacturers resulted in the following range of results for when they considered each system would be in full production. Where the two responses disagreed they have been presented as a range:

- Blind spot warning: 2020
- AEB Bus to Vehicle Rear: 2018
- AEB for pedestrians and cyclists: 2020-2026
- AEB Left turn: 2020-2022
- Automated Emergency Steering (AES): 2024-2026
- Pedestrian friendly front: 2020 - 2026
- Runover prevention structure: 2022-2026
- Direct vision: 2020
- Interior design: 2020

The vehicle manufacturers also identified the following barriers to introduction, as described in Table 5:

Table 5: Barriers to introduction of countermeasures based on survey responses from Bus manufacturers and operators.

Measure	Barriers and constraints
Blind spot warning	Systems available with complex integration
Advanced Emergency Braking (AEB); bus to vehicle rear	Liability if a passenger gets injured in the occurrence of a false positive, or even in a true positive where a collision is prevented (how to prove this was the case)
AEB for pedestrians and cyclists	Complex and difficult to perfect and integrate and liability issues as for AEB BVR
AEB left turn	Integration can be complex. Must have blind spot detection as AEB already fitted. Safety ratings of blind spot detection must be considered to enable AEB, especially with pedestrian and cyclist detection
Automated Emergency Steering (AES)	Steering system availability as well as development and integration cost and complexity
Pedestrian friendly front	Limitations based on legislative requirements (e.g. manoeuvrability), while maintaining a usable vehicle for London routes
Runover prevention structure	Very difficult, never considered before, full concept development required
Direct vision	Already very good, some minor improvements possible
Interior design	Already very good. Further research, design and simulations must be completed first to validate that any changes really provide a safety benefit

One vehicle manufacturer provided an estimate of costs but did not wish for this information to be published. In the absence of information from any other source with which to merge and anonymise the data in wider ranges or averages, no information on the costs can be presented. It was noted that the degree of difficulty in integration would provide the best indicator of possible magnitudes of cost as this early stage.

5.1.2 Bus Collisions Workshop

A workshop was held on 5th December 2016 for bus manufacturers and operators. The purpose of this was to review the collision data and identify how to fill any gaps in knowledge and to understand the countermeasures currently implemented. Another discussion topic for the workshop was to review the countermeasures identified by the analysis of bus collisions, specifically by considering these questions:

- What other countermeasures do participants foresee?
- What barriers are there to implementation?
- When might solutions be technically feasible?
- How would they affect operations?
- Are there any synergies from grouping of measures?

This workshop raised some questions, and gathered some feedback, all of which has been integrated into the previous sections of the report in section 3 and 4, and into the following analysis of countermeasures in section 5, so will not be discussed in further detail in the this section.

5.1.3 Human Factors & Behaviour Change Workshop

On 13th February 2017 a Human Countermeasures workshop was held at TfL with the aim of informing stakeholders about the human factors and behaviour change elements that need to be considered when thinking about the implementation of bus countermeasures. The stakeholders in attendance included bus manufacturers and operators. The workshop began with an introduction to the topic, and the slides are in Appendix E. The key topics covered were:

- Introduction to human factors
- Training, campaigning, and behaviour change
    - Can't we just train people to behave differently
    - Campaign examples
    - Behaviour change models and research examples

Two interactive sessions were then held. These invited participants to consider some of the countermeasures that had been suggested in the wider project from a human factors perspective, and for the stakeholders in attendance to consider:

1) What are the barriers and enablers?
2) Pick one 'quick win', one medium and one long term countermeasure

There is a long list of countermeasures and it was not feasible to discuss them all, but a handful of them were considered and the discussions are summarised in Table 6 for the vehicle countermeasures and in Table 7 for the human countermeasures.

Table 6: Summary of barriers and enablers identified by stakeholders at workshop for selection of vehicle countermeasures.

Category	Crash Phase	Group	Countermeasure	Enablers/Opportunities	Open Questions	Barriers/Blockers
Vehicle	Pre-Crash	ADAS	**Advanced Emergency Braking**	Fewer fatalities	How sensitive is it/should it be? Would pedestrians walking on the edge of the footpath trigger it?	People could 'bully' a bus
				Easier to respond to customer complaints about braking because the system would provide a log	How should it be calibrated?	Injury to standing passengers from harsh braking
				Prevents pedal confusion	How will this change driver performance and behaviours?	False alarms will reduce trust – cry wolf, disuse
				Phased implementation would help with driver buy-in	How will liability work?	Possibility of overtrust – rely on bus to brake
				Could reduce driver stress	How will unions react?	
				Involve drivers in developing/deploying the technology		
				Improve reputation		
				Culture shift in the public to recognise that it is important to help keep the bus network moving		
Vehicle	Pre-Crash	ADAS	**Mandatory Intelligent Speed Adaptation (ISA)**	Lower speeds = lower risk = fewer collisions	How can the driver turn it off?	Cost
				Driver doesn't have to think about the speed limit	Is it easy to maintain for the engineers? i.e. how reliable will it be?	Speed limit be to too high for safety driving in some conditions
				Could help with headways/regulation	Training would have to change	Lack of driver responsibility
				Improve reputation – buses can't break speed limit	Who sets the speed limit? Are they variable under different road and weather conditions or fixed to the legal speed limit?	May be stressful for drivers falling behind schedule who cannot increase speed to catch up
				Help contractors – no speeding incidents to be monitored	Is the equipment not working a reason to take a bus off the road?	Pressure from passengers to drive faster
				Safety Culture – zero tolerance of speeding	How sensitive would the system be?	Might create a risk of overtaking by other road users in some conditions
					How would it feel for the driver and how would this affect their driving performance and behaviour?	Probably not 100% effective across the geographical network (reception blackspots)
						Overtrust in the system

Category	Crash Phase	Group	Countermeasure	Enablers/Opportunities	Open Questions	Barriers/Blockers
Vehicle	Pre-Crash	ADAS	**Fatigue monitoring**	Reduction in KSIs	How accurate would it be?	Driver perception – big brother
				Could enable better fatigue management policies by providing data on actual levels of fatigue	How would it account for individual differences?	Cost of implementation
				Health benefits		Cost of dealing with reported fatigue
				Improvement in driver engagement		False positives
				Reduced driver turnover		Ability to understand variances
Vehicle	Pre-Crash	Vision	**Mirrors & cameras**	A standard 'drill' for mirrorwork		Task – driving close to the kerb (passenger access)
				Raising awareness in pedestrians and cyclists		Too many things to look at – attention
				Overconfidence in current visibility (show people this) Dispelling myths – drivers 'Exchange places' training - passengers		Cognitive overload
				Improved/easier visibility – makes it easier to 'sell' to drivers		Small size, cheap mirrors, assault screen – perceptual degradation
						Where does camera output go?
						Training needs
						Difficult to set up mirrors in a bus
						Conflicting goals seeing a lot of bus in the mirror and avoid hitting buses
						Assault screen
Vehicle	Crash	Occupant Safety	**Internal design**	Drivers/customer education for 'extra time' to get off bus		Pressure to maintain occupancy – pressure for production
				Better signage re: stairs		Operational – competing needs (e.g. cleanable, hard-wearing seats)
				Empowering bus drivers re: pressure for production		Safety Culture
Vehicle	Crash	Occupant Safety	**Seat belt use**	Raising awareness of other safety features (e.g. airbag) that do not appear in buses		Physically uncomfortable
				Social norming? Everyone wears one in a car		Evidence of effectiveness - to change safety culture
				Penalties for non-use (TfL)		Culture/social norm
						Task incompatibility? Twisting in seat to deal with clients – ergonomics
						Task incompatibility – PA system

Table 7: Summary of barriers and enablers identified by stakeholders at workshop for selection of human countermeasures.

Category	Crash Phase	Group	Countermeasure	Enablers/Opportunities	Open Questions	Barriers/Blockers
Human	Pre-Crash	Improve driver skills/behaviour	Training to improve driver behaviour	Increasing number of controllers during peak times – to lower cognitive workload		Road environment contributing to HF issues
				Technical solution – in-cab blocking of comms with controller (with override?)		Perceived punishment (e.g. losing breaks)
				Replace dedicated training with 'toolbox talks' – regular is important		Safety culture!!
				Telematics, if accepted		Drivers job is safety, controllers job is efficiency
				Monitoring and feedback on basis of incidents – for controllers		If technical solutions can be over-ridden, again this can lead to pressure for production
				Starting the training with what drivers perceive as risks		Speeding – perception that drivers are picking up time
				Bus industry is very good and getting people on training courses – this can help with delivery		People don't accept behaviour training
						Time available for training makes it difficult to fit it in
						Telematics if not accepted – big brother
						Perception of need for training
						Pressure for controllers and drivers to communicate even when driving
Human	Pre-Crash	Improve driver skills/behaviou	Hazard perception training	The idea that 'bus drivers should be the best drivers on the road'	What would the training look like?	Driver may become overly cautious
				Makes driving a more desirable job	What should the outcome be?	Time intensive for drivers
				Tailor training to the bus driver task	How often would it need to be delivered?	
				Could cover impact of hazards on passengers		

Category	Crash Phase	Group	Countermeasure	Enablers/Opportunities	Open Questions	Barriers/Blockers
Human	Pre-Crash	Improve driver skills/behaviour	Better licensing (medical/health related)	Random checks (drugs and drink) leads to fear of detection		Experience overcomes need for change – drivers resist change
				Unions – could be a useful conversation opener		Pressure for production!
				Leadership buy-in		Random checks could be more frequent
				Incentives for medical tests (vision, etc.)		Fatigue – understanding, fear, LAW
						Legal requirements become the standard
						Fear of declaration (fear of losing job)
						Unions – could resist
Human	Pre-Crash	Improve driver skills/behaviour	Public training & education	Highlight good/bad behaviour	Is it just a box tick exercise?	Really difficult to do well
				One key message		Really expensive
				Explain reasons behind bus operations		Doesn't change behaviour
Human	Pre-Crash	Improve driver skills/behaviour	System design to reduce distraction from in-vehicle devices	Find less distracting alternatives (e.g. automation – automate lights on buses)	Include the distracting devices on training buses so drivers can get used to them while training?	Legislation might mandate the devices
				Increases safety		Pressure from GLA to use them
				Better integration of displays		Cost
				A review of the devices in buses and analysis of what is still beneficial		Many different types of buses
				Involve drivers		

The workshop concluded with a summary of the top things that stakeholders would take away as knowledge, and these were:

- Hazard perception training shows promise
- Involve the drivers and unions in the development and implementation of any behaviour changes
- There is no register for PSV drivers and no qualifications for learning how to drive a bus. Bus safety interventions need to consider human factors
- Organisational factors influence the success of behavioural change programmes and should also be considered.

This list can essentially be reduced to the statement that when implementing bus safety measures, individual and organisational human factors need to be considered if effecitveness is to be maximised. The one specific recommendation on the list relates to hazard perception training, and this is expanded below.

5.1.3.1 Hazard perception skill and its importantance as a trainable skill

(Horswill and McKenna, 2004), among others, point out that hazard perception skill (broadly, the skill of anticipating potentially dangerous traffic situations) is the only driving-related skill that has been shown to be related to colliosion risk across multiple studies. The actual term has come to be used by many working in road safety more generally, without attention being paid to the specifics of the definition above. Hazard perception (as defined in the literature on its effectiveness) is not ‘general risk awareness’ or ‘ability to control a vehicle’ in hazardous situations. It is not ‘risk aversion’, and nor is it ‘driving style’.

As pointed out by (Helman *et al.*, 2010) although the measure of interest in indicating the degree of hazard perception skill tends to be ‘time-critical responding’, it is the ability to anticipate hazards that is important – not the possession of fast ‘reactions’; for example in early work on the topic at TRL in the 1970s and 1980s, it was apparent that hazards which gave no clue as to their development (for example, a pedestrian suddenly ‘appearing from nowhere’) do not seem to differentiate between people with greater or lesser levels of hazard perception skill (Grayson and Sexton, 2002). Instead the presence of anticipatory cues is required; for example a pedestrian seen approaching the roadside while distracted or looking in another direction might suggest a potential hazard.

The majority of work on the skill of hazard perception has been concerned with young and novice drivers, who lack this important skill as they begin their driving. Work in the UK has led the world in this regard, and the UK hazard perception test, delivered since November 2002 as part of the driving theory test, has been shown to have reduced some novice driver accidents by as much as 11% (Wells *et al.*, 2008).

The programme of work on which the hazard perception test was based showed that the skill of hazard perception possessed three critical features. Firstly that it can be measured reliably, see (Grayson and Sexton, 2002) for a summary of this work. Secondly that it is related to collision risk (McKenna and Horswill, 1999), (Hull and Christie, 1993), (Quimby *et al.*, 1986); and thirdly that it is trainable (Sexton,

Development of hazard perception testing), (McKenna and Crick, 1993), (Crick and McKenna, 1991).

The purpose of the test in GB has so far been to ensure that people only pass their theory test if they possess sufficient hazard perception skill to pass the hazard perception component, but work with young and novice drivers worldwide is now moving to focus on how the skill can best be trained. The 'missing link' in hazard perception research is data showing that people actually trained in the skill have fewer accidents as a result. Some preliminary data from the US has shown such an effect for young male drivers, but much remains to be done to establish a full understanding of the skill, and how it can best be trained, even in the user group about which most is known (young and novice drivers).

5.1.3.2 Developing hazard perception training for bus drivers

With the latter point in Section 5.1.3.1 in mind, the development of any bus driver hazard perception training intervention should proceed on the assumption that bespoke research is required, along with the development of bespoke testing and training materials. It is certainly not the case that there is an 'off the shelf' training package which has been shown to improve safety in any kind of scientific trial for this road user group.

A number of specific features of bus hazard perception suggest themselves for consideration in any work to research and develop materials.

1) Buses are large, and may require a greater awareness of 'blind spot' monitoring to adequately anticipate future hazards than is the case for cars.

2) Drivers will tend to be more experienced than the most-studied group in hazard perception research (young drivers). Although some literature exists on older drivers, this specific group has not, to the authors' current knowledge, been studied in detail.

3) Passengers on the bus will form part of the hazard space. Because the actions of bus drivers responding to hazards outside the vehicle will impact on standing and seated passengers inside the bus, there will almost certainly be a need to cover this in training and testing materials.

Because of these specific issues, and because of the unique position of hazard perception as a driving-related skill that is actually related to collision risk, it will be important that any attempt to introduce hazard perception training into bus driving training is undertaken with sound research, beginning with a formal literature review which can underpin future development of tests and training materials.

5.2 Aggregated Countermeasures List

The countermeasures for the HVCIS data, police fatal files, and OTS & RAIDS cases have been aggregated into tables. These tables are based on the Haddon matrix, so they cover pre-crash, crash and post-crash groups of countermeasures. In addition some sub-categories are provided for the countermeasures, in order to aid understanding. The countermeasures are also grouped as being for the vehicle (& equipment), human or environment.

The aggregated tables sum up the numbers of cases per countermeasure, which represents the pool of relevant collisions. This is given for the police fatal files, HVCIS and the OTS & RAIDS cases separately. The total cases are then summed if the countermeasure is related to a bus because this is the focus of the Bus Safety Standard. The numbers for vehicles other than buses are also provided for information, but are not included in the total because they are not the focus of this research.

Within those collisions, each countermeasure will have its own effectiveness; i.e. if there are 24 cases for a given countermeasure, that countermeasure may be only 50% effective and so 12 cases might be effected rather than the full 24. The effectiveness of each countermeasure will depend upon many factors. For example, AEB system effectiveness will depend upon the type of sensor used and its performance parameters; if the potential collision with another vehicle is at too great an angle or offset then the AEB system might not be able to detect the threat, or might detect it late, resulting in a reduced effectiveness. Furthermore, the AEB system effect might be limited by human interaction with it. If the driver gives a large steering, braking or acceleration input then the system will not activate; the driver takes priority over operation of the vehicle. However it may be that the driver has a panic response to an AEB warning, and perhaps they might take an inappropriate action (accelerating instead of braking); in that case the AEB system, even though it's fitted, cannot be effective. So these are simple examples of both system and human reasons why a countermeasure is not likely to be 100% effective. We cannot know the realistic effectiveness without years' worth of data after a countermeasure has been implemented, and that is not available for most, particularly because many are new to market. The effectiveness indicator given in the aggregated tables therefore provides an estimated effect based on TRL expert opinion, by providing an estimate in bands:

- High (75% or greater)
- Medium (25%-75%)
- Low (less than 25%)

The tables of aggregated countermeasures also provide an average of the effectiveness estimate for some countermeasures based on the feedback received from manufacturers and operators in the questionnaire. Unfortunately the response numbers were very small (four from manufacturers and two from operators). However, it may still be used as an indicator for the purpose of prioritisation for the Bus Safety Standard. Not all countermeasures were included in the questionnaire,

so this field is only completed where a response was received (blank indicates lack of information, not a zero effect).

Estimated timescales are provided for each countermeasure, as either in current availability, or for an estimated period in the future. These timescales are a compilation of the responses from the questionnaire from manufacturers (noting that there were only 2), or are an estimate for TRL experts.

Finally a description or definition is provided for all the bus and human countermeasures. This definition should help to provide additional detail for understanding of the purpose and implementation of the countermeasure.

It is worth noting that there were three ‘other’ countermeasures applied to the police fatal files in addition; however these have been excluded from the aggregated tables that follow because there was no ‘other’ category in the HVCIS or OTS & RAIDS cases.

(intentionally blank, see next pages for tables of aggregated countermeasures)

Table 8: Vehicle - Pre-Crash phase - ADAS Countermeasures.

There may be multiple countermeasures per case. There may be multiple injured occupants associated with each case.			Count represents one case. Sample is 169 cases with fatality and countermeasure applied for 1999-2008.		Count represents one fatal case. Sample is 48 cases of bus fatality 2009-2014.		Count represents one case. Sample is 35 cases of bus injuries (all severities) 2000-2015.			Bus fatalities count: HVCIS + police fatals files + OTS & RAIDS fatals	High = 75% + / Medium = 25-75% / Low = <25% / TRL Estimate	Effectiveness rating from 1/lowest) to 5/highest based on stakeholder input. Figure is the average of received responses. (blanks were not requested; blanks do not mean zero effect)		Estimated timescale as either current or future.		Timescales, effectiveness indicators, and definitions provided only for bus countermeasures.
Category	Crash Phase	Countermeasure	HVCIS		Fatal Files		OTS & RAIDS			TOTAL	Effectiveness Indicator (within target population)*	Effectiveness* (bus manufacturer; 4 responses)	Effectiveness* (bus operator; 2 responses)	Timescale*		Definition
			Buses	Others	Buses	Others	Buses	Buses (fatal)	Others	Total Fatals		Score out of 5	Score out of 5	Manufacturer responses	TRL Estimate	
Advanced Driver Assistance (ADAS) – both warning and intervention	Pre-Crash	Advanced Emergency Braking System (AEBS)	6	4	1	1	4		2	7	High	4.50	4.00	2018	2018	AEBS combines sensing of the environment ahead of the vehicle with the automatic activation of the brakes (without driver input) in order to mitigate or avoid a collision. The level of automatic braking varies, but may be up to full ABS braking capability. A City system is designed to function in low speed traffic. An Inter-Urban system is designed to work at higher speeds. A pedestrian/cyclist system is capable of responding to pedestrians and cyclists as well as vehicles. Most AEBS work in longitudinal traffic, but the Cross-traffic AEBS can respond to crossing traffic.
		Advanced Emergency Braking System (AEBS) (city/low speed)				1	1			0	High				2018	
		Advanced Emergency Braking System (AEBS) (Pedestrian/cyclist)			24	1	7	2		26	High	3.25	4.00	2020-2026	2018-2020	
		Cross traffic Advanced Emergency Braking System (AEBS)			1	1	11		1	1	High					
		AEBS - Left turn					2			0	Medium	2.75	3.00	2020-2022	2020	AEB system capable of identifying a collision between a bus turning left and pedestrians and cyclists moving along the inside of the vehicle.
		Forward Collision Warning (FCW) (motorcycles only)				1			1	0						If the driver is unresponsive and an imminent collision is detected the system automatically provides a warning to try to bring the driver back into the loop. Note: AEB systems will typically pick up motorcycles in the same situations as cars e.g. mainly front to rear.
		Driver alert for approaching permanent hazard (sharp bend, steep decline)				1				0						Uncertain, not existing now but possible with enhanced GPS maps. Better with live feed to cloud mapping as likely to be available for automated vehicles.
		Anti-lock Brakes (ABS)	4	10					3	4	Low				current	Anti-lock braking system (ABS) uses electronics to detect and prevent wheel lock up. This helps a driver maintain control of a vehicle and prevent skidding, because a car's steering will still work when ABS is engaged. Most vehicles in service will have ABS, coded in older HVCIS data because many vehicles in study were not equipped.
		Electronically controlled Brakes (EBS)	1	9						1	Medium				current	Adds electronic control over the basic pneumatic braking system. Always incorporates ABD and can improve brake response time and the distribution of braking amongst the axles improving stopping distance
		Post impact braking system			1					1	Medium				2018	Post impact braking system uses sensors to identify an impact and then applies the brakes automatically so that the vehicle does not roll or deflect into another collision.
		Electronic Stability Control (ESC) system	1	11		2			4	1	High				2018	Electronic Stability Control (ESC) compares the heading of the vehicle against the steering input and if an oversteer (spin) or understeer is detected then it applies braking to individual wheels to help correct the steering and maintain control.
		Lane Departure Warning (LDW)		4		1			1	0						LDW monitors the position of the vehicle with respect to the lane boundary and issues a warning, when a lane departure is about to occur or when a vehicle has just crossed the lane boundary
		Lane Keep Assist (LKA)	1	12		1				1	Medium				2020	LKA monitors the position of the vehicle with respect to the lane boundary and applies a torque to the steering wheel, or pressure to the brakes, when a lane departure is about to occur to keep the vehicle in the lane.
		Improve Tyre Adhesion		1						0						A range of tyres with different adhesions are available so it would be possible for some increase by effectively banning the bottom end of existing range. However, more substantial changes might require significant development and acceptance that other properties might suffer (e.g. wear or rolling resistance)
		Turning Indicators		2						0						Turning indicators.
		Intelligent Speed Adaptation (ISA) (mandatory)	4	38	1	2				5	High				current	Intelligent Speed Adaptation (ISA) describes a range of technologies designed to aid drivers in observing the appropriate speed for the road environment. ISA can be voluntary the driver is given a warning when their speed is too great but no action taken, or it can be mandatory where the driver's speed selection is physically limited by an ISA system that cannot be switched off.
		Intelligent Speed Adaptation (ISA) (voluntary)			1					1	Low				current	
		Speed-limiter (70mph)	1							1	High				current	System prevents the vehicle from travelling at speed over 70mph.
		System preventing harsh acceleration			1					1	Medium				current	A system preventing harsh acceleration or deceleration would help to reduce this risk of standing occupants falling over.
		System preventing harsh deceleration			2					2	Medium				2022-24	
		Alco-lock	1	12		1				1	High				current	Prevents ignition if driver over limit. Sensed in vehicle compartment or specific device that driver must blow into before starting car.
		Driver Alertness Warning	2	7						2	Medium				current	System either uses camera system to examine blink rate/eyes in general or monitors steering wheel inputs. Warns driver if distraction detected. Future systems are likely to become more sophisticated and effective.
		Fatigue monitoring					1		1	0	Medium				current	
		Traffic Sign Recognition (TSR) (warning only)			1					1	Low				current	Traffic Sign Recognition (TSR) uses a camera in the vehicle to identify road signs such as speed limits, and displays them to the driver to the driver on-board the vehicle.
		Reverse Alarm	2							2	Low				current	An audible warning is issued to other road users, particularly pedestrians and cyclists, when the vehicle is reversing.
		Door Interlock	3							3	Medium				current	Door interlocks ensure that doors cannot open whilst the bus is in motion and may require the brakes to be applied or gear to be in park.

1.1 * For Buses only

Table 9: Vehicle - Pre-Crash phase - Vehicle Condition & Vision Countermeasures.

There may be multiple countermeasures per case. There may be multiple injured occupants associated with each case.			Count represents one case. Sample is 169 cases with fatality and countermeasure applied for 1999-2008.		Count represents one fatal case. Sample is 48 cases of bus fatality 2009-2014.		Count represents one case. Sample is 35 cases of bus injuries (all severities) 2000-2015.			Bus fatalities count: HVCIS + police fatals files + OTS & RAIDS fatals	High = 75% + / Medium = 25-75% / Low = <25% / TRL Estimate	Effectiveness rating from 1/lowest) to 5/highest based on stakeholder input. Figure is the average of received responses. (blanks were not requested; blanks do not mean zero effect)		Estimated timescale as either current or future.		Timescales, effectiveness indicators, and definitions provided only for bus countermeasures.
Category	Crash Phase	Countermeasure	HVCIS Buses	HVCIS Others	Fatal Files Buses	Fatal Files Others	OTS & RAIDS Buses	OTS & RAIDS Buses (fatal)	OTS & RAIDS Others	TOTAL Total Fatals	Effectiveness Indicator (within target population)*	Effectiveness* (bus manufacturer; 4 responses) Score out of 5	Effectiveness* (bus operator; 2 responses) Score out of 5	Timescale* Manufacturer responses	Timescale* TRL Estimate	Definition
Vehicle Condition	Pre-Crash	Prohibit Standees	8							8	High				current	Prohibiting standees would reduce the risk of falls. This could be achieved by interior design of the bus to minimise the areas suitable for standing, or with an enforcement scheme.
		Improved occupant safety on stairs (e.g. fall mitigating surface)			1					1	Medium				current	Provision of anti-slip surface to prevent falls whilst moving around the vehicle or standing.
		Eliminate Defects	4	2						4	Medium				current	Represents a maintenance scheme that is 100% successful at avoiding vehicles with any form of maintenance defects from going into service on the public road. Thus an upper ceiling for the potential benefit from improved maintenance.
Vision	Pre-Crash	Appropriate use of lights (not defects)				2				0						Driver dictates, though automated light level sensing could also be used and is available.
		Improve pedestrian and cyclist conspicuity	12			6				12	Medium				current	Improved conspicuity can be achieved through redesign of the environment, improved vision in the vehicle, or by changing the way people dress or behave.
		Improve Conspicuity	1	1						1	Medium				current	e.g. HGV conspicuity type requirements
		Fit improved mirrors (e.g. class V and VI mirrors)			2					2	Medium				current	Fitting front and nearside blind spot mirrors to vehicles that are not equipped with them due either to exemption from regulations or vehicle age.
		Improve Forward Vision	8							8	High				2020-24	Improved visibility via the windows/vehicle structure. Improved indirect vision via cameras mounted around the vehicle.
		Improve direct vision (front)	2		3	1	1			5	High				2020-24	
		Improve direct vision (side)	6		5					11	High				2020-24	
		Improve Vision to Doors	2							2	High				2020-24	
		Camera/sensor systems for detecting pedestrians and cyclists (for large vehicles)			9	1				9	Medium	3.00	4.00	2020	2020	Sensing device (camera/radar) specific for large vehicles to detect other road users in blind spots. Typically lower speed and in traffic in urban areas.

* For Buses only

Table 10: Vehicle -Crash phase – Pedestrians and cyclists, Crashworthiness & Occupant Safety Countermeasures.

There may be multiple countermeasures per case. There may be multiple injured occupants associated with each case.	Count represents one case. Sample is 169 cases with fatality and countermeasure applied for 1999-2008.	Count represents one fatal case. Sample is 48 cases of bus fatality 2009-2014.	Count represents one case. Sample is 35 cases of bus injuries (all severities) 2000-2015.	Bus fatalities count: HVCIS + police fatals files + OTS & RAIDS fatals	High = 75% + / Medium = 25-75% / Low = <25% / TRL Estimate	**Effectiveness rating from 1/lowest) to 5/highest based on stakeholder input. Figure is the average of received responses. (blanks were not requested; blanks do not mean zero effect)**	**Estimated timescale as either current or future.**	**Timescales, effectiveness indicators, and definitions provided only for bus countermeasures.**

Category	Crash Phase	Countermeasure	HVCIS Buses	HVCIS Others	Fatal Files Buses	Fatal Files Others	OTS & RAIDS Buses	OTS & RAIDS Buses (fatal)	OTS & RAIDS Others	TOTAL Total Fatals	Effectiveness Indicator (within target population)*	Effectiveness* (bus manufacturer; 4 responses) Score out of 5	Effectiveness* (bus operator; 2 responses) Score out of 5	Timescale* Manufacturer responses	Timescale* TRL Estimate	Definition
Pedestrians and Cyclists		Improved pedestrian secondary safety (relative to current typical level) / pedestrian friendly front	96		13		1			109	Medium	3.00	2.50	2020-26	2020-22	Ensuring that the front of the vehicle is capable of providing a small amount (2-3 cm) of controlled crush in case of a pedestrian impact to soften blow.
		Improved front end design; prevents pedestrian underrun at front - only if not laying down			6		3			6	Medium	3.00	2.50	2020-26	2020-22	A nosecone or shaped front structure (rather than flat) to help deflect pedestrians and cyclists from being dragged down and under the bus, and instead deflects up toward the windscreen and off to the side so that they are not overrun.
		Improved side design; prevents pedestrian underrun	3		6					9	Medium				?	Pedestrians and cyclists knocked to the floor by the bus may subsequently pass under the side of the vehicle and be crushed by structure and/or wheels. This covers any device that prevents them passing under the side
Crashworthiness	Crash	Energy-absorbing Front Underrun Protection System (FUPS)	11							11	High				2020	The stiff structures of commercial vehicles like buses do not necessarily align well with the stiff structures of cars such that the crash structures of cars do not work well increasing the likelihood of stiff structures of the bus intruding into the passenger compartment. FUPS are rigid or energy absorbing structures positioned at a height to interact with car structures protecting car occupants.
		Rigid Front Underrun Protection System (FUPS)	6							6	Medium				2018	
		Fit stronger and lower side guards	5							5	Medium				current	Stronger guards at the side of bus/coaches based on truck style chassis. Aims to prevent underrun of vehicles at the sides, because existing side underrun guards are for pedestrians are not strong enough to prevent underrun of cars.
		Improve structural crashworthiness (frontal)		10	1		1	1		2	Medium				2022	Buses do not have to pass minimum standards of crashworthiness and in collisions with other heavy vehicles or fixed objects can suffer high levels of intrusion. Improved frontal crashworthiness would reduce intrusion offering benefits mainly to restrained occupants.
		Improve Side Crashworthiness		7						0						Improved side crashworthiness would reduce intrusion offering benefits mainly to restrained occupants.
		Move External Projections	1	1						1	High				2018	Re-location of external projections around the bus can help to minimise risk of injury, particularly when passing pedestrians and cyclists.
		Airbag		5						0						Improve occupant protection.
		Motorcycle Airbag or Leg Guard		2						0						Intended to be effective in crashes where cars pull out of junctions in front of motorcylists by putting airbag between head and roof rails and keeping legs in position away from impact. Available in prototype and in very limited production, will take time to embed widely
		Prevent Fire		1						0						Fire prevention in materials selection and system design.
Occupant Safety		Improved occupant secondary safety (relative to current typical level)			1		1			1	Medium				2020	General improvements to occupant safety; for example, improved crashworthiness, improved restraints etc.
		Improve Public Service Vehicle (PSV) Internal Design	15	1						15	Medium	3.00	2.50	2020	2020	Design improvements to the interior of the bus to help improve occupant safety. These might include lighting, grab handles, re-positioning of features, cushioning, anti-slip surfaces etc.
		Doors to all 'Open' Exits	8							8	High				current	Adding doors to 'open' exits will help to prevent inappropriate entry/egress of the vehicle. E.g. old routemasters
		Rear Facing Seat	2							2	Medium				current	A rear facing seat will provide restraint to an occupant when the bus is involved in a frontal collision, providing a partial substitute for a seat belt in the most severe collision type.
		Use appropriate Child Restraint		1						0						Child restraints are a proven safety feature.
		Use of available seat belt	4	31	1	2				5	High				current	A three-point belt is a proven occupant safety feature, and increasing fitment and usage will help to minimise injury risk.
		Use Lap Belt	2	1	2					4	High				current	A lap belt is a proven occupant safety feature, and increasing fitment and usage will help to minimise injury risk.
		Use of helmet		7		2				0						A proven safety feature in defined circumstances. Motorcycle helmets effective in much higher speed collisions than cycle helmets which are intended mainly to protect when head falls into collision with floor or similar low speed collisions with vehicles.
		Provide Grab Handles	5							5	Medium				current	Provision of grab handles for occupants might help them to stay standing steadily and reduce the risk of falls in a collision or during harsh braking/acceleration.

1.1 * For Buses only

Table 11: Human - Crash phase – Pedestrians and cyclists, Crashworthiness & Occupant Safety Countermeasures.

There may be multiple countermeasures per case. There may be multiple injured occupants associated with each case.			Count represents one case. Sample is 169 cases with fatality and countermeasure applied for 1999-2008.		Count represents one fatal case. Sample is 48 cases of bus fatality 2009-2014.		Count represents one case. Sample is 35 cases of bus injuries (all severities) 2000-2015.			Bus fatalities count: HVCIS + police fatals files + OTS & RAIDS fatals	High = 75% + / Medium = 25-75% / Low = <25% / TRL Estimate	Effectiveness rating from 1/lowest) to 5/highest based on stakeholder input. Figure is the average of received responses. (blanks were not requested; blanks do not mean zero effect)		Estimated timescale as either current or future.		Timescales, effectiveness indicators, and definitions provided only for bus countermeasures.
			HVCIS		Fatal Files		OTS & RAIDS			TOTAL				Timescale*		
Category	Crash Phase	Countermeasure	Buses	Others	Buses	Others	Buses	Buses (fatal)	Others	Total Fatals	Effectiveness Indicator (within target population)*	Effectiveness* (bus manufacturer; 4 responses) Score out of 5	Effectiveness* (bus operator; 2 responses) Score out of 5	Manufacturer responses	TRL Estimate	Definition
Improve driver skills/behaviour	Pre-Crash	Better licensing (reduce exposure to specific high risk situations)	8	4			8		9	8	Low				current	A driver training program can cover many aspects of the driving activity, including hazard perception, rules of the road, etc. Licensing encompasses the driver training.
		Better licensing (medical/health related)	1			1				1	Medium				current	A medical review and assessment scheme can help to ensure that drivers are physically and mentally fit enough to drive.
		Public Training/Education	4	1						4	Low				current	A public training / education scheme can cover many aspects, including safety on buses, alighting and leaving buses, blindspots etc.
		Training or education to reduce other risky behaviours while driving (e.g. seat belt wearing)			1	2				1	Low				current	Training or education schemes aimed at improving driver skills or prevent risky behaviours.
		Training or education to reduce risky driving manoeuvre			1	6	4			1	Low				current	
		Training or education to reduce risky pre-driving behaviour (e.g. drink or drug use)				1				0						
		Training to improve hazard perception skill			7	16	16	3		10	Low				current	
		System design to reduce distraction from in-vehicle devices			1					1	Low				current	Systems that prevent inappropriate use of devices, or that monitor driver attentiveness.
Enforcement	Pre-Crash	Add speed camera at locus				1				0						

* For Buses only

Table 12: Environment – Pre-Crash phase – Signage, Road surface condition, Road layout, and Roadside Countermeasures.

There may be multiple countermeasures per case. There may be multiple injured occupants associated with each case.			Count represents one case. Sample is 169 cases with fatality and countermeasure applied for 1999-2008.		Count represents one fatal case. Sample is 48 cases of bus fatality 2009-2014.		Count represents one case. Sample is 35 cases of bus injuries (all severities) 2000-2015.			Bus fatalities count: HVCIS + police fatals files + OTS & RAIDS fatals
Category	**Crash Phase**	**Countermeasure**	**HVCIS**		**Fatal Files**		**OTS & RAIDS**			**TOTAL**
			Buses	**Others**	**Buses**	**Others**	**Buses**	**Buses (fatal)**	**Others**	**Total Fatals**
Fit/improve signage	**Pre-Crash**	Separate signal phases for cyclist's direction and oncoming right turners				2				0
		Add Road Sign					1		1	0
		Improve sign positioning (height, location)	5		1	1	1			6
		Change the layout/position of traffic light posts to make it better defined which lights are for which junction.				1				0
		Redesign signals to for clarification.				2				0
Improve road surface condition		Improve road surface friction				1				0
		Improve surface topography (pot-holes or defects)				1				0
Improved road layout/design		Add pedestrian crossing (if in urban area and appropriate)				2				0
		Relocate pedestrian crossing 20m further along to point known to be a desired line for pedestrians.				1				0
		Improve crossing facilities	31							31
		Provide cycle lane	4							4
		Provide/improve street lighting	7							7
		Repair street lighting defects in a timely manner.				2				0
		Repositioning of the Bus stop					1			0
		Prevent parking near junctions/bus lane			1		1			1
		Improve junction layout	7							7
		Improve road layout	7	1						7
		Redesign to improve junction visibility (if permanent obscurations)			1		3	1		2
		Improve sight lines (change junction design)			1					1
Vehicle has struck an object/ roadside furniture or run off the road		Add appropriate barrier			1					1
		Make hazard passively safe				1				0

* For Buses only

(page is intentionally blank, see next page for analysis of countermeasures)

5.3 Analysis of countermeasures

5.3.1 Bus countermeasures

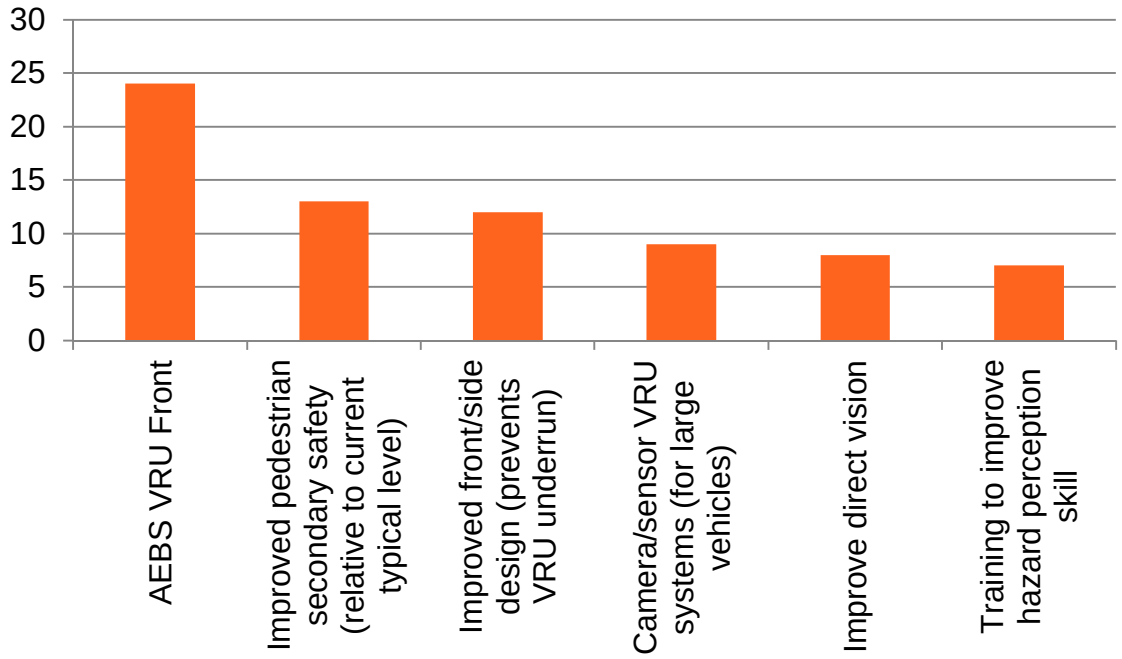
There are two primary mechanisms of injury for pedestrians in bus collisions:

- Head impacting the windscreen / A-pillar / wipers inducing severe head trauma, often followed by impact with the ground (noting that it can be difficult to differentiate between the two),
- Catastrophic crush and shear injuries when pedestrians pass under the bus.

Therefore, the associated countermeasures for buses are summarised in Figure 23, for the top six most frequent countermeasures in the police fatal files. It is very important to note that the assignment of countermeasures was an indicator of potential effect; it was not designed to represent the precise expected performance of a given system. For example, AEB systems have a range of different sensors, each with different operating parameters and effects, and then each is implemented on vehicles differently; the counts do not represent these precise systems, more a flag that an idealised AEB system had the potential to improve the outcome of the collision.

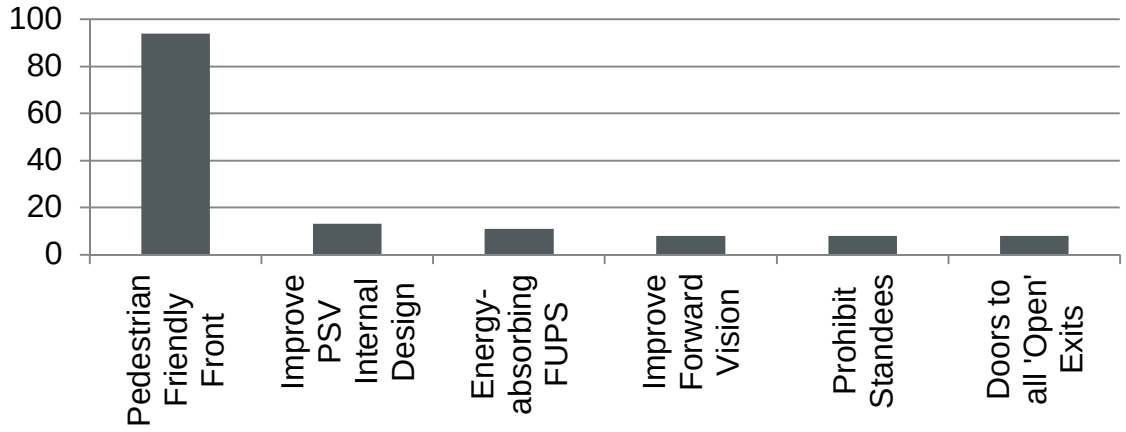
AEBS for pedestrians and cyclists at the front of buses had the highest frequency. If this is grouped with the camera/sensor systems for detecting pedestrians and cyclists and improved direct vision, which are related in terms of identification/vision of pedestrians, then this group is the largest by far. The next most frequent group is the secondary safety improvements, achieved by combining the improved pedestrian secondary safety and improved front/side design, which also accounted for a very large group of the countermeasures assigned. Overall this brings a clear message that improving the ability for the bus (driver) to identify a pedestrian hazard, and to improve the secondary safety are the two highest priorities for the Bus Safety Standard.

Figure 23: Summary of top 6 most frequently assigned bus countermeasures. Source data: police fatal files.



The HVCIS data also confirmed that protection of pedestrians and cyclists in the event of a collision would be of benefit, as shown in Figure 24 where the pedestrian friendly front structure is the most frequently assigned countermeasure. It is worth noting that AEB for pedestrians and cyclists does not appear in the HVCIS top 6; but this is primarily because it was a not a technically feasible option at the time of the data collection for HVCIS.

Figure 24: Summary of top 6 most frequently assigned bus countermeasures. Source data: HVCIS.



It is also possible to compare the most frequently occurring countermeasures in the police fatal files, HVCIS and OTS & RAIDS datasets. However, the data sets vary in

their relevance to modern TfL buses operating in London and in their statistical power, so it is important to give more weight to the more relevant and robust studies. In total, from all the datasets, there were 409 countermeasures applied to bus fatality cases. However, the vast majority are from the HVCIS due to its size; 301 from HVCIS, 101 from the police fatal files and 7 from the OTS and RAIDS cases. The advantage of the HVCIS data is the volume of data available; however it is an older dataset and could only be limited to urban crashes (not London ones). Therefore the counts for the HVCIS have been scaled down to bring the totals for HVCIS and the police fatal files to an even weighting, which was by approximately two thirds. The counts for the police fatal files were not scaled because they represent London and are a more recent dataset. The OTS and RAIDS counts were scaled to 75% because that dataset, while it is current in comparison to HVCIS, represents urban collisions outside London. This weighting of data allows a more balanced comparison between the datasets in order to generate a view of the most frequently occurring countermeasures for bus fatalities.

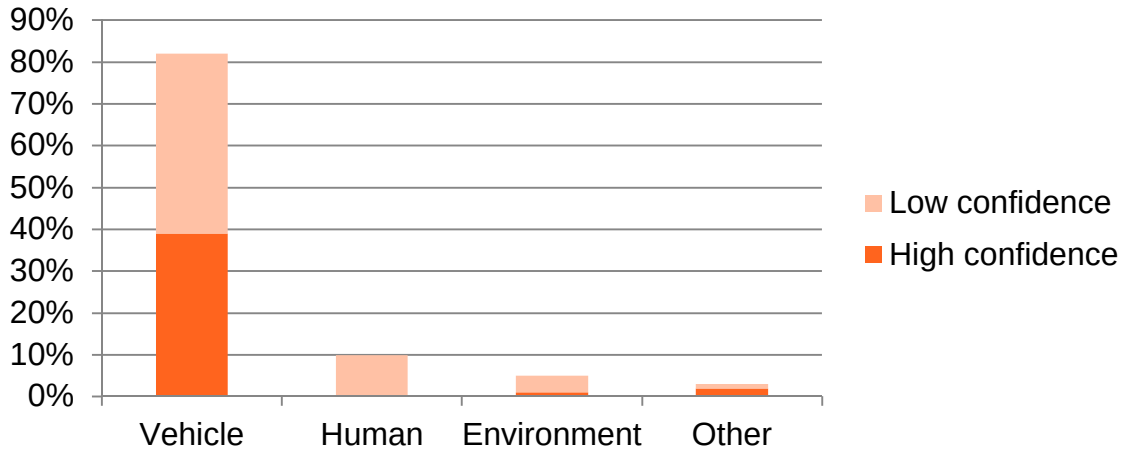
Figure 25 describes the top ten list of countermeasures after the scaling was applied. This shows that AEB for pedestrians and cyclists and Improved pedestrian secondary safety (pedestrian friendly front end) were the most frequent countermeasures that had been applied. In total, this top ten list accounts for two thirds of all the countermeasures applied.

Figure 25: Top ten bus fatality countermeasures from scaled aggregated datasets. Data source: HVCIS, police fatal files, OTS & RAIDS.

Group	Crash Phase	Category	Countermeasure	Scaled %
Vehicle	Pre-Crash	ADAS	**Advanced Emergency Braking System (AEBS) (Pedestrian/cyclist)**	12.3%
Vehicle	Pre-Crash	ADAS	**Camera/sensor systems for detecting pedestrians and cyclists** (for large vehicles)	4.3%
Vehicle	Pre-Crash	Vision	**Improve direct vision (front & side)**	6.5%
Vehicle	Pre-Crash	Vision	**Improve pedestrian conspicuity**	1.9%
Vehicle	Crash	Crashworthiness	**Energy-absorbing Front Underrun Protection System (FUPS)**	1.8%
Vehicle	Crash	Occupant Safety	**Improve Public Service Vehicle (PSV) Internal Design**	2.4%
Vehicle	Crash	Pedestrian and cyclist	**Improved pedestrian secondary safety (relative to current typical level)**	21.8%
Vehicle	Crash	Pedestrian and cyclist	**Improved front/side design (to prevent pedestrian underrun)**	6.3%
Human	Pre-Crash	Improve driver skills/behaviour	**Training to improve hazard perception skill**	4.5%
Environment	Pre-Crash	Improved road layout/design	**Improve crossing facilities**	5.0%
			Total	**66.8%**

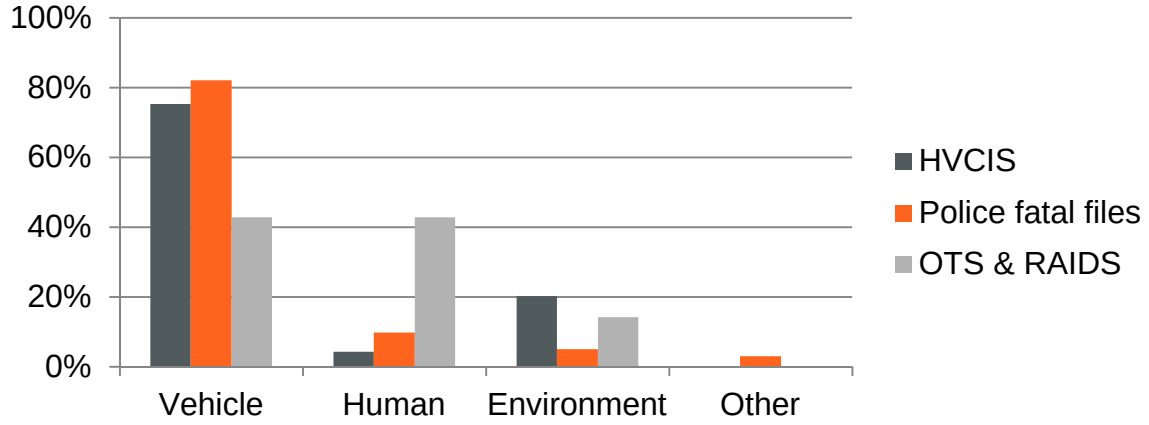
Overall, the countermeasures were also categorised as human, vehicle, environment, or other. Each countermeasure for the police fatal files was also given a confidence level (low or high) indicating how confident the investigator was of the effect of the countermeasure. For the police fatal files the countermeasures are summarised by category and confidence level in Figure 26 below.

Figure 26: Bus countermeasures by category and confidence level. Source data: police fatal files.



The bus countermeasures per category are also compared between the three datasets (HVCIS, police fatal files, and OTS & RAIDS cases) in Figure 27. This shows that there is reasonable agreement between the data sources that vehicle countermeasures are the largest group. The main difference is that there is a fairly even split between vehicle and human countermeasures in the OTS & RAIDS cases. The environment countermeasures are fairly infrequently applied in all data sources.

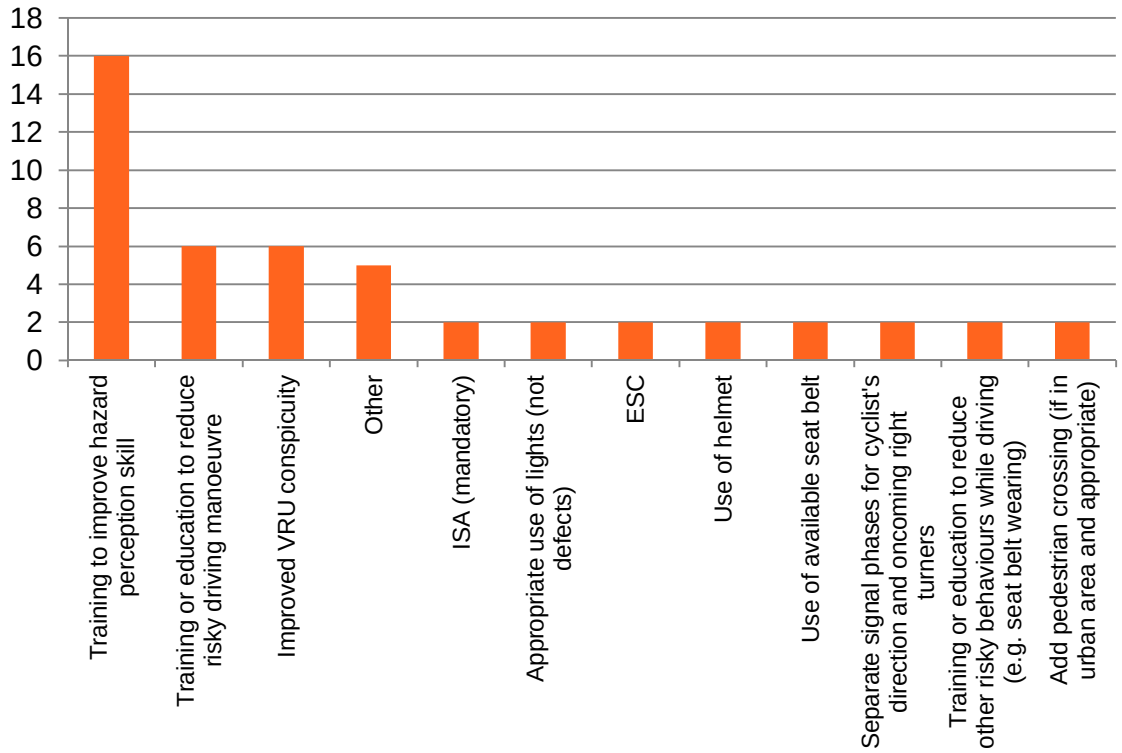
Figure 27: Bus countermeasures by category. Source data: HVCIS, police fatal files, OTS & RAIDS.



5.3.2 Other road user countermeasures

Considering the countermeasures for the other roads users as identified from the police fatal files, the analysis reveals that the most frequently applied countermeasure is training to improve hazard perception skill, as shown in Figure 28 which is using the raw unscaled counts of countermeasures. After that there is a fairly large group of countermeasures that were assigned with relatively even frequency. Training is a theme throughout the countermeasures, as is proper use of safety systems such as seat belts, helmets etc. Note that there were also many countermeasures assigned to only one case each, but these have been excluded from the figure.

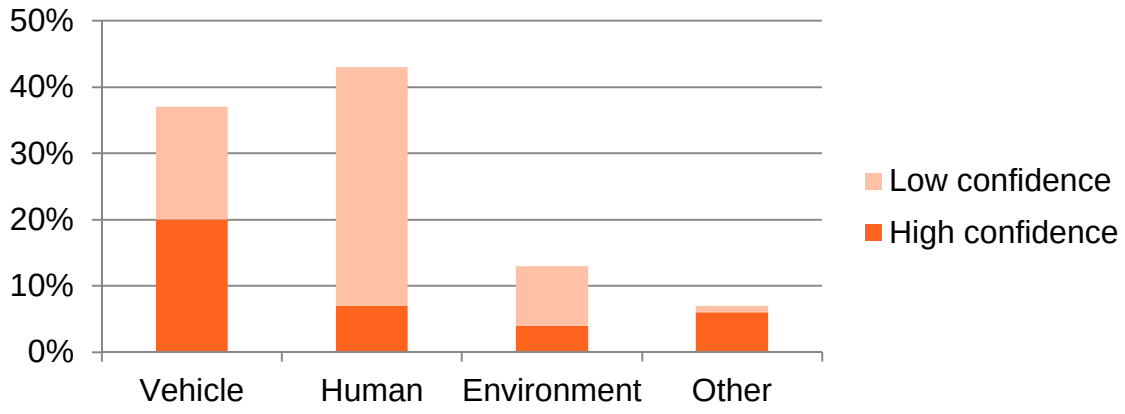
Figure 28: Summary of other road users' countermeasures.



The categories of the countermeasures (vehicle, human or environment) are summarised in Figure 29 below for the police fatal files, which also provides a summary of the level of confidence in the countermeasure's effectiveness as either high or low. The human countermeasures were the most frequent for the other road users, although mainly with low confidence. The countermeasures with the highest confidence were the vehicle related countermeasures. The 'other' countermeasures were mainly environment related and included:

- Better maintenance of existing street lights (3 defective at locus).
- Relocate pedestrian crossing 20m further along to the point where V2 & V3 crossed as this is known to be a desired line for pedestrians.
- Change the layout/position of traffic light posts to make it better defined which lights are for which junction.
- Repair street lighting defects in a timely manner.
- Although pedestrian light was red, road signed 'look right' and sign ahead stated same, its possible pedestrian thought pedestrian green light for adjacent carriageway meant safe to cross busway or saw green man on an adjacent arm.

Figure 29: Other road user countermeasures by category and confidence level. Source data: Police fatal files.



5.3.3 Combined countermeasures

The HVCIS dataset is different from the others in that it has an ability to identify a countermeasure that should be used in conjunction/combination with another/multiple countermeasure(s). There were 13 HVCIS cases where this 'in conjunction with' feature has been used for the countermeasures, and these are shown in Table 13. These are interesting because it gives some indication of how, from an engineering perspective, the countermeasures could be combined to give a better effect. For example, the intelligent speed limiter is applied in one case, but in combination with a pedestrian friendly front end for the bus; showing that a pre-crash countermeasure can be combined with a crash phase countermeasure where the pre-crash measure cannot fully avoid the collision, merely reduce the collision speed. There is one case where three countermeasures are applied in combination, which are all related to vision/lighting: improving pedestrian conspicuity, providing street lighting and improving lighting.

Table 13: HVCIS countermeasures in conjunction with other countermeasures. Source data: HVCIS.

Countermeasure	In conjunction with Countermeasure	In conjunction with Countermeasure	Buses count	Notes
Fit Electronic Brakes	Fit Anti-lock Brakes		1	
Improve Driver Training	Fit Anti-lock Brakes		1	
Pedestrian Friendly Front	Fit Anti-lock Brakes		1	These two are both combining countermeasures from the pre-crash and crash phases
Pedestrian Friendly Front	Fit Intelligent Speed-limiter		3	
Improve Forward Vision	Improve Side Vision		1	
Prohibit Standees	Improve PSV Internal Design		1	
Use Lap Belt	Provide Grab Handles		1	
Improve PSV Internal Design	Provide Grab Handles		1	
Provide Street Lighting	Improve pedestrian conspicuity		1	These two are very similar
Improve pedestrian conspicuity	Provide Street Lighting	Improve Lighting	1	
Improve signage	Improve Crossing Facilities		1	

NB, Indicates the age of the HVCIS sample

5.4 Prioritised List of Countermeasures

From the top ten countermeasures in Figure 25, it is possible to identify those that will have the greatest opportunity to affect bus collisions, i.e. those with the greatest frequency. The shortlist of the top ten was created by identifying those vehicle countermeasures with the highest combined count of fatalities from the police fatal files, HVCIS, RAIDS and OTS cases. The older and larger datasets were used in order to provide volume to the analysis, and to balance any risk posed by relying on the very small sample of the police fatal files. The effectiveness was considered as well as the frequency of the assigned countermeasures, by only including those measures that are anticipated to have medium to high effect. The top ten was then ordered by the frequency count for the police fatal files, as being the most relevant to London for the sake of the TfL BSS. This prioritised list is as follows in Table 15.

At the top of the priority list of countermeasures is AEBS for pedestrians and cyclists. This has the highest count of relevant fatalities from the police fatal files and is anticipated by the Experts Steering Group and stakeholders to have high effectiveness. However, it is important to note that for HVCIS, AEBS was not defined as a specific countermeasure, only as a generic 'collision avoidance system'; for the purposes of this analysis, these cases have been treated as AEBS. HVCIS is likely to have proportionally lower numbers against AEBS than other more modern databases, mainly due to lack of familiarity with the system on the part of the coders at that time because AEBS was relatively new, and because AEB for pedestrians and cyclists was not technically feasible at that time.

Some stakeholders raised concerns about the consequences for unrestrained and standing bus passengers in the case that AEBS were activated and braking applied (whether that be AEBS in response to a vehicle or a pedestrian). If there are standing passengers then they would be at risk as described in the simplified scenarios in Table 14. It is also important to note that in the analysis of the 48 police fatal files for London bus collisions, in the vast majority of cases the person who was fatally injured was the only person injured in the collision. It is very important that AEBS is developed with a focus on minimising false activations.

There are different types of AEBS that deploy different levels of braking and different onset rates. It should be possible to tune the algorithms for AEBS on buses to optimise collision prevention and mitigation against the need to avoid false positives, and perhaps with earlier onset more gradual braking to help minimise the risk to standing passengers. The argument about AEBS potentially causing risk to standing passengers might also be alleviated if AEBS came as a package of measures that also aimed to make the inside of buses softer and less hostile to falling passengers (e.g. soft stanchions, grab rails etc, rubberised floor). This point is highlighted in Table 15 by arrows connecting the AEBS with the bus interior design countermeasures.

Table 14: Simplified scenarios describing risk to standing passengers in bus collisions.

	Scenario	Risk to standing passengers	Notes
1	Normal driving	Very low	In normal driving standing passengers will naturally brace themselves to the movement of the bus
2	The driver braked to try to avoid a collision (whether with a pedestrian or vehicle)	Yes	Driver is taking correct action
3	The bus suffered an impact with a vehicle	Yes	Deceleration in an impact might pose a risk to standing passengers
4	AEBS braking was activated	Yes	Whether mitigation or avoidance
5	The driver braked post-impact with a pedestrian/cyclist	Yes	A common reaction is to brake post-impact
6	The bus suffered an impact with a pedestrian/cyclist, with no post-impact braking	Very Low	Unlikely to occur often, see scenario 5. Drivers are required to stop after a collision
7	AEBS warning was falsely deployed	Very Low	Drivers will assess the situation and ignore the warning
8	AEBS braking was falsely deployed	Yes	This is the only scenario where braking would not otherwise have occurred

AEBS for pedestrians and cyclists and passive protection, or pedestrian friendly front end design, could also be complementary, although not in the same way as for passenger cars. Passive protection is only effective up to 40km/h, but car collisions happen at higher speeds e.g. up to 60km/h. AEBS can mitigate the severity of a 60km/h pedestrian crash to a 40km/h collision, but it can't completely avoid a 60km/h crash. Bus to pedestrian crashes are almost all at less than 40km/h so AEBS can potentially avoid some collisions and passive protection can also work on those same collisions; making these, theoretically, duplicates. However, AEBS works well on central impacts, but is less effective on those nearer the corners, so there might be an argument for combining AEBS with passive protection around both edges of the front of the bus. This is highlighted in Table 15 with the arrow linking the two countermeasures, which notes that the two countermeasures should be optimised to complement, and not to duplicate each other. This linking of countermeasures is building on the approach used by experts in the HVCIS, who identified countermeasures to be used in conjunction with others. The pairings are the not the same in this priority list of the Bus Safety Standard as those identified in HVCIS, but the engineering approach is the same.

As found in the collision analysis (see Appendix A.5) the pedestrians are most frequently approaching from the nearside, and there is very little time for the driver to react, however 40% of the police pedestrian fatalities had a time to collision greater than one second. In collision investigation it is typically considered that driver reaction times are in the range of 0.75 to 2 seconds and the bus will additionally take a finite amount of time to stop once the driver has applied the pedal. Thus, in principle a warning might help a driver who was distracted such that they didn't see the pedestrian move off the kerb, but who then reacted at the faster end of the spectrum expected. In other words, an AEB system that can reduce the reaction time using automation fundamentally has more potential for avoiding or mitigating the severity of pedestrian fatalities than a warning system.

In the development of AEBS for cars, the AEBS capable of responding to the rear of a car and the AEBS capable of responding to pedestrians and cyclists have been developed in close succession. In general on cars, the AEBS for pedestrians and cyclists can also respond to vehicles, and is seen as the more sophisticated system.

The top ten identified in section 5.3.1 included some measures that are not included in the prioritised list for the Bus Safety Standard. These are:

- Improve pedestrian conspicuity; out of scope of the BSS
- Training to improve hazard perception skill; shows promise although further research is needed, and is out of scope of the BSS
- Improve crossing facilities; out of scope of the BSS

ISA is a countermeasure included in the priority list despite it not showing in the top 10 based on the bus fatalities analysis. This is because it has a high effectiveness indicator, and because it is being reviewed for implementation into the General Safety Regulation; more importantly because it might have benefits for air quality, fuel consumption and greenhouse gas emissions too. TfL is already delivering a program of research around ISA for Buses, based on commitments already in place; this research includes a TRL project to develop a specification (as yet unpublished).

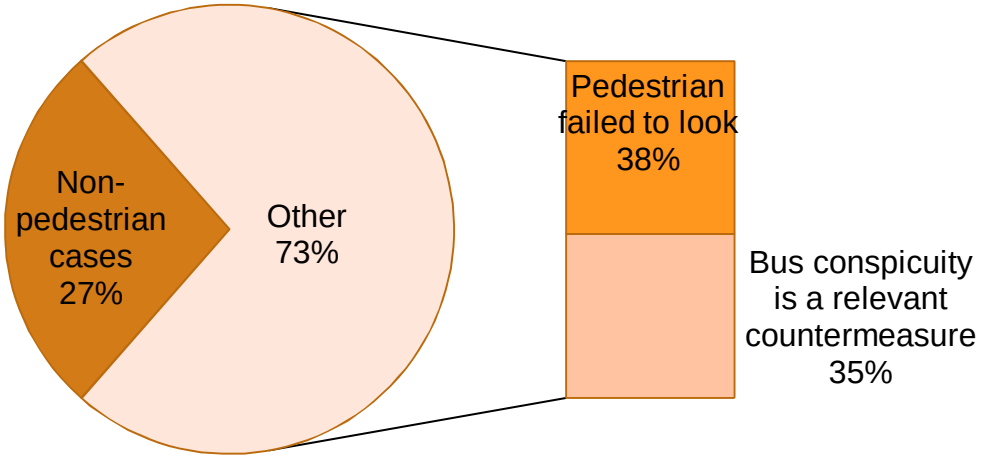
The prioritised list in Table 15 includes a "Notes" column covering any regulatory aspects, additional information, and highlighting any combinations of countermeasures.

Automated Emergency Steering (AES) is a system that offers some promise for avoiding or mitigating pedestrian collisions at the front corners of the bus. Pedestrians crossing from the nearside with a small overlap are the most frequent scenario for pedestrian fatalities in bus collisions. However, this countermeasure was not coded by the investigators at the time, so it is difficult to quantify the potential benefit in the same way as others on the list. The system is very new to the car market, and we might expect implementation on buses to take at least several more years. AES is therefore perhaps a system to monitor in development for cars, and then consider for a second phase of the Bus Safety Standard.

Improved bus conspicuity might help to avoid or mitigate collisions. This countermeasure might include adding brighter or more reflective colours, adding lighting, even adding sounds etc; it could include any feature that might draw the attention of a pedestrian to the bus. An existing example would be the bus conspicuity measures on school buses in the USA. Bus conspicuity was not coded

as a countermeasure by the investigators and therefore hasn't been included in the aggregated tables or priority list. However, we might assume that for any pedestrian collision, increased bus conspicuity would help, but that would be an overestimate since in 18 of 35 (about half) pedestrian deaths in the police fatal files had 'failed to look' recorded for the pedestrian. If the pedestrian does not look at all, then increased bus conspicuity cannot help. However, it still would be relevant for 17 (35%) of the police fatal files (as in Figure 30) and therefore this measure has been included on the priority list, especially because it could be implemented immediately without waiting for technological developments. Additionally, if changes are made to bus conspicuity at the front of the bus this might also affect pedestrian friendly front end design, so these two measures are also combined.

Figure 30: Estimation of relevant pool of police fatal files for bus conspicuity. Source: Police fatal files



The stiff structures of commercial vehicles like buses do not necessarily align well with the stiff structures of cars. The result in a collision is that the crash structures of cars do not work well, and there is increased likelihood for the stiff structures of the bus to intrude into the passenger compartment. Energy-absorbing Front Underrun Protection System (FUPS) are energy absorbing structures positioned at a height to interact with car structures protecting car occupants (they may also be in a rigid form). Energy-absorbing FUPS is included in the priority list on the basis of the number of times it was identified as a countermeasure in HVCIS, although it does not appear as a countermeasure in the police fatal files. This is perhaps due to the small sample size of the police fatal files and might be down to chance. However it might be that underrun is not such a problem on London's roads, or that the modern London buses often have a low floor that aligns with vehicle structures. Therefore this countermeasure was moved to the lowest position in the list, tenth; and further research on this topic is recommended before implementation into the BSS.

Table 15: Prioritised List of Countermeasures for Bus Safety Standard.

Countermeasure	Target Population	Effectiveness	Available	Notes
Advanced Emergency Braking System (AEBS) for pedestrians and cyclists	24 (police fatal files)	High (3.25 from operators, 4 from manufacturers)	2018	Buses designed for standing passengers are currently exempt from regulation.
Bus conspicuity	17 (estimate; police fatal files)		Current	Not coded by investigators, but estimated based on collision data.
Pedestrian Friendly Front End	93 (HVCIS) 13 (police fatal files)	High (3 from operators, 2.5 from manufacturers)	2020/22	Should be optimised to complement, not duplicate. AEBS for pedestrians and cyclists will help for pedestrian collisions in the middle of the bus front; so pedestrian friendly front should focus on the corners of the bus for softness and deflection out of path
Improved front/side design (to prevent pedestrian underrun)	3 (HVCIS) 12 (police fatal files)	Medium (2.5 from operators, 3 from manufacturers)	2020-22	
Camera/sensor systems for detecting pedestrians and cyclists	9 (police fatal files)	Medium (3 from operators, 4 from manufacturers)	2020	AEB technologies for the same areas might be more effective, but were not directly assessed by the coders. Further technical sophistication may be needed so implementation would be later. Under review for EC regulatory requirement for all M3 vehicles to have camera and detection: 01/09/2020 new approved types, 01/09/2022 for new vehicles
Improve Direct Vision (front and side)	8 (police fatal files)	High	2020-24	Under review for EC regulatory requirement for all M3 vehicles to have improved direct vision: 01/09/2028 for new approved types; No new vehicles date foreseen due to impact on overall truck cab designs
Advanced Emergency Braking System (AEBS) to other vehicle rear	1 (police fatal files)	High (3.25 from operators, 4 from manufacturers)	2018	Buses designed for standing passengers are currently exempt from regulation.
Bus interior design	15 (HVCIS) 1 (police fatal files)	Medium (3 from operators, 2.5 from manufacturers)	2020	Should be packaged to complement AEBS to mitigate any adverse effect of false positives; prevention of frequent minor injuries is an operator priority. Likely to be particularly important for reducing slight injuries. Top priority because two thirds of casualties occur without a collision.
Intelligent Speed Adaptation (ISA)	6 (HVCIS) 1 (police fatal files)	High	2018	Under review for EC regulatory requirement for all M3 vehicles: 01/09/2020 new approved types, 01/09/2022 for new vehicles
Energy-absorbing Front Underrun Protection System (FUPS)	11 (HVCIS)	High	2020	

5.5 Summary of analysis of countermeasures

From discussions at the Experts' Steering Group the countermeasures considered to be most suited to the collision types identified in the police fatal files are:

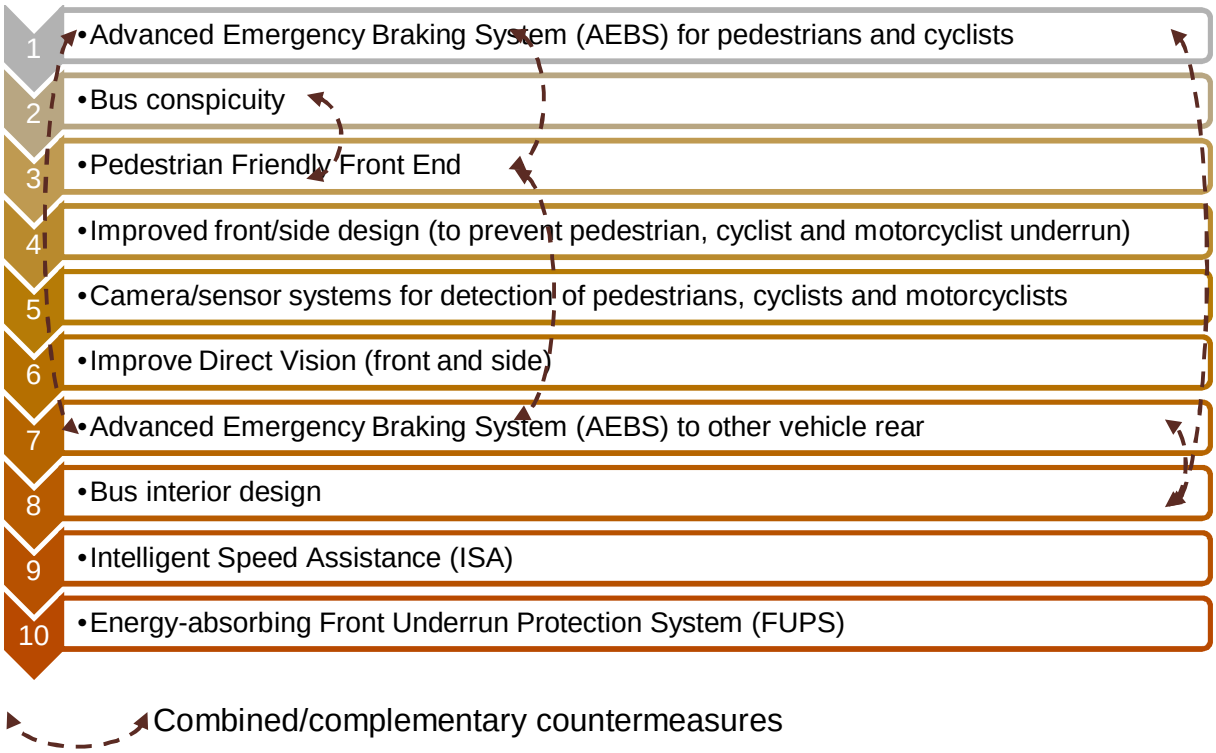
- AEB for pedestrians and cyclists (for frontal impact scenarios)
- Improved bus occupant safety
- Improved frontal structures

Stakeholder input via a questionnaire and a workshop has provided some useful insight into the enablers and barriers to implementation for many of the countermeasures. For example, there was strong concern about AEBS applying braking to avoid a pedestrian, but causing injury or even fatality to possibly multiple standing occupants on board the bus. Although in most collisions the bus will be braking anyway, whether driver braking prior to or affect impact or deceleration during the impact, so the risk to bus occupants is unavoidable; perhaps the biggest risk of additional casualties would be from false activations of AEBS.

A key finding from the human factors and behaviour change workshop was that hazard perception training shows some promise, but that the drivers and unions need to be involved and supportive of any behaviour change program. The Advanced Driving Instruction program should also consider human factors in order to best support bus drivers. Further research is needed into the field of hazard perception training.

The countermeasures identified in the police fatal files, HVCIS and OTS & RAIDS cases were compiled into aggregated countermeasures tables, following the Haddon matrix approach. This gave an indication of the total number of cases that might be affected by a given countermeasure. A scaling was applied to the counts for each dataset in order to make them more comparable, and then a top ten countermeasures list was generated by selecting the highest frequency measures and those with medium/high effectiveness. This top ten, along with some expert input from the Steering Group, was used to generate a prioritised list of countermeasures for the Bus Safety Standard based on the frequency of the police fatal files from London (the most relevant dataset for TfL). The highest priority measure is AEBS for pedestrians and cyclists, since the highest frequency of fatalities is pedestrians The priority list includes some notes of where countermeasure should be developed together, in order to harmonise performance for the greatest casualty saving effect. For example AEBS should be developed in conjunction with improved internal bus design, in order to protect the occupants on board should a braking event occur; and alongside pedestrian friendly front end design in the event that a collision is unavoidable due to a very short reaction time.

The priority list represents the top ten recommendations of bus coumtermeasures for the BSS, including those measures that are combined or inter-related, and is summarised below:


1
•Advanced Emergency Braking System (AEBS) for pedestrians and cyclists
2
•Bus conspicuity
3
•Pedestrian Friendly Front End
4
•Improved front/side design (to prevent pedestrian, cyclist and motorcyclist underrun)
5
•Camera/sensor systems for detection of pedestrians, cyclists and motorcyclists
6
•Improve Direct Vision (front and side)
7
•Advanced Emergency Braking System (AEBS) to other vehicle rear
8
•Bus interior design
9
•Intelligent Speed Assistance (ISA)
10
•Energy-absorbing Front Underrun Protection System (FUPS)
Combined/complementary countermeasures

6 Conclusions

6.1 Bus Collision Types

The analysis of bus collisions has examined a variety of data sources, including Stats19, 48 police fatal files, HVCIS, and case summaries from OTS and RAIDS. This has contributed to a detailed picture of bus collisions happening in London, and analysis summarising the findings has been generated:

1) In a European context, bus collisions have reduced by almost 50% in the period 2005 to 2014.
2) Comparing fatalities per billion vehicle kilometres travelled, the group comprising cars, taxis and vans have one-fifth of the risk compared to buses; however exposure and usage differences are likely to be important factors in this difference.
3) GB statistics show that casualties from bus collisions are reducing; fatality reduction on London's buses is only fractionally less than nationally. When only London is considered, the reduction in casualties from collisions involving buses is much less (13%) than for the national equivalent (38%).
4) In bus collisions, occupants of the bus are the most frequently injured casualties.
5) According to Stats 19 over two-thirds of the injuries on buses occur without a collision. IRIS data from TfL indicates that 76% of injuries are onboard injuries.
6) Pedestrians are the most frequent bus fatalities accounting for around two thirds of the fatalities in London.
7) Pedestrians are most often killed by buses when crossing the road, and most often in collisions with the front of the bus crossing from the nearside. The time to collision is often very low (less than a second), but in about 40% of the police fatal files the pedestrian became visible more than 1 second before impact; potentially within scope of AEB.
8) Car occupants are also most often killed in impacts at the front of the bus; belt usage by the car occupant is an important factor for these crashes.
9) Human and environmental factors were the most frequent causation factors.
10) In over half the police fatal files assessed, the bus driver was not assigned a precipitating factor because the pedestrian entered the carriageway without due care. However in other cases the drivers failed to avoid a pedestrian/object/vehicle or failed to stop.
11) Loss of control of the vehicle was the biggest precipitating factor for the car occupant fatalities in the police fatal files.

6.2 Bus Collision Countermeasures

There are a variety of countermeasures designed to help avoid or to mitigate the severity of injury in bus collisions and these can be active in any of the crash phases;

most are active in the pre-crash and crash phases. As an example, the most frequent countermeasure was Advanced Emergency Braking Systems (AEBS) that is capable of responding to pedestrians and cyclists; which is related to the majority of fatalities from bus collisions being pedestrians.

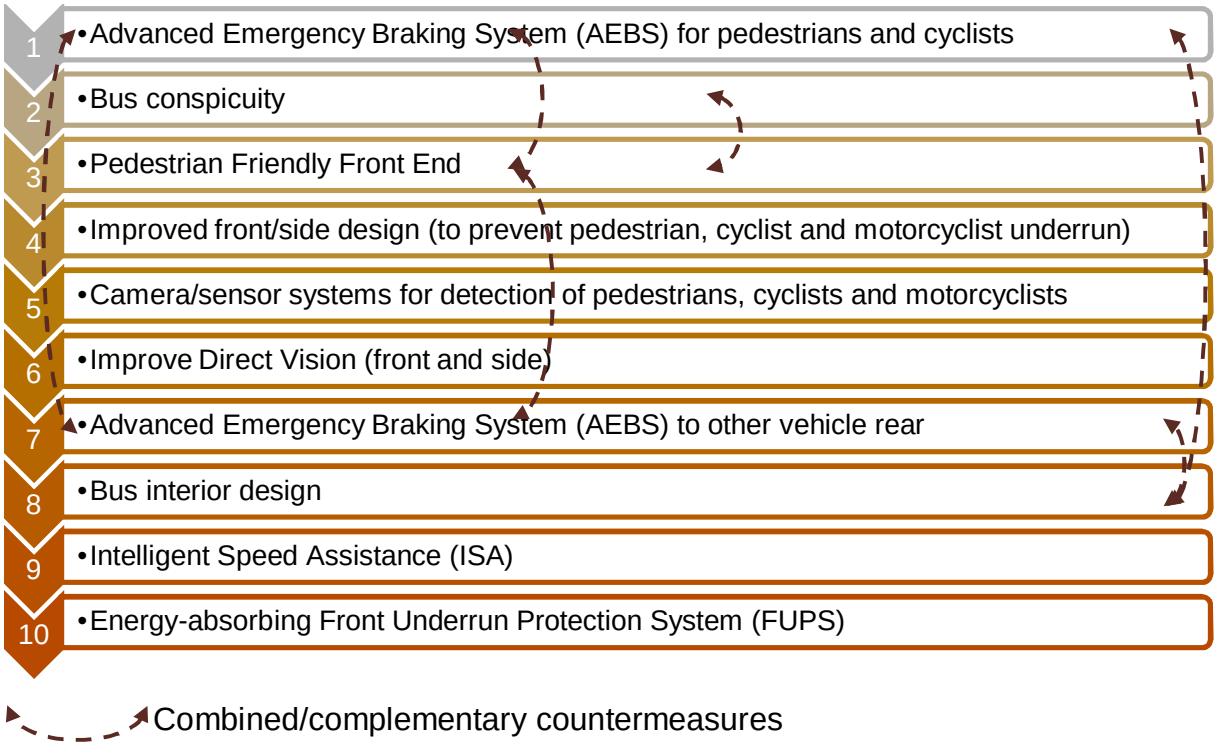
In reality there was a very long list of countermeasures that were applied to the cases in the datasets examined, and multiple countermeasures can be applied to each case. The effectiveness of the countermeasures varies depending on the specific situation and characteristics of the collision location. Combinations of countermeasures applied together may prove more effective than isolated countermeasures.

Stakeholder input via a questionnaire and a workshop has provided some useful insight into the enablers and barriers to implementation for many of the countermeasures. For example, there is strong concern about AEBS applying braking to avoid a pedestrian, but causing injury or even fatality to possibly multiple standing occupants on board the bus. Although in most collision scenarios the bus driver will brake the bus sharply at some stage, so the risk to bus occupants is unavoidable; perhaps the biggest risk of additional casualties would be from false activations of AEBS.

The countermeasures identified in the police fatal files, HVCIS and OTS & RAIDS cases were compiled into aggregated countermeasures tables, following the Haddon matrix approach. This gave an indication of the total number of cases that might be affected by a given countermeasure. A scaling was applied to the counts for each dataset in order to make them more comparable, and then a top ten countermeasures list was generated including only those measures that were medium or high effectiveness. This top ten, along with some expert input from the Steering Group, was used to generate a prioritised list of countermeasures for the Bus Safety Standard. The ordering was based on the frequency in the police fatal files, which is the most relevant dataset for TfL because it was London buses only. The highest priority measure is AEBS capable of responding to pedestrians and cyclists, mainly because pedestrians represent the majority of bus fatalities. The priority list includes some notes of where countermeasure should be developed together, in order to harmonise performance for the greatest casualty saving effect. For example, AEBS should be developed in conjunction with improved internal bus design, in order to protect the occupants on board should a braking event occur. Also, AEBS should be developed in combination with pedestrian friendly front end design, perhaps with a particular focus on the front corners of the bus, to protect those pedestrians in cases where the reaction time is so short that the collision is unavoidable. The AEBS should be implemented on buses carefully in order to minimise the risk of false activations, because these false activations might incur additional risk to any standing passengers. Manufacturers and operators should also develop suitable repair and calibration processes so that costs are minimised in the event that damage should occur to the sensors.

The priority list represents the top ten bus coumtermeasures recommended for the BSS, and is summarised below. These were prioritised on the basis of numbers of fatalities (combined from a range of sources), system effectiveness and system applicability, with the final list ordered by the frequency count for the police fatal files becasue this was judged most relevant for the BSS. The arrows on the priority list below indicate complementary/combined countermeasures that address the same

collisions, or in the case of bus interior design and AEB, those that might be considered as part of the risk migation strategy for standing passengers. Additionally, if changes are made to bus conspicuity at the front of the bus this might also affect pedestrian friendly front end design, so these two measures are also combined.



6.3 Limitations

The datasets available for this study were heavily focussed on fatalities, and thus the analysis of collision distributions and relevant countermeasures is unlikely to represent an effect for slight or serious countermeasures as well it does for fatalities. The HVCIS dataset is relatively old, and may not be representative of the types of collisions and their associated countermeasures that are occurring with today's bus fleet in London. However, if data from the London bus operating companies could be accessed, then further analysis of this, potentially more relevant dataset, could be completed, and used to complement and extend the work already completed in this project. Data is gathered from London Bus operating companies using an in-house data logging system, IRIS, which every London bus operating company has access to. Bus companies are required to report incidents regardless of blame and severity. The logging system is intended to provide data for statistical reasons to support safety evaluation. Data from this source, perhaps supplemented with additional detail from the operators, could be provided to TRL. This could cover all incidents which resulted in an injury, and for other event types deemed by London Buses to be serious or had the high potential to be serious, but did not result in an injury. Analysis of this data would also help to quantify any under-reporting in Stats19 (which is police reported injury collisions). This level of detailed operational data was not available to TRL for analysis within the timeframe for this report; however a further project could be used to add this analysis.

The effectiveness of the countermeasures is very difficult to assess due to a lack of exposure of some countermeasures that simply haven't been available for long enough to build up enough exposure to make an assessment; or there is a lack of evidence that relates specifically to buses. The analysis made in this report has indicated the confidence level for the countermeasure as high or low. Furthermore, the aggregated countermeasures tables have provided effectiveness estimates based on the expert opinion combined with estimates provided by stakeholders (where available). Further effectiveness studies and testing programmes to assess the countermeasures will be required to make a more detailed statistical analysis of effect, and if combined with a long term programme of data analysis, then a more accurate effectiveness for the countermeasures could be evaluated.

In the analysis for this study, countermeasures were assigned based on their applicability to certain collision types and circumstances. The implementation of any countermeasure should be monitored with respect to its actual effectiveness in service and to mitigate against the effects of any unintended consequences.

The implementation of the BSS and any countermeasures would require a full cost benefit analysis, and that is not included in this report. This research sets out the possible maximum target population of fatalities in order to create a prioritised list. The next step would be a consideration of the manufacturing and operational costs of implementation of these countermeasures. The societal benefits of the casualty savings could also be quantified in such a cost benefit analysis, including the savings in emergency services costs, insurance and damage costs, lost productivity, human costs, and congestion/emissions costs.

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Appendix A Collision Analysis

This appendix provides greater detail on the collision analysis for buses, and on injuries occurring without a collision.

A.1 Bus Collision Frequency

It is also possible to look at the improvements in bus safety between 2006 and 2015. Over this period, road safety overall has been a success story. The bars in Figure 31 are negative, which indicates a reduction in casualties for the period. The dark blue bar on the left shows a 28% reduction in all casualties in GB (from collisions involving all types of vehicles). The mid blue bar next to it shows that nationally, buses have contributed more than average with a 38% reduction; i.e. a better casualty reduction than other forms of transport. However, the light blue bar suggests that when only London is considered, the reduction in casualties from collisions involving buses is much less (13%) than for the national equivalent (38%).

Overall the actions taken nationally have been more effective for fatalities than for less serious crashes. This is shown by comparing the right and left sets of bars in Figure 31, where the left (blue) set represent all casualties, and the right (orange) set represent fatalities; the reductions for fatalities (the bars on the right) are much greater. When all road fatalities in GB are considered, there has been a 45% reduction. Nationally, collisions involving buses have contributed to that reduction in line with other vehicle types. Fatality reduction on London's buses is only fractionally less than the national figure.

If we consider the severity of casualties and their reductions, this reveals an explanation for the smaller reduction in casualties for London overall, as shown in Figure 32. The fatality reductions are relatively similar for GB compared to London. For serious injuries there is a much greater reduction in London (56%) than for GB (38%), which is very positive progress. However, for slight injuries the reduction in London is very small (6%) in comparison to GB levels (28%).

Figure 31: Casualty reduction in percentage between 2006 and 2015: All casualties and fatalities. Source data: Stats19 (2006-2015) & transport statistics (2006-2015)

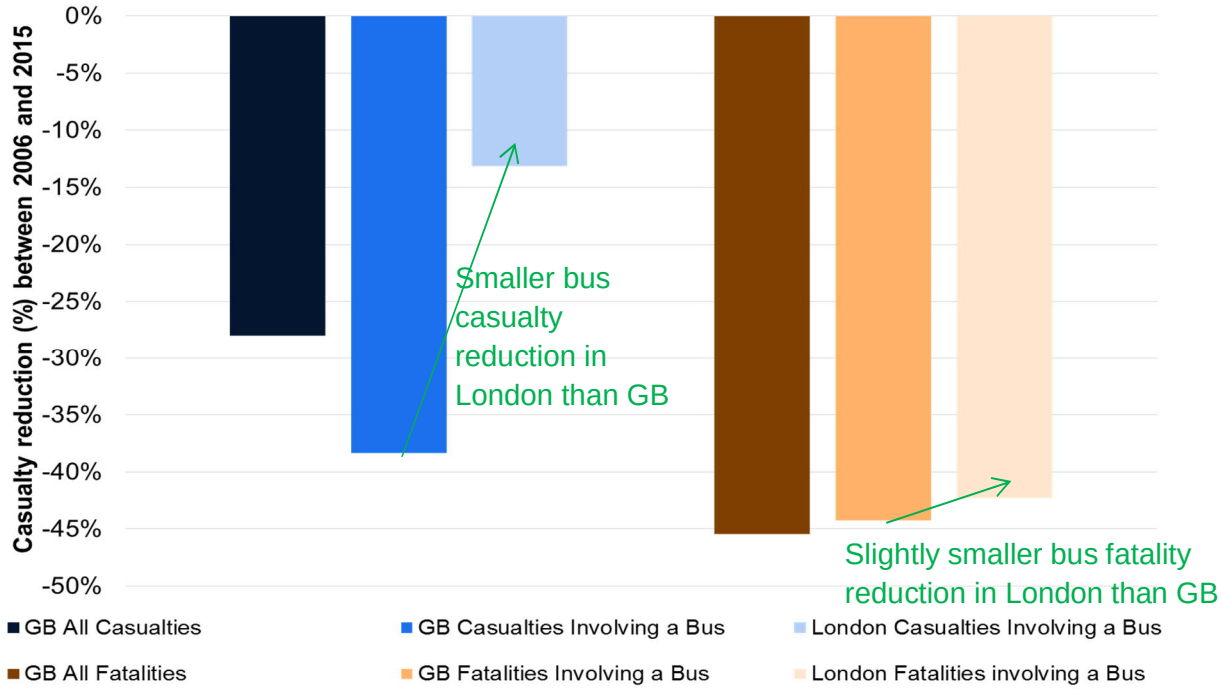


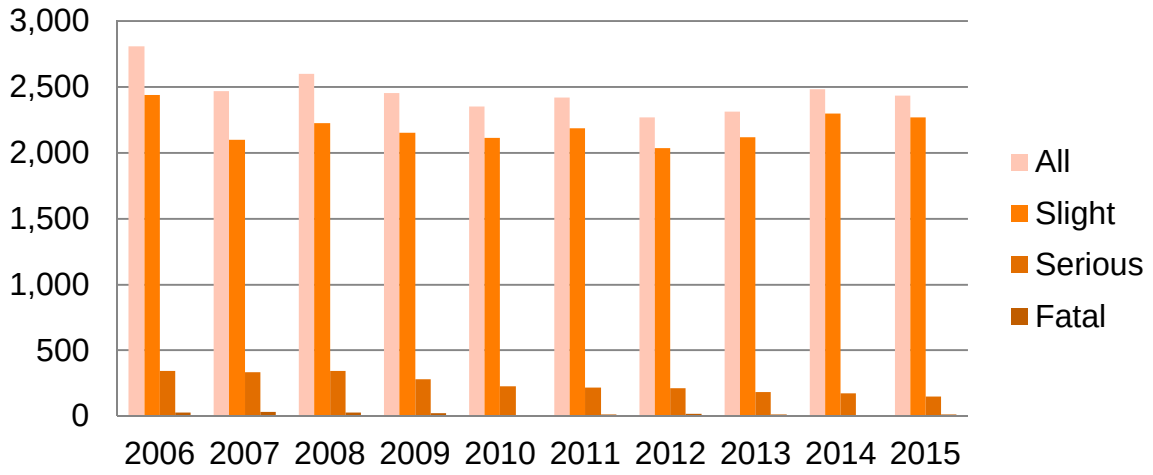
Figure 32: Casualty reduction in percentage between 2006 and 2015: Fatal, serious and slight injuries. Source data: Stats19 (2006-2015) & transport statistics (2006-2015)

A.2 Bus Casualty Types

Another factor of the analysis is to examine who is at risk of injury. TfL published a paper on bus/coach casualty trends in London between 2006 and 2015 based on Stats19 data. In London, between the years 2006 and 2015, it was recorded that 24,606 casualties resulted from a collision that involved a bus or a coach: 188 (0.8%) were fatally injured and 2,474 (10.1%) were seriously injured (TfL, 2016b). This is also illustrated in Figure 33.

It is important to note that within Stats19, buses and coaches are aggregated into one category which means there is no differentiation between TfL buses and other buses or coaches. Furthermore, this data only included casualties resulting from collisions that involved a bus or coach and so does not include casualties from non-collision incidents such as falls or slips and trips.

Figure 33: Casualties in a collision where a bus or coach was involved (by severity) in London between 2006 and 2015. Source data: (TfL, 2016b)



When considering all GB casualties in the Stats19 data from collisions involving buses/coaches, bus occupants dominate, as shown in Figure 34, with 61% of the casualties. The next largest casualty groups are car occupants (17%) and pedestrians (15%). The distribution of casualties in London is similar to that for GB, as shown in Figure 35 except that pedestrians and cyclists account for slightly larger proportions of the total and passenger car occupants a slightly lower proportion of the total.

Intuitively, it would be expected that the large number of bus casualties observed would be because buses carry large numbers of passengers that may all be at risk of injury in one collision. Stats 19 data for the years 2006-15 shows that the maximum number of bus occupants injured in any one collision was 91; although this may have involved more than one bus, it illustrates the potential. However, on average, the number of bus occupants injured per collision involving a bus was 1.43 (noting that this would be skewed upward by the maximum number of 91 bus occupants injured

in one collision). The average of 1.43 casualties relates to the number of bus occupant casualties per accident involving a bus where at least one bus occupant was injured; i.e. it doesn't include in the average accidents where a bus was involved and injured a pedestrian without injuring any bus occupants. If you include those accidents the number is less than 1. This compares to an average of 1.33 casualties of any class injured per accident of any type. So bus collisions do involve a higher number of bus occupant casualties per accident, but the difference is nowhere near as large as might be expected given the different occupancy levels of buses and other vehicle types. Many bus collisions must occur either where the occupancy is low and/or where a large proportion of the occupants remain uninjured.

Figure 34: GB casualties by type in collisions involving buses/coaches. Source data: Stats19

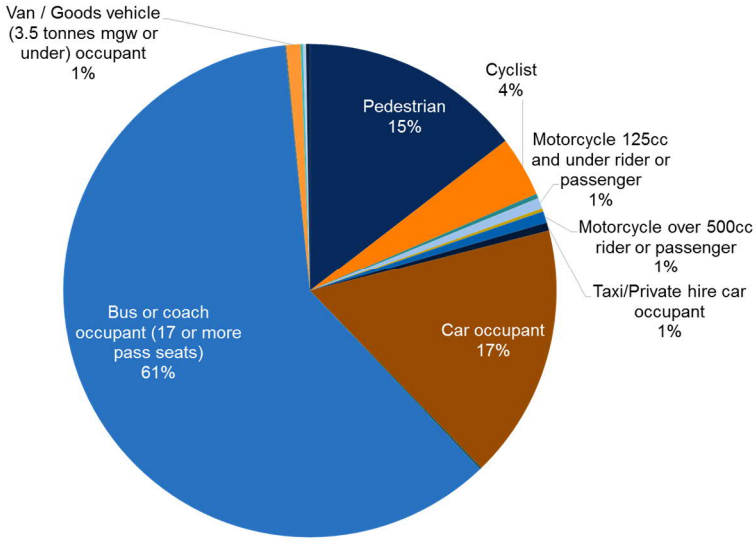
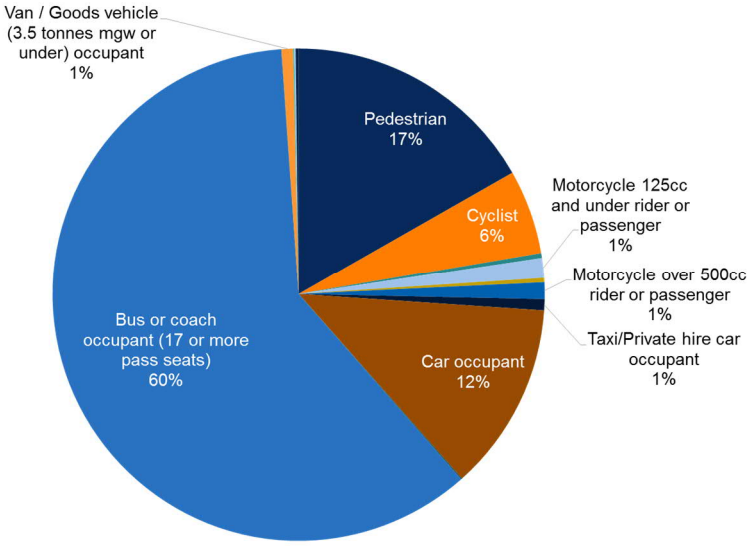


Figure 35: London casualties by type in collisions involving buses/coaches. Source data: Stats19



Stats19 data reveals in Figure 36 that in GB, pedestrians are the largest group of fatalities with 45%. The next largest groups are car occupants at 26% and bus/coach occupants at just 12%. This trend is further reinforced when considering fatalities in London (Figure 37), where pedestrian fatalities account for 64% of all the fatalities compared to 45% for GB. Similarly, car occupants and bus/coach passengers are the next largest groups of fatalities in London with bus/coach passengers accounting for just 8%.

Figure 36: GB fatalities by type in collisions involving buses/coaches. Source data: Stats19

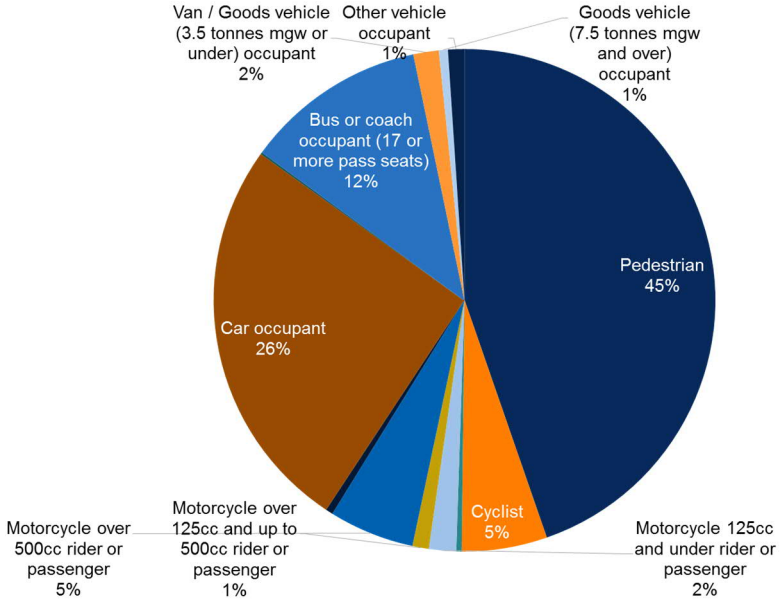
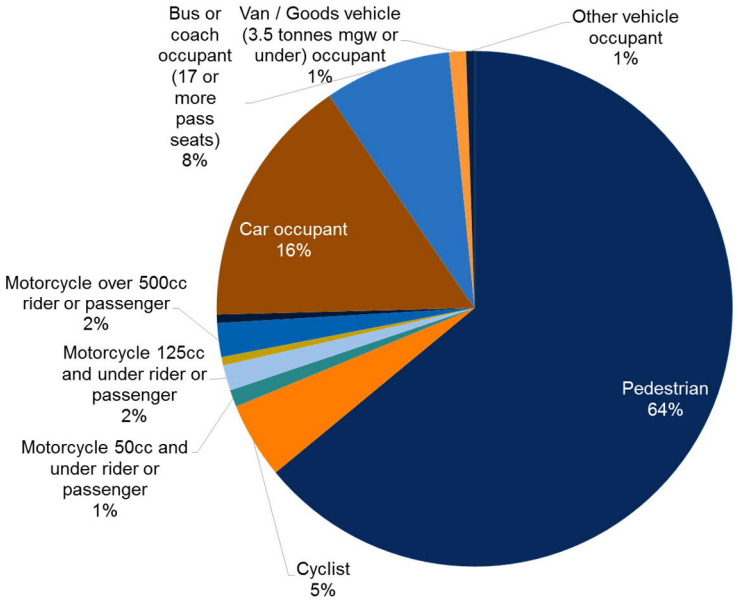
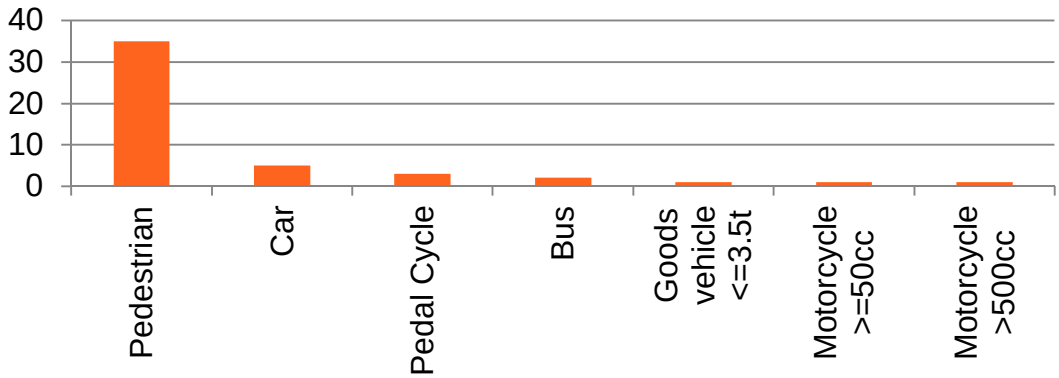


Figure 37: London fatalities by type in collisions involving buses/coaches. Source data: Stats19



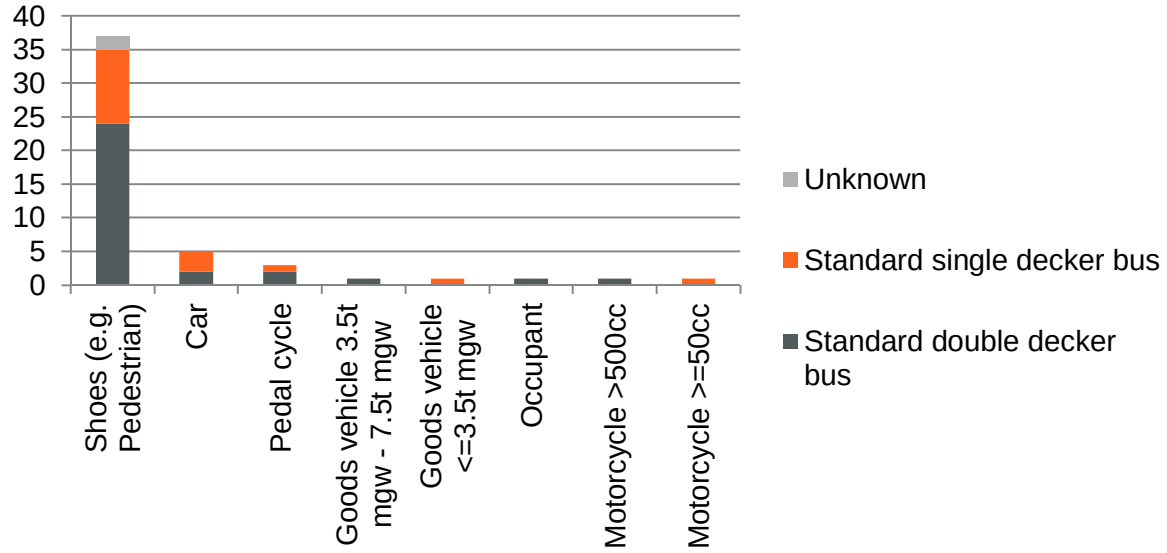
The distribution of the fatalities in the 48 Police fatal files also reiterates this finding; Figure 38 shows that the pedestrians accounted for the largest proportion of fatalities. From the 48 fatalities in the police files there were 7 other slight injuries. These occurred in 4 collisions, so, for example, one fatality was associated with 3 other slight injuries. In the vast majority of cases, the person who was fatally injured was the only person injured in the crash.

Figure 38: Fatalities from bus collisions. Source data: 48 Police fatal files



The most frequent collision partner for buses was pedestrians with 37 of 48 fatalities (77%) in the police fatal files as shown in Figure 39. For 24 of these collisions the bus was a standard double decker bus, 11 were with a single decker, and for two of the cases the bus type was unknown. The next most common collision partner was cars (5) and pedal cycles (3).

Figure 39: Distribution of collision partners by bus type. Source data: 48 Police fatal files



The slightly older HVCIS dataset also confirms that pedestrians are the largest group of road user fatalities in bus collisions, as shown in Figure 40. This distribution considers all fatalities involved in the bus collisions (i.e. not just the number of cases).

Figure 40: Distribution of fatalities in bus collisions. Source data: HVCIS

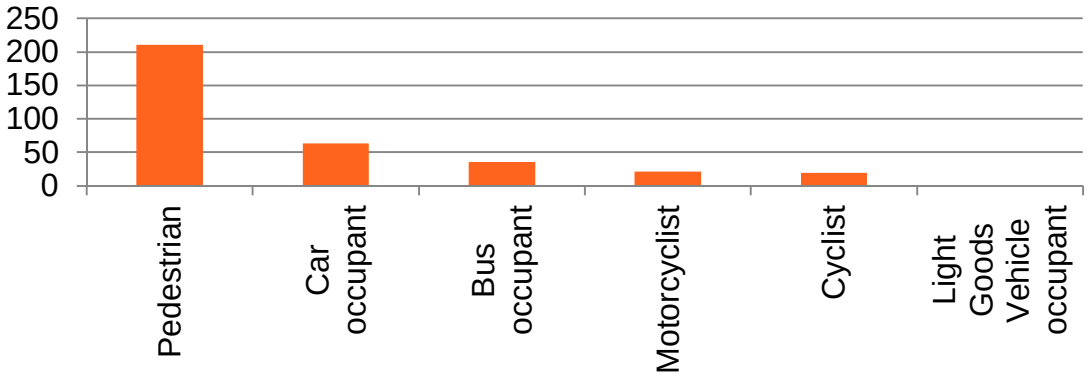
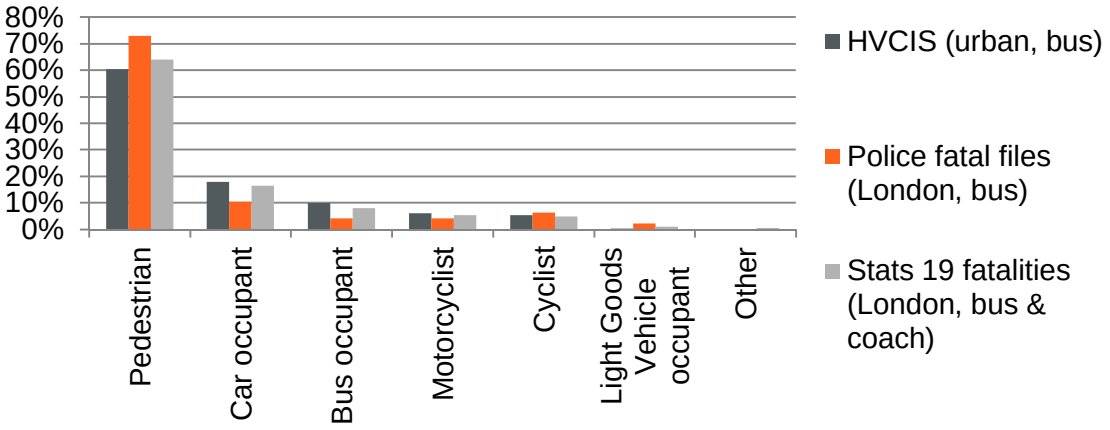


Figure 41 provides a summary of the findings for different casualty types, comparing the HVCIS, Police fatal files, and Stats19 London bus fatalities data. There is fairly good agreement between the different sources of data, despite their different sources and the differences in the samples. The pedestrian fatalities are a slightly greater proportion for the police fatal files (buses only) in comparison with the HVCIS & Stats19 fatalities that include coaches too; this is consistent with buses being more likely to be in pedestrian collisions than coaches and London having slightly more of a problem with pedestrians than other urban areas across the country. However,

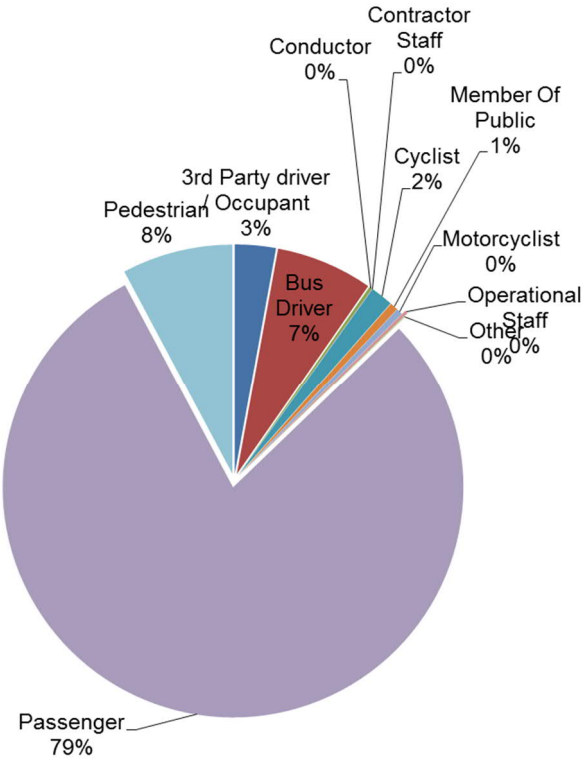
these differences are relatively small such that what works well in London might have a good chance of working well across the country. The pedestrians are the most frequent fatality type, with car occupants and bus occupants being of much lower frequency; casualties of other types are even lower still.

Figure 41: Summary of fatality types for bus collisions. Source data: HVCIS, Police fatal files, Stats19.



The IRIS data, which is not limited to fatalities like the police fatal files and HVCIS, reveals a slightly different picture. In the IRIS data the vast majority, 79%, of casualties are bus passengers; as shown in Figure 42. This is due to the vast majority of injuries occurring on the buses without a collision, which is described in greater detail in the following section A.4. Pedestrians make up the next largest group of injuries, which is in agreement with the findings in the other datasets.

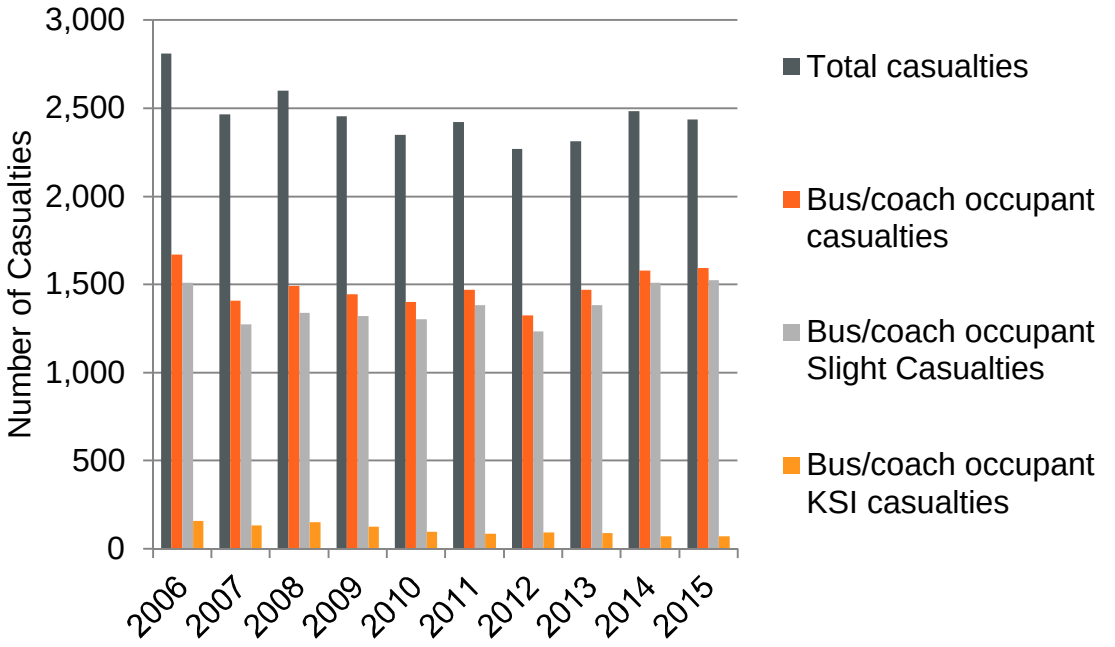
Figure 42: Injuries by victim category. Source: IRIS



A.2.1 Bus Occupant Casualties

Bus/coach occupant casualties accounted for on average 60% of all bus/coach casualties over the 10 year period (Figure 43), according to data from TfL. Considering bus/coach occupant casualties, the majority of injuries sustained were slight, with 7.3% recorded as KSI on average over the 10 years (TfL, 2016b).

Figure 43: Casualties in a collision in London where a bus or coach was involved. Source data: (TfL, 2016b)



The following data was extracted from Bus Safety tables published by TfL and in this case bus occupants include the bus driver, passengers and any other staff on board such as conductors (TfL, 2016a). In the 21 month period between October 2014 and June 2016 there were 8,704 bus occupant casualties accounting for 87% of total casualties associated with TfL buses. Bus passengers in particular, accounted for 80% of casualties with the driver and staff making up to remaining 7%. Between January 2014 and June 2016 there were only 2 reported bus occupant fatalities in London and they were both passengers who had a slip, trip or fall. On average 75.3% of occupants sustained injuries that could be treated on-scene; the remaining 24.7% were taken to hospital for treatment. Bus drivers were most likely to sustain injuries that resulted in a trip to hospital when involved in a collision incident, whereas bus passengers were most likely to sustain injuries that required hospital attention after a slip trip or fall. Mechanisms in which bus passengers sustained injuries requiring hospital attention included boarding and alighting incidents, falls down stairs, trips, slips and falls, wheelchair/buggy incidents and collisions.

It has been shown that bus occupants involved in non-collision incidents in the UK are more likely to sustain KSI injuries (63.4%) than in incidents involving a collision (Kirk *et al.*, 2003). Elderly female occupants were found to most frequently sustain injuries and had an increased risk of a serious injury.

A study of injuries sustained by bus and coach occupants in Sweden also found that injuries from non-collision incidents (54.2%) were more frequent than injuries from collision incidents (45.8%) (Björnstig *et al.*, 2005). Occupants involved in collisions with other vehicles most often sustained neck injuries (73%), occupants involved in single vehicle collisions sustained predominantly head (30%) and upper extremity injuries (27%). The majority of non-collision injuries were sustained when the

occupant was alighting a stationary bus/coach and this often resulted in injuries to the lower extremities. Harsh braking was the main cause of injury to occupants when the bus/coach was in motion and this resulted in a combination of head and upper and lower extremity injuries.

Analysis of bus collision data from Denmark's national collision database between 2002 and 2011 showed that the occurrence of injury to bus passengers was positively correlated to the involvement of heavy vehicles, crossing junctions with yellow or red light, high speed limits and slippery road surfaces. In comparison with collisions with cars, the probability of more severe injuries in bus collisions are greater for accidents involving vans and heavy vehicles, with increased risk of injury of 7.3–23.4% for slight injuries, 11.7–43.2% for severe injuries, and 14.2–55.7% for fatal injuries (Prato and Kaplan, 2012).

A.2.2 Pedestrians, Cyclists and Motorcyclist Casualties

Various data and literature has highlighted the large proportion of bus collisions which involve pedestrians, cyclists and motorcyclists; also known as Vulnerable Road Users (VRUs). In accordance with statistics recorded by TfL, it is apparent that these collisions are relatively likely to result in a fatal outcome (TfL, 2016a). Statistics reveal that in London between January 2014 and June 2016, there were 33 fatalities recorded involving buses; 21 pedestrians, four motorcyclists and one cyclist, representing 85% (TfL, 2016a). Another previous TfL study revealed that between 2006 and 2015, pedestrians, cyclists and motorcyclists accounted for 25.4% of all casualties and 47.6% of all KSI casualties on average over the ten year period for bus collisions. Fatalities were not reported separately from KSI casualties. Pedestrians were the most frequent casualty (66.1%), followed by pedal cyclists (22%) and then motorcyclists (11.9%) (TfL, 2016b). When focusing on pedestrian safety in London, it has been found that pedestrians are at a higher risk of injury in a collision during darkness than during the day. It was also highlighted that pedestrians who are intoxicated are at a higher risk of being involved in a collision with a bus (TfL, 2014). In a recent study of pedestrian fatalities in London, it was found that there were a significantly higher number of pedestrian fatalities between the hours of 6pm and 6am on Saturdays and Sundays, than compared to daylight hours. It was thought that increased social activity and consumption of alcohol during these hours was a likely contributory factor (Knowles *et al.*, 2012).

The number of collisions with pedestrians was greater at bus stop segments (a 75 foot radius buffer around each stop in the bus route system) than other parts of the route and approximately half of cyclist collisions occurred at bus stop segments. Bus stops cause line of sight obstruction and can also result in the crossing of paths of cyclists and buses as cyclists overtake the stationary bus on the offside[8] (Oregon Transportation Research and Education Consortium, 2013).

Increasing bicycle use and bus usage are both desirable policy goals from a sustainability perspective for any city (Delaware Valley Regional Planning

[8] **Offside** = right/driver/road- side in the UK

Commission, 2009). On city streets, however, these two modes of transport are in several ways natural opponents: while occupying opposite ends of the size and weight spectrum, they often operate in the same place (Delaware Valley Regional Planning Commission, 2009). Park and Trieu (2014) highlighted the causes of collision when the bus was travelling forwards; shows that 'Bicycle Related' was attributed to 15% of these collisions. The study also noted that rather than the bicycles and buses making contact with each other, the presence of a bus travelling within close proximity of the bicycle caused the cyclist to collide with an object or fall from their bicycle. It was recommended that buses and bicycles should avoid travelling side-by-side, but rather one in front of the other down narrow streets or where no bicycle lane is present. It is worth noting that in this type of collision with the bike in close proximity to the bus, but no actual collision, that case might not be recorded as a bus collision in Stats19; perhaps as a single cyclist collision instead.

In the United States, between 1999 and 2005, more than 40% of fatal transit bus crashes involved a collision with a pedestrian (Blower *et al.*, 2008). Perk *et al.* (2015) studied transit bus safety in the United States. The study used a sample of National Transit Database (NTD) safety data augmented with interviews from seventeen participating transit agencies. It was found that 10% of the sample incidents involved the bus colliding with a pedestrian or cyclist. Approximately 28% of these occurred while the transit vehicle was making a turn. Between the years 2008 to 2012, there were 64 bus collisions which were recorded in the NTD. Of these 64 fatal collisions, 12.5% involved a cyclist, 15.6% involved a pedestrian using a crossing and 15.6% involved a pedestrian not using a crossing. Perk *et al.* (2015) also noted that there are several incidents where a cyclist or a pedestrian collided with the bus whilst it was stopped. In some of these cases the Pedestrians, cyclists and motorcyclists were determined to be intoxicated.

A.2.3 Car Occupant Casualties

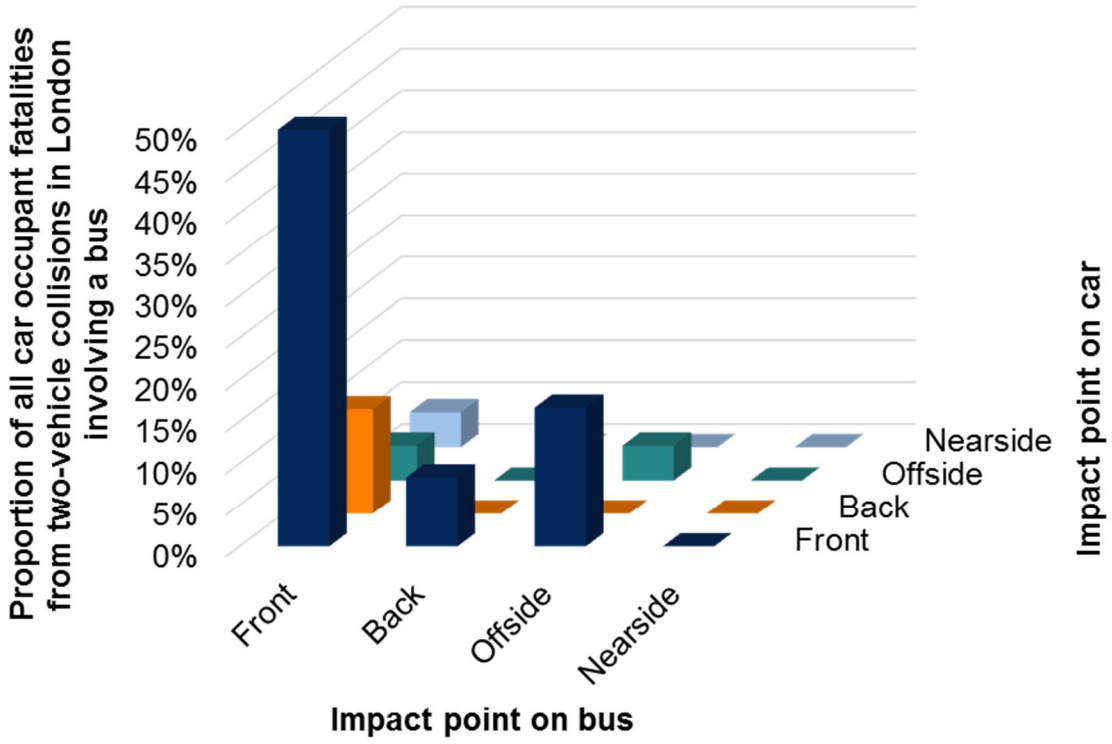
The term 'Other Vehicle Occupants' refers to occupants of other vehicles using the road. This can include car, taxi, van or goods vehicle occupants (but not pedestrians or cyclists). As previously noted, a review of literature and data revealed that apart from pedestrians, the most frequent collision type was a bus to vehicle collision, and that car occupants were the most frequently injured occupant type. Although this may be the most frequent type, it does not necessarily mean that it is likely to result in a serious or fatal injury.

It was noted that in London, between 2006 and 2015, 2662 KSI casualties were recorded as a result of a collision involving a bus or coach (TfL, 2016a). Of these, 10.5% were classified as 'Other Road User' occupants (car, taxi, goods vehicle and other vehicle occupants). Car occupants who sustained a KSI injury were the most common 'Other Road User' (85.7% of the total 'Other Road Users'). This was subsequently followed by goods vehicle occupants (6.07%), other vehicle occupants (5%) and taxi occupants (3.21%) (TfL, 2016a).

Using Stats19 it is also possible to examine in more detail the collisions between buses and cars. describes collisions between a bus and car, noting that collisions with three or more vehicles are very complex and difficult to analyse using Stats19 so have been excluded from this analysis. Fatalities are shown in Figure 44 and

these principally occur in head on, car front to bus offside[9], and bus front to car rear configurations. When all severities are considered, as shown in Figure 45, bus front to car rear is the dominant type followed by bus offside to car nearside; which perhaps indicates a lane changing type of crash. This might lead to a possible conclusion that Front Underrun Protection (FUP) might be a suitable countermeasure for bus fatalities. However, later in Appendix A.5.2 the data reveals that there is little evidence for this, due to these collisions involving low overlap, high intrusion, or the car occupants not wearing seat belts.

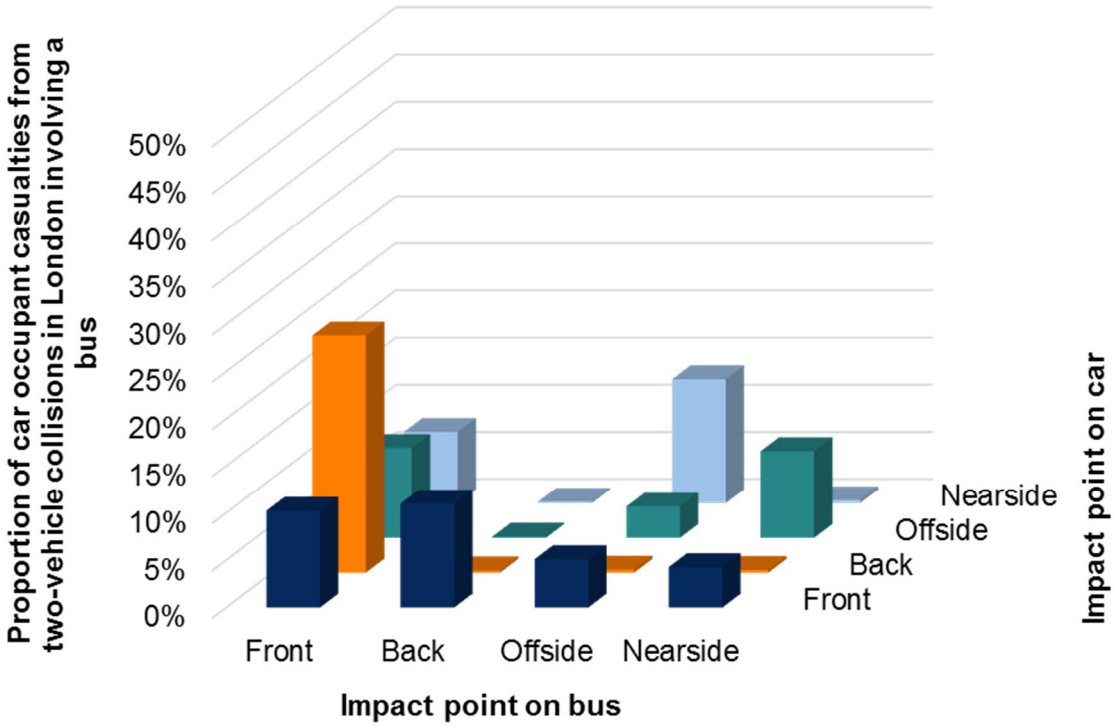
Figure 44: All car occupant fatalities from bus & car collisions by impact point. Source data: Stats19



[9] **Nearside** = left/passenger/kerb- side in the UK

Offside = right/driver/road- side in the UK

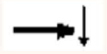
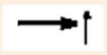
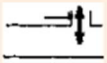
Figure 45: All car occupant casualties from bus and car collisions by impact point. Source data: Stats19



A.3 Bus Collision Types

A previous TRL study of pedestrian fatalities in London between 2006 and 2010 reported on 198 pedestrian fatalities, and 33 of these were involving a bus or coach. All these collisions, except one on a 40mph road, were on 30mph road and approximately two thirds of collisions occurred at junctions. All but one of the collisions occurred in fine weather and the day of the week seemed to have little effect on the occurrence of collisions. The bus or coach driver's line of sight was found to have been affected in just over a third (13 out of 33, 39%) of the collisions. This was most commonly due to vision being blocked by another vehicle (6 out of 33, 18%) or a blind spot of the vehicle being driven at the time (4 out of 33, 12%). This was most commonly due to vision being blocked by another vehicle or a blind spot of the vehicle being driven at the time. Table 16 below presents the collision types recorded between pedestrians and buses/coaches. The main collision type involved the bus/coach travelling ahead and a pedestrian crossing the road. Almost half of collisions occurred when the pedestrian was crossing from the left side as the bus was traveling forward (Knowles *et al.*, 2012).

Table 16: Bus/coach versus pedestrian collision types (Knowles *et al.*, 2012)

Conflict			In carriageway:						Total
			At pedestrian crossing	Within 50m of pedestrian crossing	Crossing elsewhere	On central island	On footway	Other/unknown	
	N1	Bus/coach going ahead, pedestrian crossing left side	6	4	5	0	0	1	16
	N2	Bus/coach going ahead, pedestrian crossing right side	2	2	1	0	0	0	5
	N3	Bus/coach left turn, pedestrian crossing left side	0	1	3	0	0	1	5
	P3	Walking on footpath	0	0	0	0	3	0	3
	N4	Bus/coach right turn, pedestrian crossing right side	0	0	0	1	0	0	1
	N6	Bus/coach right turn, pedestrian crossing left side	1	0	0	0	0	0	1
	P2	Walking facing traffic	0	0	1	0	0	0	1
	Q8	Miscellaneous other	0	0	0	0	0	1	1
Total			9	7	10	1	3	3	33

Some studies in the published literature can also provide some background context to the type of bus collisions that occur. For example, a study conducted by Albertsson and Falkmer (2005), noted that the majority of bus and coach incidents in eight European countries took place on urban roads with a speed limit of 50km/h (~30mph). The finding is highly applicable to this study since bus routes in London are generally limited to 30mph.

Other studies found that rear end and side swipe collisions were the most recurrent bus-to-vehicle collisions (Yang, 2007) (Chimba *et al.*, 2010) (Wahlberg, 2002). Rear end collisions are known to be associated with with increased 'stop-and-go' conditions, at bus stops for example. Wahlberg's (2004) findings on the characteristics of bus collisions in the Swedish town of Uppsala support this, as it was found that 26.4% of the reviewed collisions occurred at bus stops. A study into collisions on the TriMet's bus system in the United States showed that approximately 65% of collision incidents and 80% of non-collision incidents occurred at the bus stop segments of the bus route (Oregon Transportation Research and Education Consortium, 2013). The proportion of collisions occurring at a bus stop will presumably be highly dependent on the average density of bus stops on the route and without this information it is difficult to consider whether the proportion of collisions at them is high. However in the papers cited, the authors have found that a high number of collisions occur at bus stops.

Chimba *et al.* (2010) noted that side swipe collisions could be caused by erratic lane changing behaviours and merging into mainline traffic. This type of collision may also occur at bus stops or bus lay-bys. Wahlberg (2002) believed that these types of collisions are attributed to lack of space for buses. It is important to note that non-collision bus incidents also occur. Brenac and Clabaux (2005) studied the direct and indirect involvement of buses in traffic collisions in France. The study found that 11% of the recorded bus collisions were non-collision events that relate mainly to a passenger injuring themselves during boarding/alighting or moving about the bus.

Feng *et al.* (2016) stated that turning left or right in a bus is more dangerous than travelling along a straight road. This may be due to visual blind spots and the loss of perception of the surrounding situation. These visibility issues can contribute to bus to Vulnerable Road User (VRU) collisions. Yang (2007) analysed bus collision data from the US National Transit Database. It was found that the majority of bus collisions occurred at junctions and divided highways. The authors commented that the majority of buses operate in urban areas which contain mostly these types of roadway types.

A previous UK based study conducted by Robinson and Chislett (2010) reviewed Stats19 data concerning Large Passenger Vehicles (LPVs) for the years 2003 to 2005. It was noted that 63% of pedestrians in collisions with LPVs had a first point of impact of the front of the LPV. The most frequent manoeuvre for the LPV was classified as 'Going ahead other': this accounted for 70% of the KSI pedestrians. A further study conducted by Robinson *et al.* (2009) looked at the injuries sustained in heavy vehicle collisions. It was noted that 33% of pedestrians in collisions with buses were considered not to be paying attention and 18% of pedestrians were under the influence of alcohol. The median impact speed for collisions between pedestrians and the front of LPVs was approximately 19mph (30km/h). Furthermore, it was noted that the most frequent cause of death was head injuries.

Park and Trieu's (2014) study highlights the vast amount of collisions that occur when the bus is travelling forwards (Table 17). Note that the vehicles studied travelled on the right hand side of the road and were left-hand drive. These collisions were mostly the result of 'Jaywalking and Pedestrian/Operator Inattention', followed by 'Other' and 'Bicycle Related'. The locations of these collisions were approximately evenly split between junctions/bus stops and mid-block. The majority of these collisions were on the front-right side of the bus. A lower number of impacts were recorded on the left side and Park and Trieu attribute this to the fact that the driver is situated on the left side which may increase their awareness in that general direction. Data in Appendix A.5 indicates the reverse for the UK, due to driving on the other side of the road. Implementation of electronic sensors, additional mirror and bus operator educational programs were suggested to minimise these collisions.

Table 17: Cause of collisions for buses travelling forwards and making left turns. Source: (Park and Trieu, 2014)

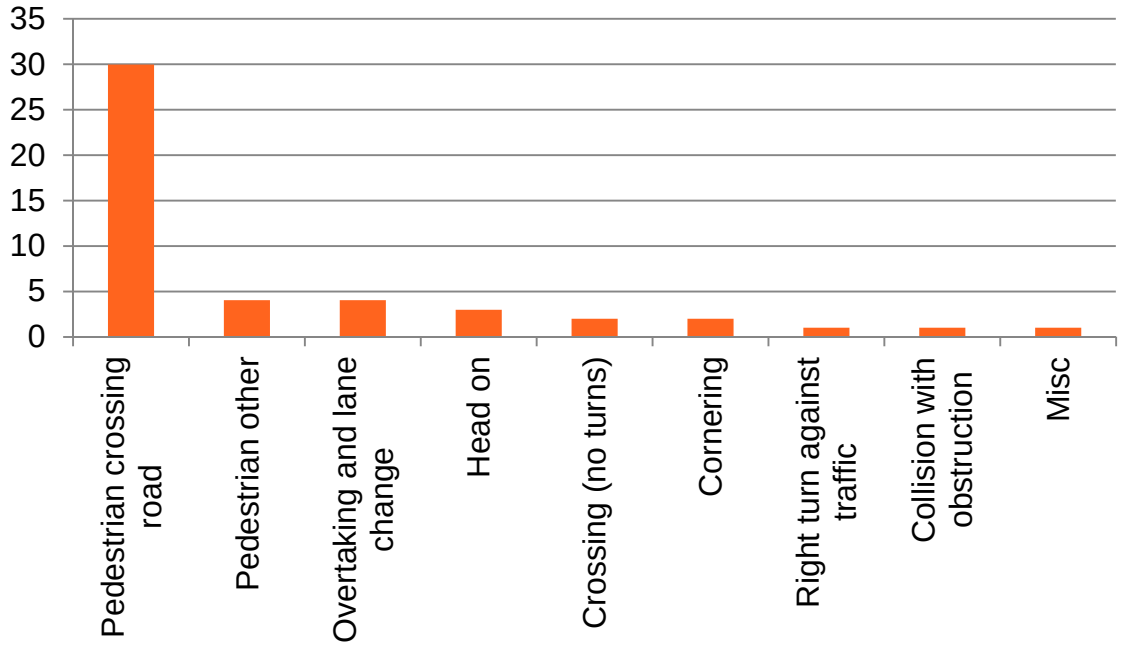
Cause of collision for a bus	Travelling forward		Turning left	
	Number	%	Number	%
Jaywalking and Pedestrian/Operator Inattention	60	49%	40	75%
Other	19	16%	0	0%
Bicycle Related	18	15%	0	0%
Pedestrian or Bus Too Close to Curb	8	7%	0	0%
Pedestrian Clumsiness	6	5%	0	0%
Unknown	5	4%	1	2%
Pedestrian Under Influence	3	2%	0	0%
Bus Operator's Blind Spot	3	2%	12	23%
Total	**122**	**100%**	**53**	**100%**

Furthermore, a study conducted by Almuina (1989) highlighted that, compared to other manoeuvres at junctions, left turn manoeuvres are associated with a particularly high proportion of collisions with pedestrians. Note that the vehicles studied travelled on the right hand side of the road and were left-hand drive. To minimise these types of collisions Almuina recommends the installation of protected left-turn signal phasing as well as installing devices to remind and assist bus drivers to check their blind spots.

In a study carried out on public transit buses in the city of Philadelphia, 209 pedestrian related collisions were analysed. The highest proportion of collisions occurred whilst the bus was travelling forwards (58%), followed by when the bus was making a left hand turn (25%), then when the bus was stationary (10%), when it made a right turn (3%), and when it was braking (2%) (Park and Trieu, 2014).

The literature provides useful information about bus collisions; however examination of the specific bus collisions in London is of the most relevance for this research. As established previously, pedestrians are the most frequently injured, so it is not surprising that pedestrian collisions are most common type of crash in the police fatal files. The most frequent fatal collision type was hitting pedestrians crossing the road (63%), as shown in Figure 46; adding other types of pedestrian impacts brings that up to 71%. The other collisions types were far less frequent and were fairly evenly distributed.

Figure 46: Fatal collision type distribution. Source data: 48 Police fatal files



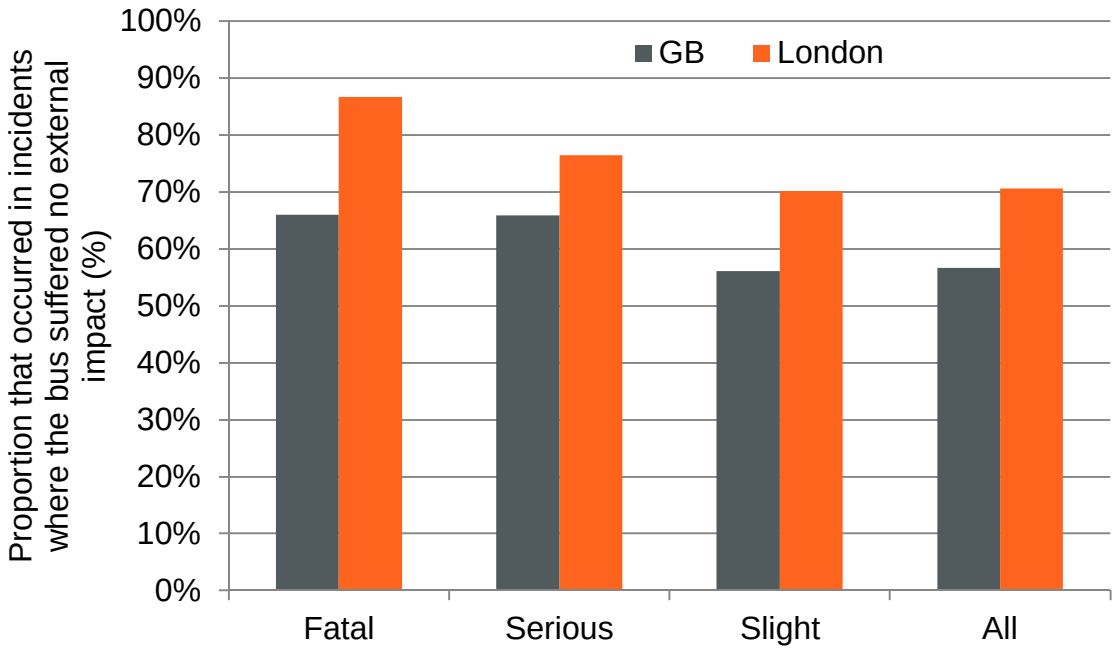
Yang (2007) also noted that the number of collisions between 13:00hrs and 19:00hrs were approximately double those than in the morning period: this correlated with the core hours of bus operation being predominantly in the afternoon/evening. As with the study by Knowles *et al.* (2012), the majority (over 75%) of collisions occurred during clear weather. Yang (2007) proposed that the effect of bad weather such as fog, rain, and snow had minimal impact on the likelihood of a collision; however, this could also be due to the fact that there were larger periods of clear weather rather than bad weather and so the numbers of collisions in clear weather conditions would naturally be higher. The effect of poor lighting conditions was also found to have minimal impact on the likelihood of a collision occurring as over 90% of bus collisions occurred in well-lit conditions. Day of the week has also been shown to be associated with collision severity; results showed that driving during the week has a decreased probability of serious collisions occurring when compared to the weekend (Feng *et al.*, 2016).

A.4 Injury Without a Collision

Injuries can occur without a bus actually being involved in a collision. TfL has published Bus Safety tables containing information reported to TfL by bus companies of incidents involving TfL buses that resulted in injury or fatality. In London between January 2014 and June 2016, there were 33 fatalities recorded involving buses; 31 of which were due to a collision incident and the remaining two were due to a slip trip or fall (TfL, 2016a).

According to the Stats19 data, the majority of bus occupant injuries occur without an impact to the external parts of the bus; injury without a collision. Figure 47 compares the proportion of injuries without a collision for GB against the proportions for London, and the trend is clearly higher for London than for GB. Given that Stats19 combines buses and coaches, this difference is perhaps due to the influence of coaches being more frequently used outside of London for longer distance journeys. It may well also be influenced by different bus occupancy rates. The proportion of fatal and serious injuries is both more frequent than slight injuries too.

Figure 47: Proportions of injuries that occurred in incidents without a collision; GB vs London. Source: Stats19



This finding in the Stats19 data that a high proportion of injuries occur without a collision is echoed in the IRIS data. 76% of injuries occur onboard the bus, and 20% occur in collision, as shown in Figure 48. The small remainder are a mix of safety critical failures and assaults. The IRIS dataset also provides an overview of the severity of the injuries according to how the injuries were treated, as shown in Figure 49. This indicates that the vast majority of injuries were not severe enough to warrant

hospitalisation, and were treated on scene; this is aligned to the data showing that the vast majority of injuries occur without a collision.

Figure 48: Injuries by event type. Source: IRIS

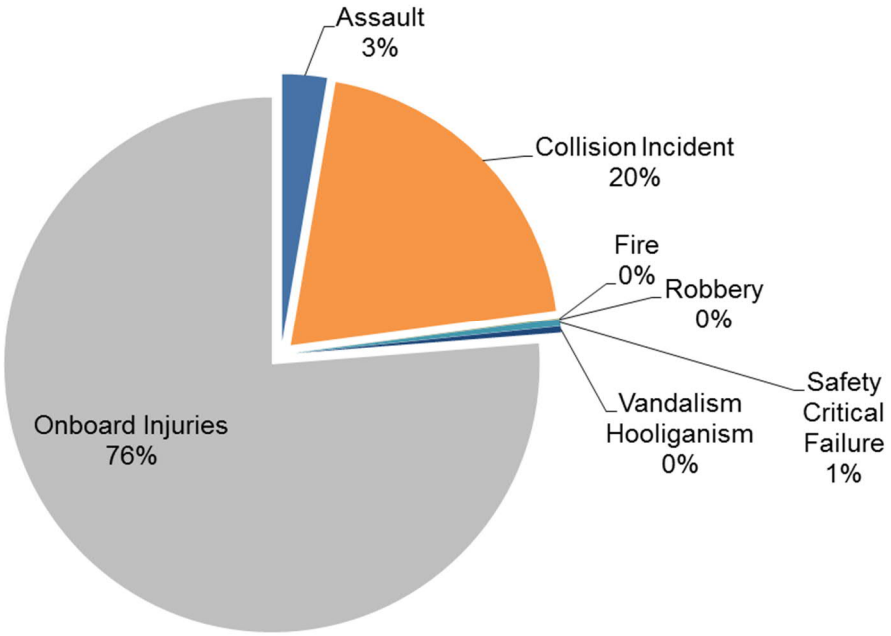
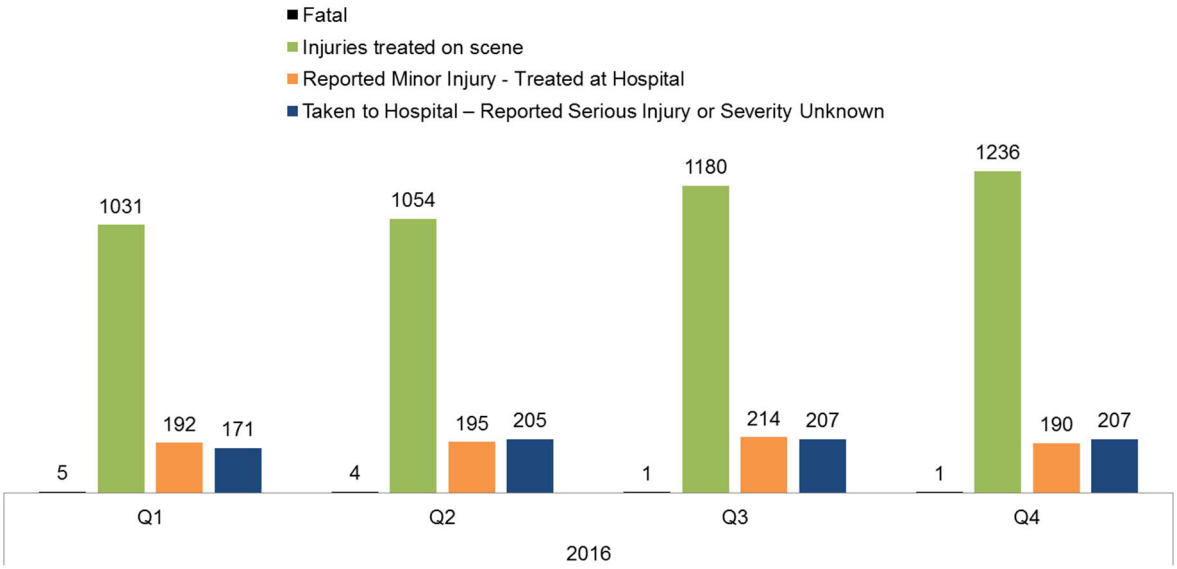
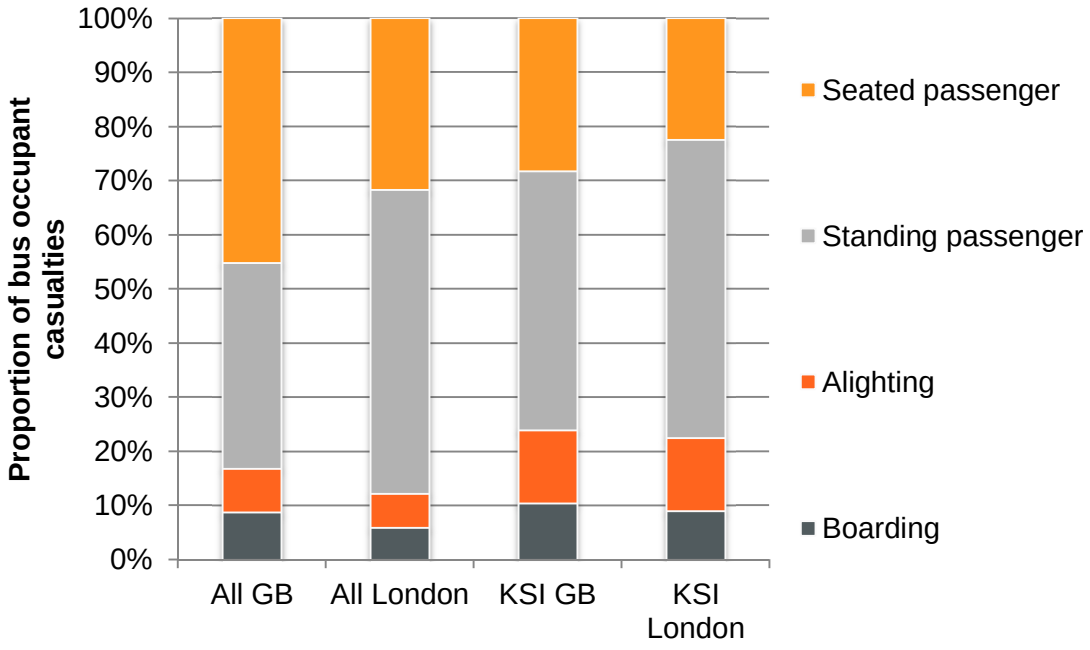


Figure 49: Injury severity over time; by treatment type. Source: IRIS



The activities of the passengers that were injured without external impact were also analysed as shown in Figure 50. Most injuries occurred whilst passengers were standing, followed by seated. A minority of injuries occurred whilst passengers were alighting or boarding. Comparison between GB and London in the Stats19 data reveals that injuries whilst sitting are more frequent for GB than for London, which is perhaps due to exposure factors, for example passengers might stand more often in London.

Figure 50: Activity of passengers at time of injury. Source: Stats19



An alternative means of analysis is to examine what the bus was doing at the time of an injury, as shown in Figure 52. For example accelerating and decelerating account for nearly two thirds of the injuries to standing passengers; this is perhaps unsurprising. More than a quarter of passengers are injured when the bus is 'going ahead other', and more are injured with a stationary bus then when cornering; 6% of injuries for standing passengers were when the bus was stationary. The standing passengers are important because they account for the biggest portion of injuries, so more data on these types of injuries would be very useful; for example on board video data, telematics, or claims data could help to understand the injury mechanisms and therefore help to design the most cost-effective countermeasures.

Injuries to passengers that are boarding and alighting buses are dominated by situations where the bus is stationary, but perhaps not to the extent expected. 35% of KSIs while boarding involve a moving vehicle; which suggests that either people are boarding when the bus is pulling away, or that the bus is pulling away before all passengers are settled, though in this case the instructions for the completion of Stats19 data suggest the casualty should be recorded as a standing passenger not as boarding. Furthermore, 20% of the injuries whilst alighting are whilst the bus is going ahead other, which may also indicate that people are disembarking the bus

when they shouldn't, or that people are getting up to move to the exit while the bus is still moving have been classified as 'alighting' rather than as 'standing' passengers.

Two case examples are provided in Figure 51 that describes fatalities occurring on buses without an associated collision.

Figure 51: Case examples of fatalities on buses without collisions

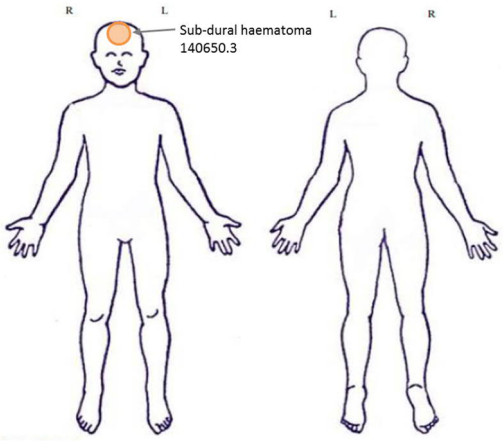
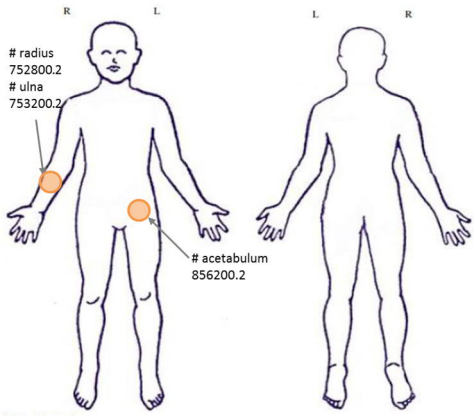
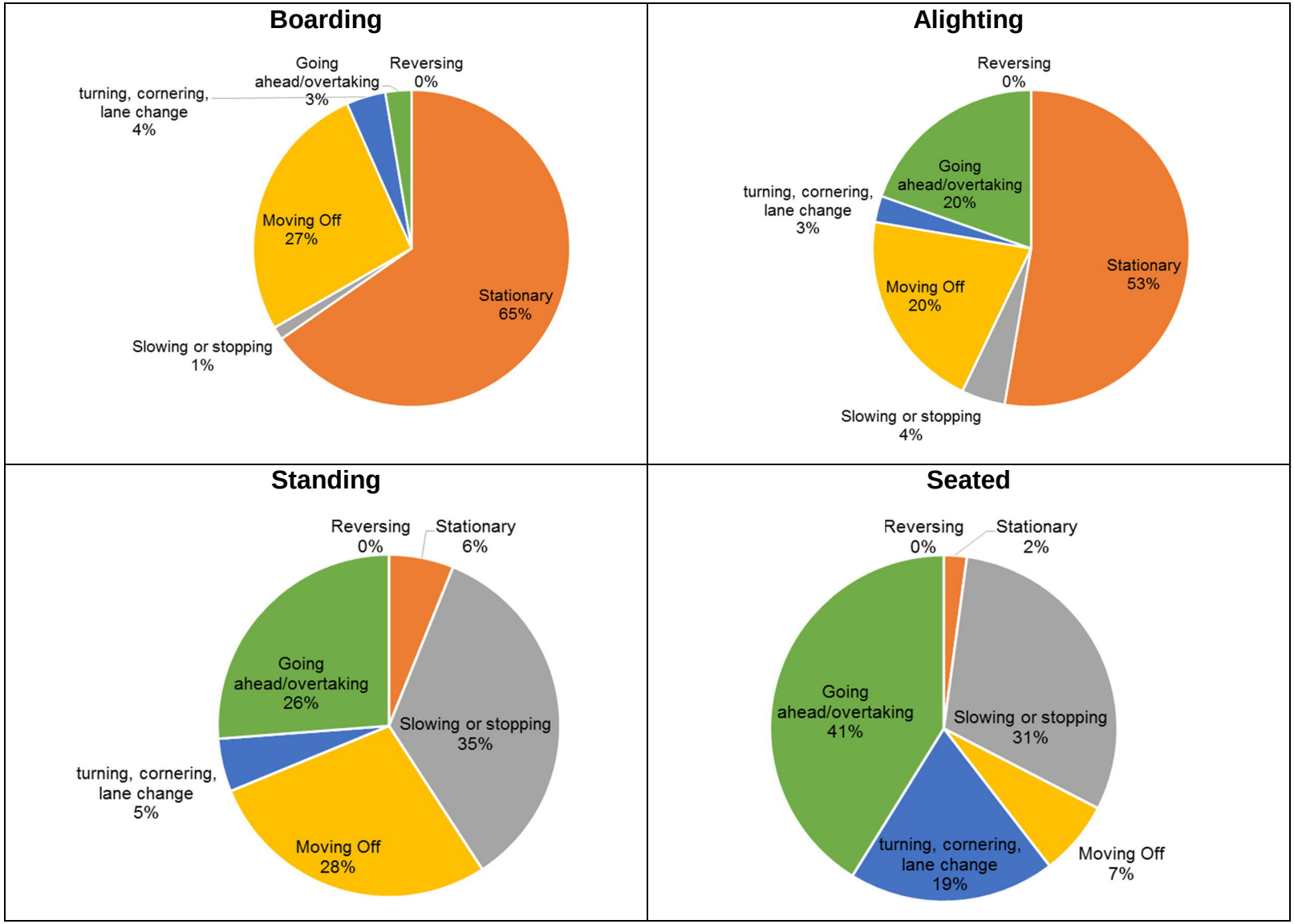
CASE EXAMPLE 1	CASE EXAMPLE 2
A 71-year-old male was stood at the top of the stairs waiting. The bus accelerated normally from stationary at a bus stop. The man fell down the stairs and suffered a subdural haematoma (AIS 3) resulting in fatal myocardial infarction at the hospital. 	A 70-year-old male was sat on the rear bench seat. The bus emergency braked to avoid a minor collision. The man slid to the floor. He suffered three injuries, two to his right arm and one to his pelvis; the result was a fatal pulmonary embolism. Two other passengers also sustained minor injuries. 

Figure 52: Activities of buses at the time of injury; by passenger activity. Source: Stats19.

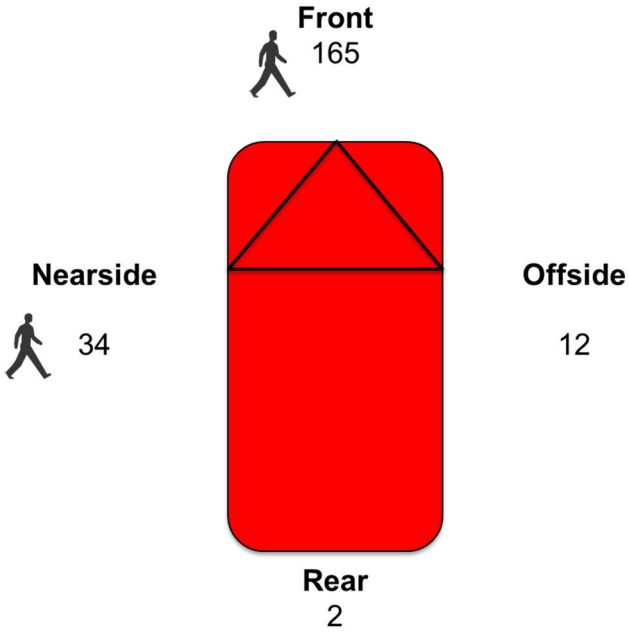


A.5 Collision Distribution around the Vehicle and Collision Features

A.5.1 Pedestrian, cyclist and motorcyclist fatalities

Given that these road users account for such a large proportion of the fatalities, it is important to examine these collisions in greater detail. In the HVCIS data shown in Figure 53, the vast majority 77% of pedestrians were injured by the front of the bus. Nearside is then the most frequent at 16%, offside at 6% and the remaining 1% injured at the rear.

Figure 53: Collisions involving pedestrian fatalities: distribution around the bus. Source data: HVCIS.



In the Police fatal files, these collisions are similarly dominated by frontal collisions (26 out of 27 cases), as shown in Figure 54. Around 70% of the collisions involved double decker buses, which is approximately proportionate to the fleet in London. The summary of the collision distributions around the bus is given in Figure 55, which compares the police fatal files and HVCIS data. The two datasets are in agreement that the front of the bus is the most frequent area of impact with a pedestrian. It is probably a feature of the small dataset for the fatal files that it shows as 100% for pedestrians; we might expect that with a larger sample size, the distribution would be similar to the HVCIS data.

Figure 54: Collisions involving pedestrian/cyclist fatalities: distribution around the bus. Source data: Police fatal files.

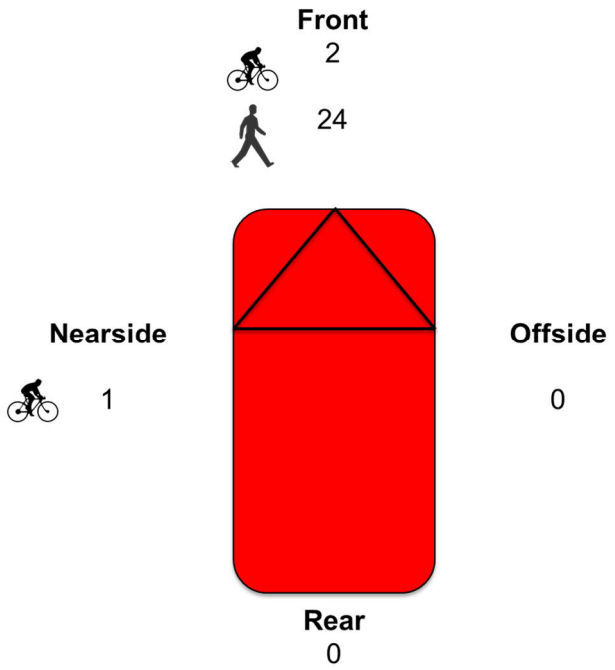
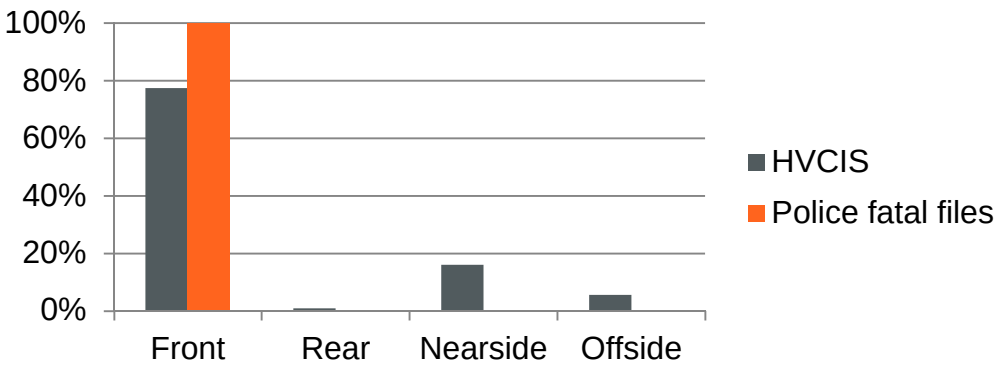
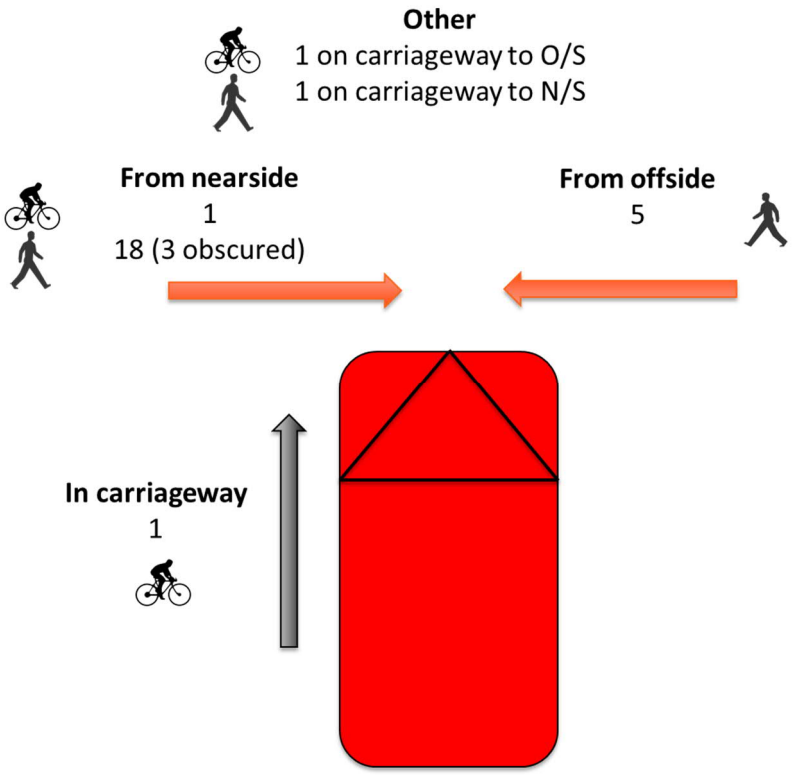


Figure 55: Summary of collisions involving pedestrian fatalities: distribution around the bus. Source data: HVCIS and Police fatal files.



By going into further detail about the movements of the pedestrians and cyclists, it is possible to learn more about the circumstances of the collisions. This is feasible from the police fatal files where the investigators were able to review cases and compile additional data. For example, Figure 56 describes the motion paths in more detail. Most pedestrians were crossing from the nearside, with a minority from the right or ahead. One cyclist was to the left side of the bus.

Figure 56: Movements of the pedestrians and cyclists in relation to the buses. Source data: police fatal files.



The depth of the data available by reconstruction of the fatal files allows another layer of detail to be considered, and this is important for defining the potential effect of countermeasures. The reconstruction work allows consideration of the following factors:

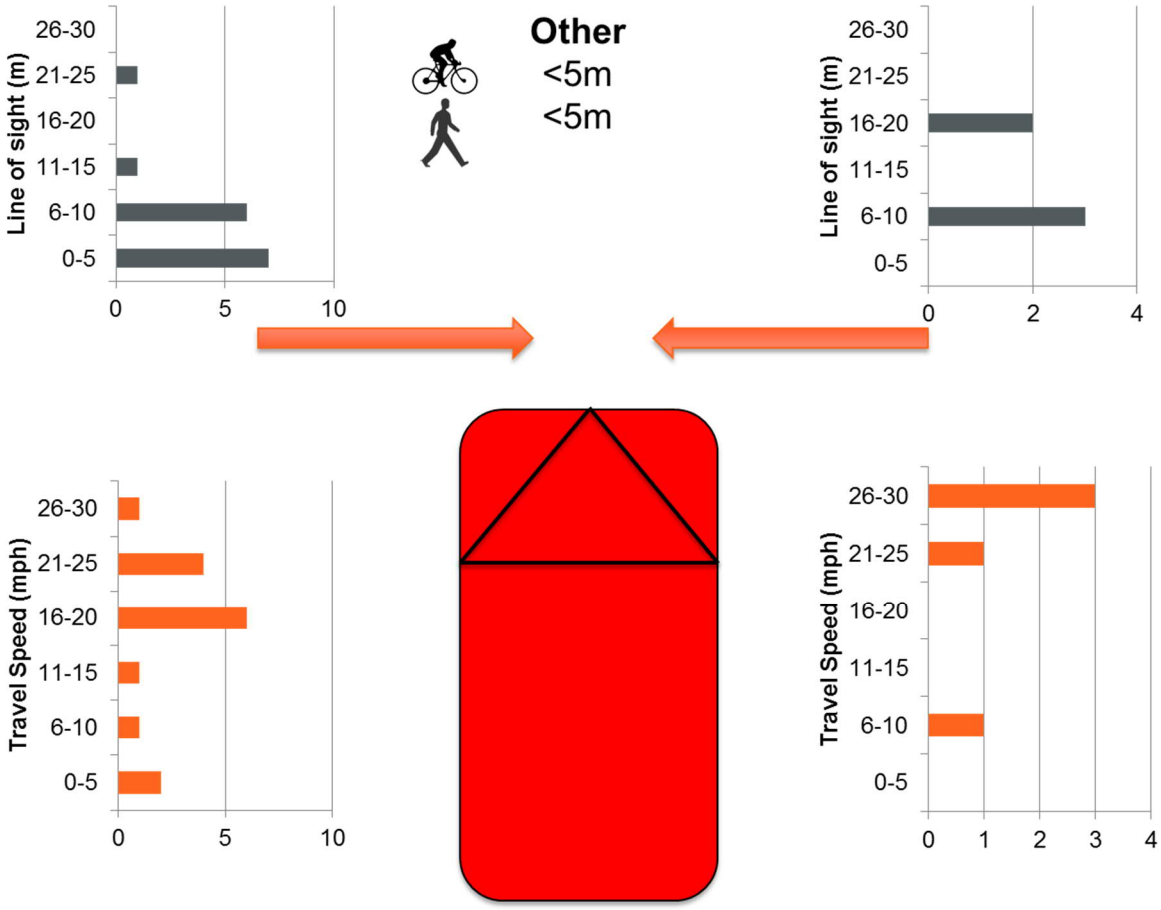
- Line of sight
- Travel speed of the bus
- Pedestrian point of contact
- Pedestrian Time To Collision (TTC)

Line of sight was defined as the distance at which it would first have been possible for the driver to identify the pedestrian as an imminent threat. For example, how far was the bus from the point of impact at the first moment a pedestrian emerging from behind a parked car would become visible? Where a pedestrian is not obscured from view but is simply walking along the pavement before suddenly changing direction and crossing the road they would be visible for a long distance before the collision, but it would only really be possible for the driver to identify them as a threat at the moment they clearly commenced crossing the road. The line of sight distance would, therefore, refer to the moment they commenced crossing. Figure 57 summarises the line of sight findings for the police fatal files where a pedestrian was crossing,

alongside the bus travel speeds too. There were 3 cases where the point of perception is unknown and the travel/impact speed is unknown.

The reconstructions of the police fatal files indicate that for the pedestrians and cyclists crossing from the nearside the line of sight was small; 13 of 15 cases had line of sight <10m, and 7 of those were <5m. For the collisions where the pedestrians approach from the offside the bus is typically at higher speed. Assuming bi-directional traffic and identical pedestrian speeds, the reaction time available from the point when the pedestrian leaves the kerb is much greater for the offside. So, with greater driver reaction time available, why is it not being used? One potential explanation is that on average, pedestrians coming from the offside were moving faster than those from the nearside, eroding or reversing the reaction time advantage; this is examined in a subsequent section. The 'other' cases refer to a pedestrian and a cyclist cases where the line of sight was less than 5m; these people were in/on the road, but not from the near/offside.

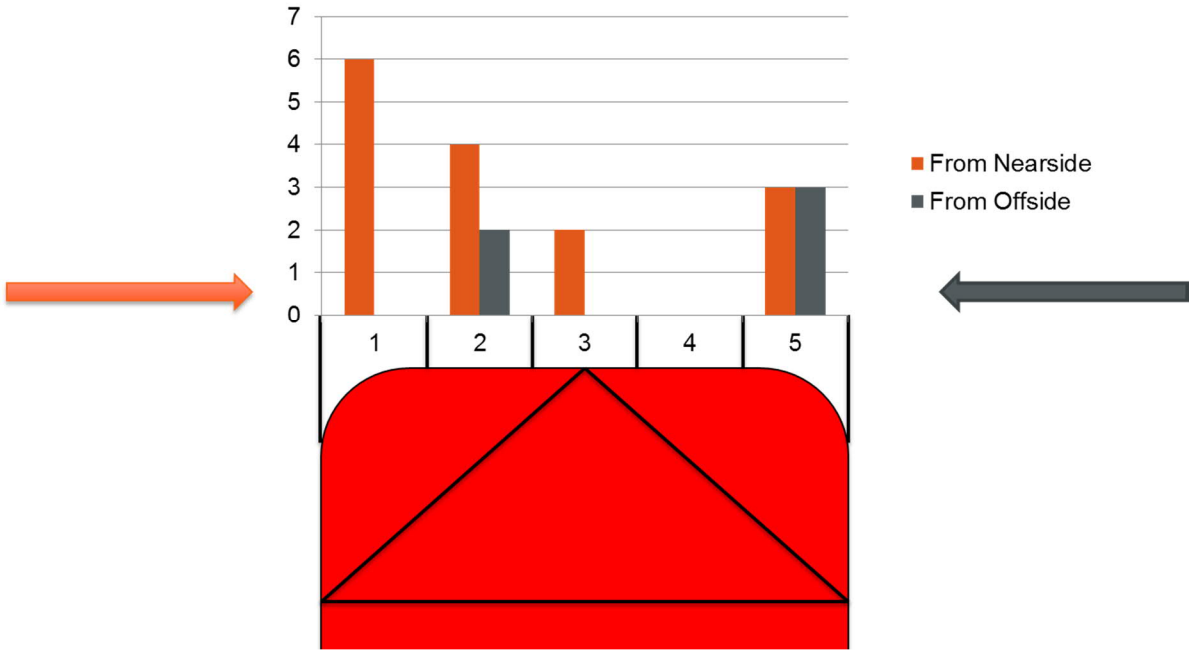
Figure 57: Line of sight and bus travel speed. Source data: Police fatal files.



Using the police fatal files the point of contact of the pedestrian on the front of the bus was also identified, and coded as within one of five zones as shown in Figure 58. Unsurprisingly, the majority of the pedestrians crossing from the nearside made contact with the bus closest to the nearside in zone 1; and the majority of

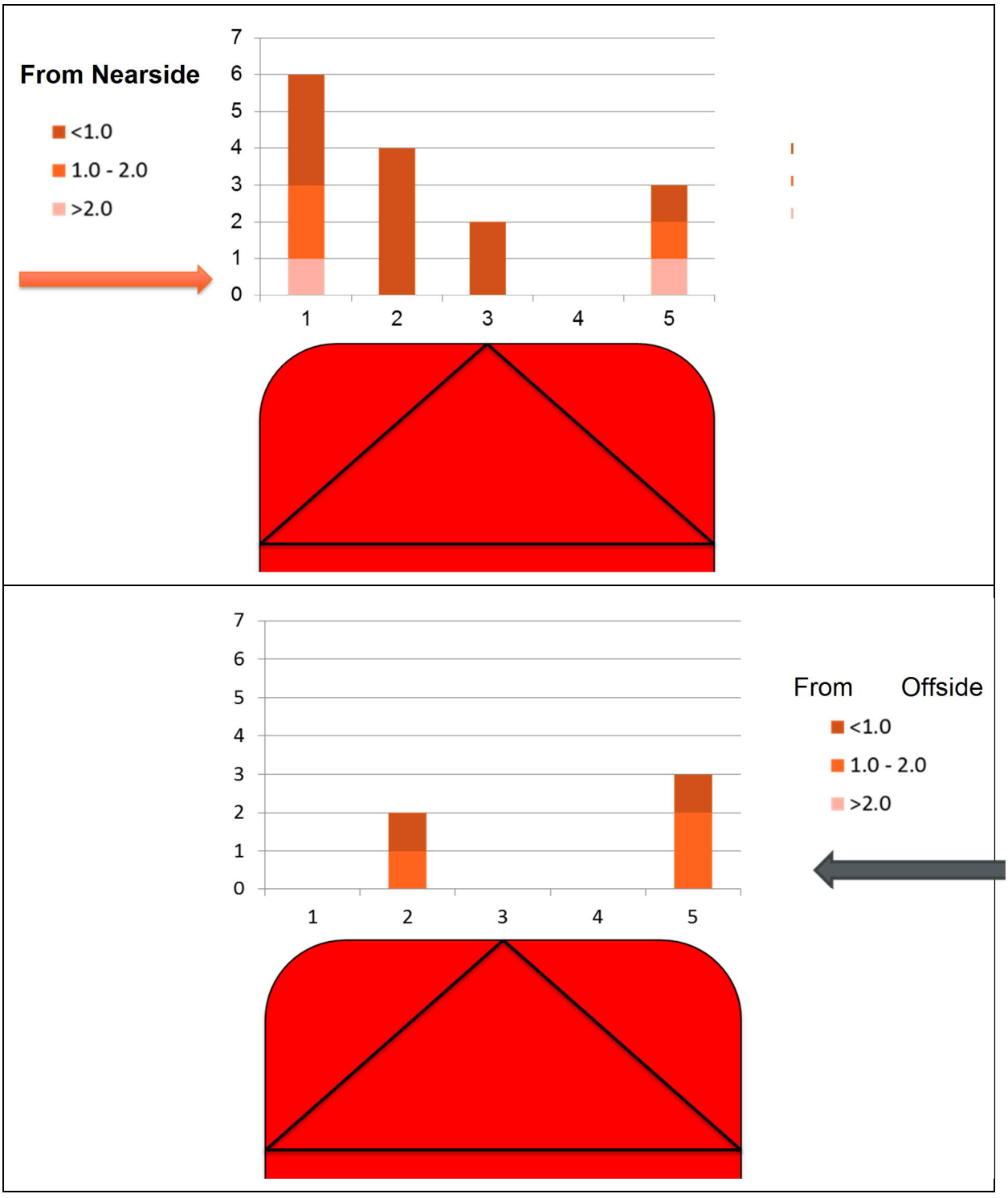
pedestrians crossing from the offside made contact closest to the offside in zone 5. It is interesting to note that in 3 of the cases the pedestrian crossing from the nearside did make it all the way across to zone 5 before contact was made.

Figure 58: Pedestrian point of contact across front of bus. Source data: Police fatal files.



The time to collision was also calculated by the reconstruction experts for the police fatal files and is show in Figure 59. The majority of cases had <1.0 second, whether crossing from the nearside or offside, indicating that very little reaction time was available to the driver/vehicle or pedestrian. Given the additional distance the pedestrians covered from the kerb to the point of impact when approaching from the offside, the fact the available reaction time remains similar shows that pedestrians in collisions from this side were typically moving faster than those coming from the nearside.

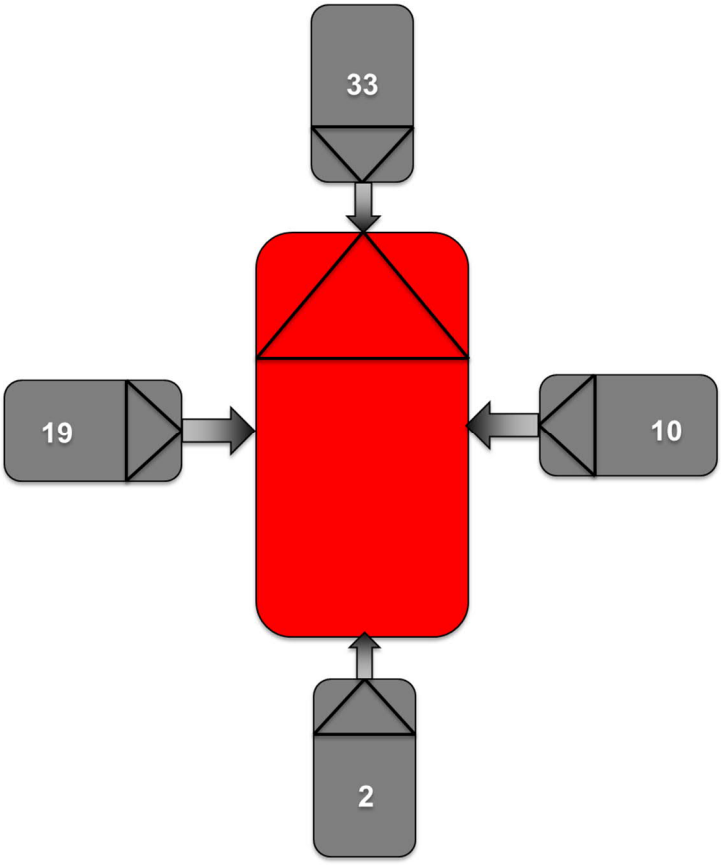
Figure 59: Pedestrian time to collision from the nearside (upper) and offside (lower). Source data: Police fatal files.



A.5.2 Car Occupant Fatalities

In the HVCIS data there were 64 car occupants injured where the impact point on the bus is known, as shown in Figure 60. The majority 52% were impacting with the front of the bus. The nearside was the next most frequent impact point at approximately 30%, offside was 15% and the remaining 3% were at the rear. Note that for this dataset it is not possible to distinguish in any greater granularity (such as rear nearside) where the impact location was, whereas the police fatal files were examined to gather that greater level of information.

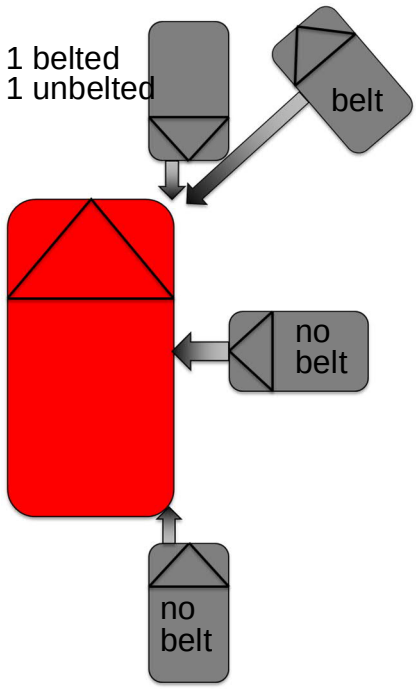
Figure 60: Collisions involving car occupants: distribution around the bus. Source data: HVCIS.



In the police fatal files there were five fatal collisions involving car occupants. One of these car collisions included three slight injuries on the bus. All the fatalities were drivers; no passengers were present. Overall, bus crashworthiness and collision compatibility was not deemed a factor in any of these five car occupant fatalities. The main factors were reckless driving / excessive speed, lack of seat belt use by the car driver (three of the five fatalities were for car drivers not wearing their seat belts), and collision configuration (e.g. small overlap).

Three of five of the buses were single decker buses. The impact distribution around the buses is described in Figure 61, with the majority being at the front of the bus.

Figure 61: Impact distribution for bus collisions involving car occupant fatalities. Source data: Police fatal files.



Three of the car driver fatalities lost control of their vehicle; two of them were not wearing their seat belts and were travelling with excessive speed. In another case the loss of control occurred after an impact with a pedestrian island. In this case, vehicle deformation was very significant and the seat belt was not worn. However, the cause of death was attributed to a head strike with planks of wood inside the car.

For the remaining two cases that did not involve loss of control, one involved an unbelted car driver suffering a diabetic episode resulting in multiple impacts with other road users and roadside furniture, culminating in a severe rear-end offside collision with a stationary bus. The last was an alcohol related collision, where the car drifted on to the wrong carriageway and collided head-on with the bus.

Appendix B Stakeholder Questionnaire

B.1 Introduction

Transport for London (TfL) are in the process of developing a new Bus Safety Standard with the aim of reducing the frequency and/or mitigating the consequences of collisions involving buses. TRL has been commissioned as part of the first phase of the development of this standard, to undertake a detailed analysis of collisions involving buses in order to better understand the circumstances. Based both on the findings and a study of best practice on London's buses, international best practice and possible technology transfer from other vehicle types, the research aims to identify the most effective vehicle technologies and design features in terms of casualty reduction.

At this stage, preliminary analysis of research literature, data from the GB national collision database (stats 19) and data from a sample of police fatal collision reports have been analysed. The aim of this questionnaire is to help the project team fill the remaining gaps in the knowledge with particular reference to:

- The detailed circumstances of groups of collision types where the available data is limited
- The cost of collisions and incident claims to bus operators (e.g. self-insured payouts, reinsurance premiums, driver absence, vehicle downtime etc.)
- Identifying countermeasures which we have missed

Giving views on:

- The effectiveness of the countermeasures identified
- Their technical feasibility
- Any barriers to implementation or constraints that would be imposed on operation
- When it would be possible to implement them
- How much they would cost

The project team will be grateful for your expert opinion in these matters. However, if you had data, for example from insurance claims data or from telematics systems that you would be prepared to anonymously share for TRL to analyse this would be enormously beneficial to the research. If you are willing to discuss the provision of hard data, please contact Kerri Cheek (kerricheek@tfl.gov.uk) or Jane Lupson (JaneLupson@tfl.gov.uk).

B.2 Frequently asked questions

Who is conducting the research? This research is being carried out by TRL (the Transport Research Laboratory) on behalf of Transport for London (TFL).

How long will the survey be open for? The survey will be open for responses until 5 pm GMT on 20th December 2016 .

Will my answers be confidential? You will be asked to provide your name and your organisation name. This information will only be shared within the TRL team and Transport for London. You will not be identified in any published materials unless you provide permission. Neither will you be contacted by anyone who does not work at TRL or TfL, and you will only be contacted if you provide permission.

How long will it take? It is anticipated that you would be able to reply with your expert opinion in 60 minutes or less. However, if you were able to share objective data with us we would be very grateful but this would be expected to take longer to define exactly what is available, what it means and what constraints and agreements are necessary to protect the privacy and commercial interests of those involved.

Who can I contact if I have any questions? If you require any further information please contact TRL on ageorge@trl.co.uk

B.3 Consent

1. Please state whether you agree with the following statements:

- I have read and understood all of the information above (if you have any questions, please email survey@trl.co.uk)
- I feel sufficiently informed as to the survey's purpose
- I am aware that I am free to withdraw from the survey at any time

Yes, I agree with these statements

No, I do not agree with these statements

2. Please provide your name, organisation and email address:

Name:

Organisation

Email address:

If you are willing to, please also provide your phone number:

3. Please indicate whether you provide permission for your responses to be published:

☐ Yes

☐ No

B.4 Collision data

TRLs analyses of on-road injury collision data and police fatal collision files suggest the following groups of road users are most commonly injured in collisions involving buses. Which of these has the most impact on your operation, balancing consideration of disruption, costs, and any corporate and social responsibility objectives you may have as a company? Please give a rank order (1 is highest impact, 3 is lowest)

Road user injured	Rank order of impact on business objectives
Car occupants	
Pedestrians	
Bus Occupants	

Please explain your reasoning for the selection above.

Do injuries to any other road user groups have a significant impact on your business objectives? If so, which and in what way?

How do you think the safety of buses compares with that of other road vehicles (better, worse, similar)? Why do you think this?

How do you think the safety performance of bus operations in London compares to GB as a whole?

Analyses of on-road injury collision data suggests overall reductions in the number of casualties from collisions involving buses and coaches (can't be separated in national data) during the period 2006-15. It suggests that proportionally there have been greater reductions in the number of people killed than in the number of all those injured, whatever the severity. Can you think of any reasons why this might be?

The data suggest that in London, the fatality reduction is broadly comparable to GB but that the reduction in injuries of lesser severity is considerably less than for GB as a whole. Can you think of any reason why this might be?

The collision data identifies that for a substantial proportion of those classified as bus or coach occupants, their injuries were sustained in an incident that did not involve the bus colliding with another vehicle or object. Relatively few of this group were killed. Please can you list the types of incident that might occur to cause the injuries within this group and provide a rank order to indicate which you think are the most common causes (use additional sheet if required)?

Collision type/circumstances/causes	Rank order indicating which are most common

Are you able to supply data that would allow us to examine the circumstances and causes of collisions involving buses in more detail? If so, please elaborate.

B.5 Countermeasures

The number of casualties arising from collisions involving buses has reduced over the period 2006-15. What safety changes do you think will have influenced this change and why. Please separate by the categories of safety intervention indicated below.

Bus design and performance

Bus operation (e.g. scheduling, routing, matching vehicle choice to route, maintenance etc)

Bus driver behaviour (training, speeding, distraction, fatigue etc)

Improvements to infrastructure (road layout, markings, signage, bus stop design etc)

Design and performance of other vehicles (cars, trucks, motorcycles etc)

Behaviour of other road users (pedestrians, other drivers etc)

In terms of the design of buses, TRL has identified the following potential countermeasures based on literature describing existing best practice and technology transfer from other vehicle types. Their function is described below. Please could you add any additional measures which you consider might be beneficial.

Blind spot warnings: Systems that use sensors such as ultrasound, radar, or camera to identify pedestrians or cyclists in blind spots around the vehicle, particularly the front nearside corner in the event of a left turn

AEB: Automated Emergency Braking system. This uses advanced sensors such as radar, camera or lidar to scan areas around the vehicle and detect situations where there is a risk of collision. Where urgent action is necessary but the driver has not responded, the vehicle will apply braking automatically in order to avoid a collision or to at least reduce the collision speed. Different forms of AEB exist and will be effective in different collision scenarios as identified below;

AEB (BVR): Bus front to Vehicle Rear – works where the bus is about to collide with the rear of a vehicle ahead travelling in the same direction and the same lane.

AEB (pedestrian and cyclist): Effective where the front of the bus collides with a pedestrian or cyclist crossing the road approximately at right angles to the direction of bus travel.

AEB (Left turn): Effective where the bus turns left across the path of a pedestrian or cyclist positioned to the nearside of the vehicle.

AES: Automated emergency steering, where sensor systems detect that swerving around a hazard will provide a better avoidance strategy than braking. Initially considered only in relation to avoiding frontal collisions with pedestrians crossing the road where the impact point is near the edge of the vehicle.

Pedestrian friendly front structure: The shape of the vehicle can be changed (curved) to reduce the severity with which pedestrians are pushed to the ground, and deflect them out of the path of the vehicle to lessen the chance of running over. The materials used can be changed to ensure they allow 2-3 cms of controlled deflection to reduce the risk of serious injury in the primary impact.

Runover prevention structures: addition of structure intended to prevent pedestrians being run over by wheels

Improvements to direct vision: Eliminate blind spots at source.

Improved interior design: Measures to reduce the chance of falls, to minimise the distance an occupant could fall or slide before impacting an interior structure and/or ‘softening’ of interior structures to present less injury risk in the event of a collision, these could include gating the stairs while in motion, large radius, soft material or frangible grab rails, higher seat backs etc.

Additional Measures

Please could you give your view as to how effective each countermeasure considered might be for bus operations in London. Please rate each measure on a scale of 1 (not effective at all) to 5 (highly effective) and provide any comments or explanations associated with your rating.

Measure	Effectiveness rating (1-5)	Comment/explanation
Blind spot warning		
AEB BVR		
AEB pedestrians and cyclists		
AEB Left turn		
AES		
Pedestrian friendly front		
Runover prevention structure		
Direct vision		
Interior design		

How technically feasible do you think each solution might be if it were assumed that it was fitted to new buses in 2018, 2023, or 2028. Rate on a scale of 1 (not technically feasible) to 5 (already in production). So a measure already in production in 2016 would score 5 in all boxes. A complex measure not yet in prototype form but where problems are solvable might start at 1 in 2018 and progress to 5 by 2026.

Measure	Feasibility in year (score 1-5)					Comment/explanation
	2018	2020	2022	2024	2026	
Blind spot warning						
AEB BVR						
AEB pedestrians and cyclists						
AEB Left turn						
AES						
Pedestrian friendly front						
Runover prevention structure						
Direct vision						
Interior design						

What barriers to implementation could you foresee and what constraints would it cause in terms of vehicle operation?

Measure	Barriers and constraints
Blind spot warning	
AEB BVR	
AEB pedestrians and cyclists	
AEB Left turn	
AES	
Pedestrian friendly front	
Runover prevention structure	
Direct vision	
Interior design	

What do you think each countermeasure might cost focussing mainly on the purchase cost per vehicle? If there are additional on-going costs please identify these and any rationale or explanation in the comments section.

Measure	Cost (£)	Comment/explanation
Blind spot warning		
AEB BVR		
AEB pedestrians and cyclists		
AEB Left turn		
AES		
Pedestrian friendly front		
Runover prevention structure		
Direct vision		
Interior design		

Appendix C Bus Countermeasures Master List

Vehicle and Equipment	
Pre-crash	**Vehicle condition**
101	Better maintenance of vehicle consumables/features (brakes, tyres, lights etc.)
102	Appropriate use of lights (not defects)
103	Ensure proper adjustment of mirrors
104	Fit mirrors that are currently legislated (only apply if mirrors fitted do not meet legislation)
	Vehicle features
110	ESC
111	Lane departure warning
112	Lane keep assist
113	AEBS (city - low speed shunts ONLY)
114	AEBS
115	AEBS (Pedestrian/cyclist)
116	ISA (voluntary)
117	ISA (mandatory)
118	Blind spot warning (motorway lane changes)
119	Overtake assist
120	Fatigue monitoring
121	Alco-lock
122	Driver alert for approaching permanent hazard (sharp bend, steep decline)
123	Driver alert for approaching temporary hazard (road works, broken down vehicle, queuing traffic)
124	Intersection assistance
125	do not use code
126	Improved mirror visibility
127	Camera/sensor systems for detecting pedestrians and cyclists (for large vehicles)
128	Improved sideguards
129	Improved rear underrun guards

130	Post impact braking system
131	Intersection AEBS (prevents vehicle from setting off into oncoming vehicle from stationary)
132	Traffic sign recognition (warning only)
133	Cross traffic AEBS
134	ABS (motorcycles only)
135	Forward collision warning (motorcycles only)
136	Distraction monitoring
137	Buses only - Fit improved mirrors (e.g. class V and VI mirrors)
138	Buses only - Improve direct vision (front)
139	Buses only - Improve direct vision (side)
140	Buses only - System preventing harsh acceleration
141	Buses only - System preventing harsh deceleration
142	Buses only - Prevent ejection NFS
143	Buses only - Improve structural crashworthiness (frontal)
144	Buses only - Improve structural crashworthiness (rollover)
145	Buses only - Improve structural crashworthiness (rear)
146	Buses only - Bridge impact prevention system
147	Buses only - improved front end design (prevents pedestrian underrun at front - only if not laying down)
	Pedestrian, Cyclist, Motorcyclist accidents
190	Improved pedestrian and cyclist conspicuity
Crash	
201	Improved pedestrian secondary safety (relative to current typical level)
202	Improved occupant secondary safety (relative to current typical level)
203	Better helmet
204	Use of helmet
205	Use of available seat belt
206	Pedestrian friendly mirrors (impacts with large vehicles)
207	Fit and use lap belt

208	Fit and use 3 point belt
209	Buses only - improved occupant friendly structures (e.g. deformable handrails)
210	Buses only - improved occupant safety on stairs (e.g. fall mitigating surface)
211	Buses only - Use front facing seating
212	Buses only - Use rear facing seating
213	Buses only - Eliminate steps and other trip hazards
214	Buses only - Prevent door entanglement
215	Buses only - Prevent boarding/alighting while in motion
216	Buses only - Reduce swept path during turn (e.g. eliminate nose/tail swing)
220	Proper use of helmet
221	Use of appropriate secondary safety clothing (eg. motorcycle leathers)
Post-crash	
301	eCall
302	Improve emergency exits

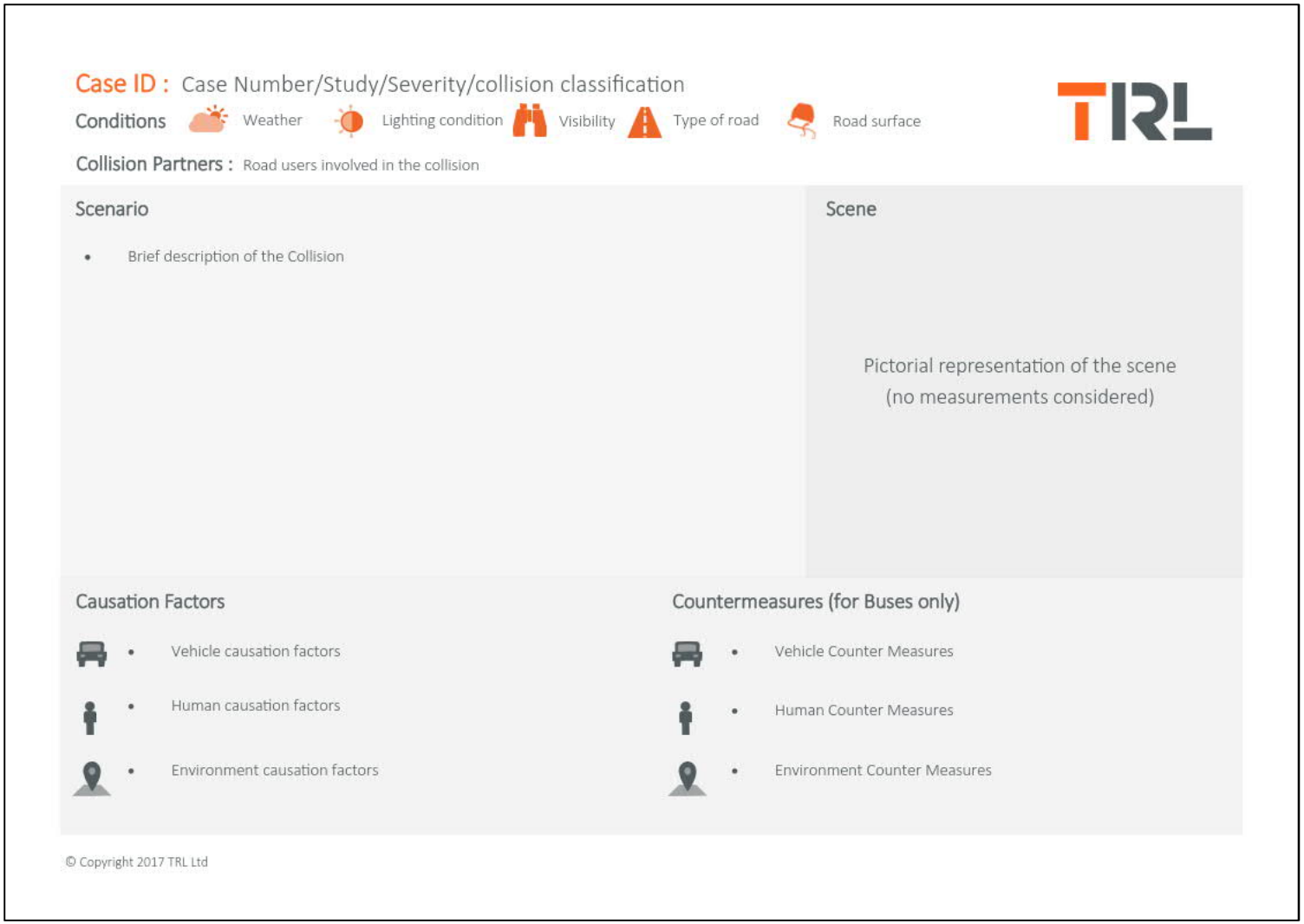
Human Factors	
401	do not use code
402	do not use code
403	do not use code
	Improve driver skills/behaviour
420	Better licensing (reduce exposure to specific high risk situations)
421	Better licensing (increase on-road experience driving in specific situations e.g. weather, busy traffic)
422	Better licensing (medical/health related)
423	Training to improve hazard perception skill
424	Training or education to reduce risky driving manoeuvre
425	Training or education to reduce risky pre-driving behaviour (e.g. drink or drug use)
426	Training or education to reduce other risky behaviours while driving (e.g. seat belt wearing)
427	System design to reduce distraction from in-vehicle devices
428	System design to reduce distraction from out-of-vehicle sources
	Enforcement
410	add speed camera at locus
411	Improved road traffic police profile/checks
412	Add red light camera
413	Add red light camera that detects cyclists
414	Prevent parking within 50m of a junction

Environmental factors	
Pre-crash	**Improve road surface condition:**
701	Improve road surface friction
702	More effective drainage
703	Improve surface topography (pot-holes or defects)
704	More effective surface treatment (e.g. gritting)
	Fit/improve signage:
710	Add signs
711	Better sign visibility in visual scene
712	Improved sign positioning (height, location)
713	More effective sign type/design - Intelligent signage
714	Separate signal phases for cyclist's direction and oncoming right turners
	Improved road layout/design:
720	stagger junction (break sightlines)
721	add traffic light control to junction (reduce conflicts)
722	add roundabout (reduce conflicts - maintain flow)
723	sign alternative route (avoid road feature - narrow bridge etc)
724	add pedestrian crossing (if in urban area and appropriate)
725	Redesign to improve junction visibility (if permanent obscurations)
726	Add street lighting
727	Reduce speed limit
728	Add or widen pedestrian pathway
729	Improve sightlines (change junction design)
730	Prevent parking near junctions/bus lane
732	add pedestrian crossing (overpass or underpass when 724 is not appropriate e.g. on fast roads)
733	Physical segregation of cycle lane (e.g. kerb separated cycle lane)
734	Move stop line further away from crossing to allow large vehicles to see pedestrians and cyclists

	When the vehicle has struck an object/roadside furntiture or run off the road:
740	1) Remove hazard
741	2) Relocate hazard beyond clear zone
742	3) Make the hazard passively safe
743	4) Shield hazard with Vehicle Restraint System (VRS) /Improve type of VRS – not further specified
744	Add appropriate barrier
745	More effective barrier type
746	Higher containment level barrier (Mitigates crossover)
747	Better barrier position (Hits object behind)
748	Motorcycle protection system (Mitigates motorcycle impacts)
749	Presence of a safety barrier (May be correct barrier but has failed due to age/poor maintenance)
750	Better maintained barrier
752	5) Delineate the hazard
Post-crash	**Emergency access**
901	Better access for emergency vehicles (road layout)
902	Better access for emergency vehicles (through congestion)

Other	
888	Other (add comments)
999	Unknown (if you can't think of any, or none in the list are appropriate)

Appendix D OTS & RAIDS Case Summaries



Legend:

Case ID : Case1/OTS/Fatal/Pedestrian

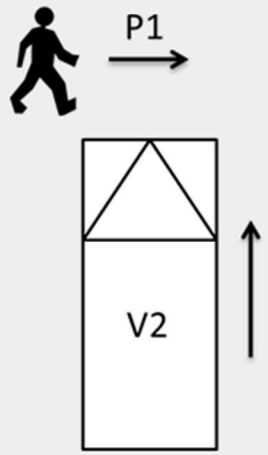
Conditions Fine | Daylight | Good | Single Carriageway | Wet/damp

Collision Partners : 1- Pedestrian 2-Local Bus

Scenario

- A pedestrian (P1) was crossing a street from the nearside in a built-up urban area.
- A local bus (V2) was approaching the bus stop.
- V2 driver claims not to have noticed P1 until the last instant and could not avoid him.
- P1 was knocked to the ground and suffered head injuries.
- Whilst recovering from his injuries, P1 suffered fatal complications within 30 days of the collision.
- P1 was not visible to the V2 driver due to obscuration by bushes around the bend leading up to the collision scene.

Scene



Causation Factors

- Bus Driver: Failed to look properly .
- Pedestrian: Careless, reckless or in a hurry
- Obscuration due to vegetation.

Counter Measures

- Pedestrian AEB.
- Improved pedestrian secondary safety
- Training to improve hazard perception skill.
- Redesign to improve junction visibility (if permanent obscuration).

Case ID : Case2/OTS/Fatal/Pedestrian

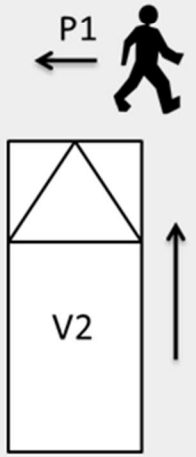
Conditions Fine | Daylight | Good | Single Carriageway | Unknown

Collision Partners : 1-Pedestrian 2-Local Bus

Scenario

- A pedestrian (P1) (believed to be intoxicated) got out of a taxi and placed his hands on the boot to steady himself.
- As the taxi pulled away, P1 appears to have lost balance and then staggered, backwards, into the path of the oncoming bus (V2).
- P1 had crossed into the path of V2 from the driver's offside.
- P1 struck the front offside of V2, which dragged him underneath the bus and fatally injured him.

Scene



Causation Factors

- Pedestrian: Careless, reckless or in a hurry

Counter Measures

- Pedestrian AEB.
- Improved pedestrian secondary safety
- Training to improve hazard perception skill.

Case ID : Case3/OTS/Fatal/Head-on

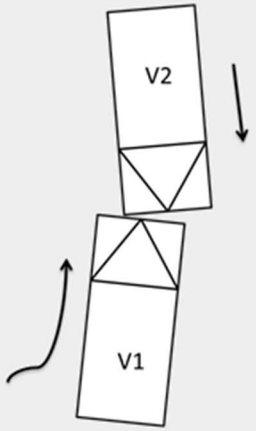
Conditions Unknown | Daylight | Good | Single Carriageway | Snow

Collision Partners : 1-Car 2-Local Bus

Scenario

- The driver of a car (V1) was driving the vehicle along the single carriageway road around the right hand bend.
- At the locus, the bend was moderate and there was a slight downhill gradient.
- The driver of V1 was possibly inexperienced at driving in adverse road conditions and lost control of the vehicle as it began sliding on the icy road surface.
- The driver of a local bus (V2) was driving along his regular route in the opposite direction to V1, steered to the nearside and braked in an attempt to avoid the collision.
- V1 slid across the carriageway to the offside and directly into the path of the V2. V1 then collided head on with the V2.
- The impact caused the driver of V1 to suffer fatal injuries and the driver of V2 suffered from what was believed to be a heart attack at the scene and was hospitalised.

Scene



Causation Factors

- Car-Loss of control
- Car Driver-Learner or inexperienced driver/rider
- Car-Travelling too fast for conditions
- Slippery road (due to weather)

Counter Measures

- Improve structural crashworthiness (frontal)
- Training to improve hazard perception skill.
- Reduce speed limit

Case ID : Case4/OTS/Serious/Pedestrian

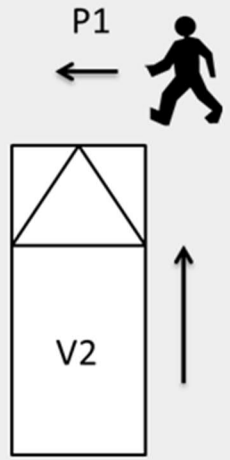
Conditions Fine | Daylight | Good | Single Carriageway | Dry

Collision Partners : 1-Pedestrian 2-Local Bus

Scenario

- A local bus (V2) was travelling along an A-road approaching some traffic lights on a pelican crossing.
- V2 driver saw flashing amber, but nobody was crossing, so he proceeded across the traffic lights.
- A child pedestrian (P1) stepped out right in front of V2 as it passed over the pelican crossing.
- V2 driver had no time to react and P1 hit the bumper and then the windscreen.
- P1 was thrown and dragged 17m as V2 braked to a halt.
- Hospital notes record that P1 was crossing the road behind another pedestrian.

Scene



Causation Factors

- Pedestrian-Careless, reckless or in a hurry

Counter Measures

- AEBS (Pedestrian/cyclist)
- Improved pedestrian secondary safety
- Training to improve hazard perception skill.

Case ID : Case5/OTS/Serious/Pedestrian

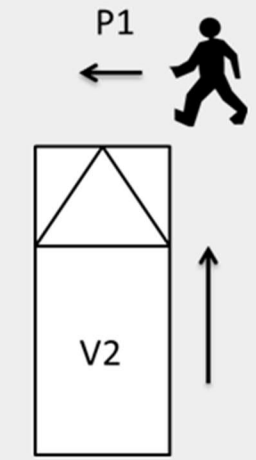
Conditions Fine | Daylight | Good | Single Carriageway | Dry

Collision Partners : 1-Pedestrian 2-Local Bus

Scenario

- Driver of a foreign HGV (now classed as a pedestrian) (P1) stopped and alighted from the vehicle intending to ask directions.
- P1 stepped out into the carriageway (passing behind the parked HGV) and looked in the wrong direction (forgetting, momentarily, that traffic in the U.K. drives on the left) and stepped out.
- P1 stepped straight into the path of an oncoming bus (V2).
- The front offside wheel of V2 has driven over the left foot of P1.

Scene



Causation Factors

- Pedestrian-Failed to judge vehicle's path or speed

Counter Measures

- AEBS (Pedestrian/cyclist)
- Training to improve hazard perception skill.

Case ID : Case6/OTS/Serious/Sideswipe & Head-on

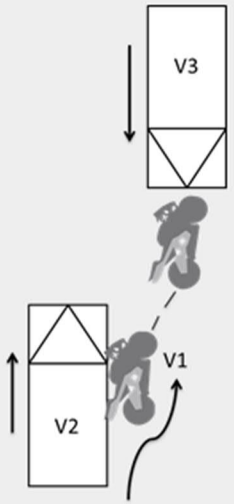
Conditions Fine | Daylight | Good | Single Carriageway | Dry

Collision Partners : 1-Motorcycle 2-Car 3-Local Bus

Scenario

- A car (V2) was passing an unknown stationary bus at a bus stop.
- Rider of a motorcycle (V1) tries to overtake V2 from the right side and panics.
- V1 swipes the offside of V2 and gets deflected.
- V1 is then sent across to the offside of the road and collides head-on with a bus (V3) travelling in the opposite direction.

Scene



Causation Factors

- Rider-Poor turn or manoeuvre
- Rider-Careless, reckless or in a hurry

Counter Measures

- AEBS
- Training to improve hazard perception skill.

Case ID : Case7/OTS/Serious/Rear-end

Conditions Fine | Daylight | Good | Single Carriageway | Dry

Collision Partners : 1-Motorcycle 2-Local Bus

Scenario

- A motorcycle (V1) lost control when the rider panicked and braked hard on the front wheel only after seeing a local bus (V2) stationary in the lane ahead but indicating to pull out of the lane.
- Due to the wheel lock, V1 skidded before falling and collided with the rear V2.
- Both V1 and the V1 rider came to rest underneath V2.

Scene

Causation Factors

- Rider-Nervous, uncertain or panic
- Rider-Travelling too fast for conditions

Counter Measures

Case ID : Case8/OTS/Serious/Pedestrian

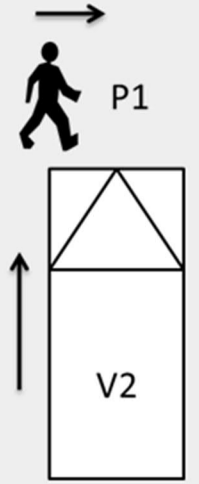
Conditions Unknown | Daylight | Good | Single Carriageway | Dry

Collision Partners : 1-Pedestrian 2-Local Bus

Scenario

- On a dry day during the morning rush hour, a pedestrian (P1) began to run across a road near a train station.
- P1 was crossing from the nearside of an oncoming local bus (V2) and failed to use the pedestrian crossing metres away.
- P1 was struck by V2 and their head hit the lower part of the front screen on the nearside.
- V2 stopped and P1 was thrown to the ground.

Scene



Causation Factors

- Pedestrian-Failed to judge vehicle's path or speed

Counter Measures

- AEBS (Pedestrian/cyclist)
- Improved pedestrian Secondary safety
- Training to improve hazard perception skill

Case ID : Case9/OTS/Serious/Front-side

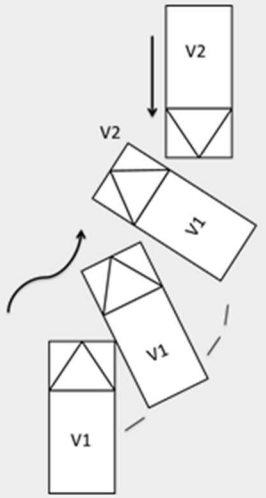
Conditions Fine | Darkness | Good | Single Carriageway | Dry

Collision Partners : 1-Car 2-Local Bus

Scenario

- During late evening at a busy junction in town centre, a car (V1) carrying 4 occupants swung wide around left hand bend down hill to be confronted by a local bus (V2) in the opposing lane.
- V1 driver reacted by braking hard while V2 began to spin anti-clockwise.
- As V2 became nearly stationary the driver of V1 swerved to the left leaving the offside of V1 exposed to the front of V2.
- The offside door of V1 struck the front offside corner of V2 and V1 rolled over onto it's nearside.
- All 4 occupants were trapped in V1 and were cut out by Fire and Rescue Services.
- The driver of V1 was sober though the other 3 passengers were heavily intoxicated by alcohol.

Scene



Causation Factors

- Car-Swerved
- Car driver- Careless, reckless or in a hurry
- Road layout

Counter Measures

- Training to improve hazard perception skill

Case ID : Case10/OTS/Slight/Other

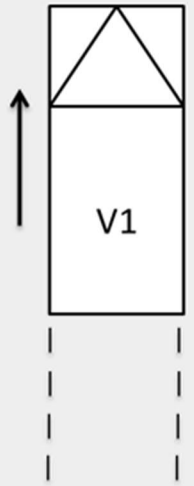
Conditions Fine | Daylight | Good | Dual Carriageway | Dry

Collision Partners : 1-Local Bus

Scenario

- A Local bus (V1), braked heavily due to an unknown vehicle cutting in front of it.
- No other vehicles contacted and the offending vehicle was never traced.
- One passenger on-board was thrown forward and injured in the incident.

Scene



Causation Factors

- Bus driver- Failed to judge other person's path or speed
- Bus driver– Sudden Braking

Counter Measures

- Improved occupant friendly structures
- Training to improve hazard perception skill

Case ID : Case11/OTS/Slight/Junction

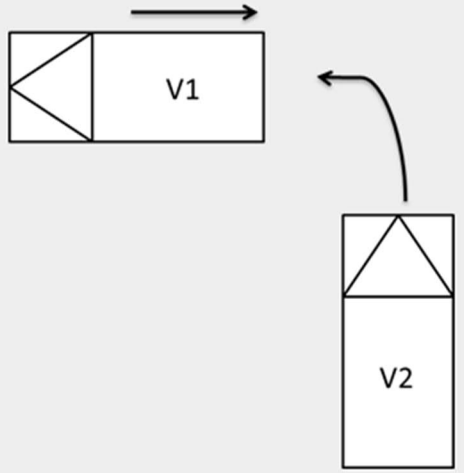
Conditions Fine | Darkness | Good | Single Carriageway | Dry

Collision Partners : 1-Car 2-Local Bus

Scenario

- A car (V1) started to reverse as it had missed a turning to the left.
- A single decker bus (V2) pulled out from a side road turning left to follow V1.
- It was too late by the time V2 driver found V1 reversing back along the carriageway.
- V1 reversed into the V2 and both the vehicles came to rest in the centre of the junction.

Scene



Causation Factors

- Car- Careless, reckless or in a hurry
- Bus- Failed to judge other person's path or speed

Counter Measures

- Cross Traffic AEB
- Training to improve hazard perception skill

Case ID : Case12/OTS/Slight/Rear-end

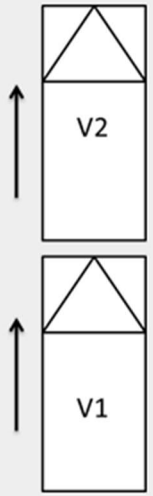
Conditions Fine | Daylight | Good | Single Carriageway | Dry

Collision Partners : 1-Van 2-Local Bus

Scenario

- A single decker bus (V2), slowed down suddenly while approaching a traffic signal.
- A van (V1) was following V2 closely.
- V1 failed to stop behind and stuck the rear of V2.

Scene



Causation Factors

- Van—Following too close
- Van-Failed to look properly
- Inadequate or masked signs or road markings

Counter Measures

- Training or education to reduce risky driving manoeuvre
- Add signs

Case ID : Case13/OTS/Slight/Junction

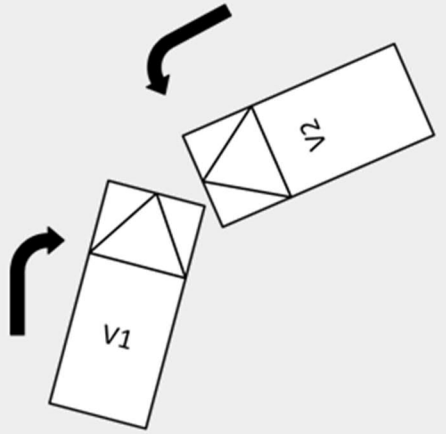
Conditions Fine | Daylight | Good | Single Carriageway | Dry

Collision Partners : 1-Car 2-Local Bus

Scenario

- A car (V1) failed to give way to traffic on the main road and was turning right out of a car park.
- A single decker bus (V2) approaching from the right of V1 on the main carriageway was turning left
- Front of V1 collided with the front of V2 in the centre of the junction.

Scene



Causation Factors

- Car- Junction overshoot
- Car-Failed to look properly
- Car- Disobeyed Give Way or Stop sign or markings
- Bus- Failed to judge other person's path or speed

Counter Measures

- Cross Traffic AEB
- Training to improve hazard perception skill

Case ID : Case14/OTS/Slight/Junction

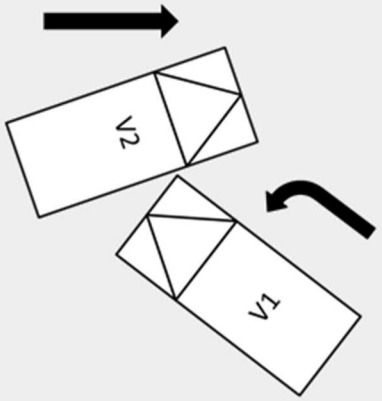
Conditions Fine | Daylight | Good | Single Carriageway | Dry

Collision Partners : 1-Car 2-Local Bus

Scenario

- A car (V1) approached the T-junction, intending to turn left, onto the main road. V1 stopped at the give-way line and the driver looked left, and saw a local bus (V2) approaching.
- V2 driver slowed down and moved to the centre of the road, to pass the line of parked vehicles.
- V1 driver thought that V2 was slowing down to allow him to pull out and started to pull out onto the main road. The front offside of V1 scraped along the offside of the V2 as it passed.
- V1 came to rest with the front in the main road and the rear in the side road. V2 was brought to rest on the main road.
- Vehicles on the main road were legally parked , opposite the entrance to a side road.

Scene



Causation Factors

- Bus- Failed to look properly
- Car-Failed to judge other person's path or speed
- Road Layout

Counter Measures

- Cross Traffic AEB
- Training to improve hazard perception skill
- Prevent parking near junctions/bus lane

Case ID : Case15/OTS/Slight/Rear-end

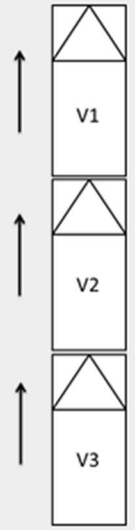
Conditions Fine | Darkness | Good | Single Carriageway | Wet/damp

Collision Partners : 1-Car 2-Car 3-Local Bus

Scenario

- A car (V1) was being followed by another car (V2), which in turn was being followed by a local bus (V3) on a single carriage way.
- All three vehicles were travelling along a main road with heavy traffic.
- Both V1 and V2 stopped in a queue of traffic approaching the traffic light controlled junction.
- V3 driver didn't notice the stopped vehicles ahead and ran into the rear of V2. Which in turn was pushed forward and stuck the rear of V1.

Scene



Causation Factors

- Bus- Failed to look properly
- Bus- Following too closely

Counter Measures

- AEBS (city -low speed shunts ONLY)
- Training to improve hazard perception skill
- Improved sign positioning (height, location)

Case ID : Case16/OTS/Slight/Junction

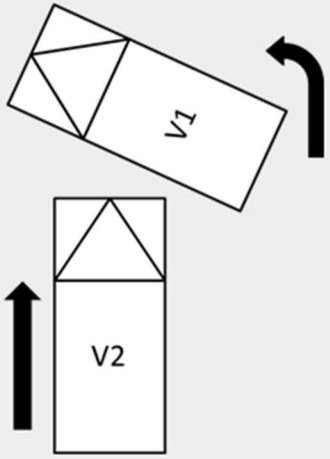
Conditions Fine | Daylight | Good | Single Carriageway | Dry

Collision Partners : 1-Car 2-Local Bus

Scenario

- Driver of a car (V1) overtook a bus (V2) travelling in the bus lane.
- V1 passed the bus in lane 1,indicated and started to turn left in front of V2.
- V1 stopped across the bus lane as a pedestrian was crossing the minor road where V1 intended to travel.
- V2 was unable to stop in the available distance and collided with nearside of V1 pushing it sideways.

Scene



Causation Factors

- Car-Poor turn or manoeuvre
- Car-Careless, reckless or in a hurry

Counter Measures

- Cross Traffic AEB
- Training to improve hazard perception skill

Case ID : Case17/OTS/Slight/Junction

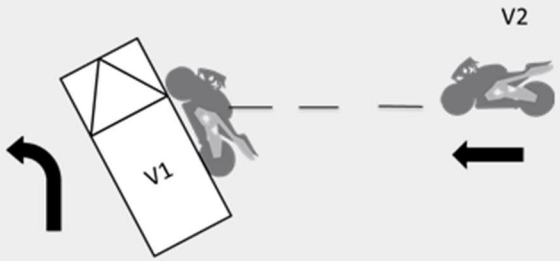
Conditions Unknown | Daylight | Good | Single Carriageway | Dry

Collision Partners : 1-Local Bus 2-Motorcycle

Scenario

- A bus (V1) was at T-junction, waiting to turn left. Driver of V1 had a restricted view to the right obscured by a bend in the road, a fence and vegetation, and was possibly not helped by bright sunlight.
- A motorcycle (V2)(young rider) was travelling downhill along main road.
- Rider of V2 heard rattling noise at the rear wheel and looked down to see.
- V1 saw no traffic approaching, so decides to pull out of the junction (possibly watching to the right, as that side has poor visibility).
- V1 blocks the entire road as it makes the turn. V2 rider looks up to see V1 at about 50m from him blocking the road. V2 brakes and steers slightly left.
- Front of V2 collided with Offside V1 (probably <5mph). V2 slid for about 3m, under O/S V1. V2 rider slightly grazed left hip.

Scene



Causation Factors

- Motorcycle- Learner or inexperienced driver/rider
- Road layout (e.g. bend, winding road, hill crest)
- Vegetation

Counter Measures

- Improved side design (prevents VRU underrun)
- Training or education to reduce risky pre-driving behaviour
- Redesign to improve junction visibility (if permanent obscuration)

Case ID : Case18/OTS/Slight/Front-side

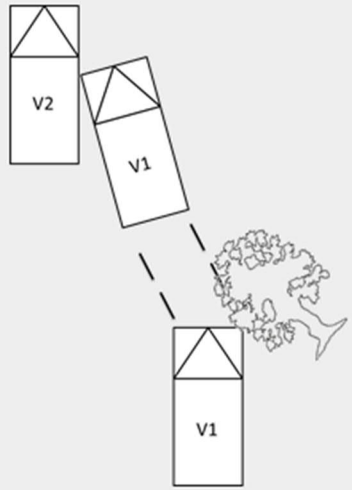
Conditions Unknown | Daylight | Good | Single Carriageway | Dry

Collision Partners : 1-Local Bus 2-Car

Scenario

- On a 30mph speed limit residential road, lined with trees and parked vehicles a single deck bus (V1) was travelling along its usual bus route.
- Suspect V1 driver fell asleep and the upper front offside corner V1 hit tree off road to offside.
- V1 driver reacted by flinging himself down over the steering wheel, and trying to apply the brakes (but missed, and hit the accelerator instead).
- V1 driver steered left. Front nearside V1 hit right offside of a car (V2), which was parked on the road, near the nearside kerb.
- V1 came to rest some distance along the road.
- V1 driver was possibly fatigued and was due to have a break a few minutes before the accident happened.

Scene



Causation Factors

- Bus Driver: Fatigue
- Bus Driver: Nervous, uncertain or panic

Counter Measures

- Fatigue monitoring
- Training or education to reduce risky pre-driving behaviour

Case ID : Case19/OTS/Slight/Sideswipe & Rear-end

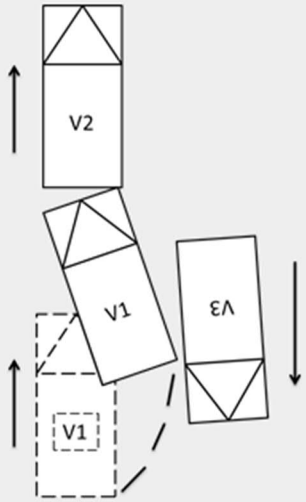
Conditions Fine | Daylight | Good | Single Carriageway | Dry

Collision Partners : 1-Car 2-Car 3-Local Bus

Scenario

- A car (V1) approached from around a left hand bend at speed and saw another car (V2) stationary in lane 1 ahead, waiting for a bus (V3) to pass around a parked vehicle.
- V1's driver panicked and braked hard on seeing the obstruction ahead and started to skid.
- V1 then continued to skid colliding with the offside of V3 and the rear of V2.
- V2 was pushed forward and half onto the footpath where it came to rest.
- V1 and V3 came to rest in the centre of the carriageway.

Scene



Causation Factors

- V1 driver—Nervous uncertain or panic
- Road layout (e.g. bend, winding road, hill crest)

Counter Measures

- Training to improve hazard perception skill.
- Add signs
- Improved sign positioning

Case ID : Case20/OTS/Slight/Junction

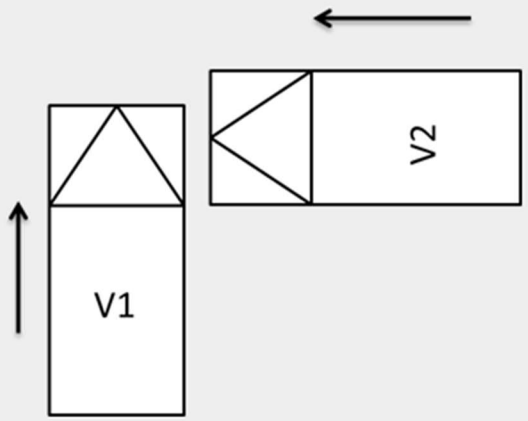
Conditions Fine | Daylight | Good | Single Carriageway | Dry

Collision Partners : 1-Car 2-Local Bus

Scenario

- A car (V1) failed to give-way to vehicles entering from the right on a mini roundabout .
- V1 entered the roundabout without stopping intending to take the second exit.
- A single decker bus (V2) already on the roundabout from the right was unable to stop in time
- V2 collided with the offside of V1 pushing it to the nearside of the carriageway.
- The driver of V1 only had a provisional licence

Scene



Causation Factors

- Car-Learner or inexperienced driver/rider
- Car-Careless, reckless or in a hurry

Counter Measures

- Cross Traffic AEB
- Training to improve hazard perception skill.

Case ID : Case21/OTS/Slight/Pedestrian

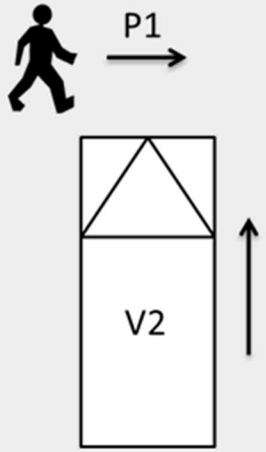
Conditions Fine | Daylight | Good | Single Carriageway | Dry

Collision Partners : 1- Pedestrian 2-Local Bus

Scenario

- A pedestrian (P1) ran out on a pedestrian crossing into the path of a double decker bus (V2) travelling from the pedestrians right.
- V2 braked heavily but still collided with P1 knocking them to the floor.
- P1 sustained minor injuries.

Scene



Causation Factors

- Pedestrian- Careless, reckless or in a hurry

Counter Measures

- AEBS (Pedestrian/cyclist)
- Training to improve hazard perception skill.

Case ID : Case22/OTS/Slight/Junction

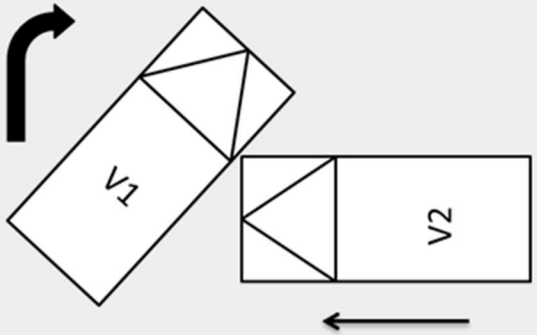
Conditions Rain | Daylight | Good | Dual Carriageway | Wet/damp

Collision Partners : 1-Car 2-Local Bus

Scenario

- On a wet day during a period of rain, a car (V1) was waiting to turn right onto a busy one way class A dual carriageway.
- V1 was required to cross a contra flow bus lane to make the turn.
- The driver looked right and saw a bus (V2), but thought there was plenty of time to make the right turn having seen a gap in traffic.
- V2 had begun moving from the bus stop. The driver pulled out and the front offside of the V1 was struck by the front of V2.
- V1 came to a halt in the road and V2 pulled over on the nearside.

Scene



Causation Factors

- Car- Careless, reckless or in a hurry
- Car-Poor turn or manoeuvre

Counter Measures

- Cross Traffic AEB
- Training to improve hazard perception skill.

Case ID : Case23/OTS/Slight/Junction

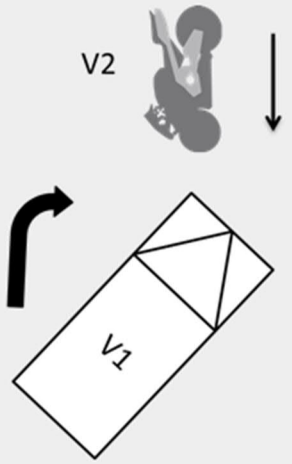
Conditions Rain | Darkness | Good | Dual carriageway | Wet/damp

Collision Partners : 1-Local Bus 2-. Motorcycle

Scenario

- A single decker bus (V1) was waiting in a right turn lane ready to turn right into the side road.
- The driver of V1 failed to notice a motorcycle (V2) travelling from the opposite side and turned across it's path.
- V2 braked hard and skidded before colliding with nearside of V1.

Scene



Causation Factors

- Bus- Careless, reckless or in a hurry
- Bus-Poor turn or manoeuvre

Counter Measures

- Buses only -Improve direct vision (Front)
- Training or education to reduce risky driving manoeuvre

Case ID : Case24/OTS/Slight/Junction

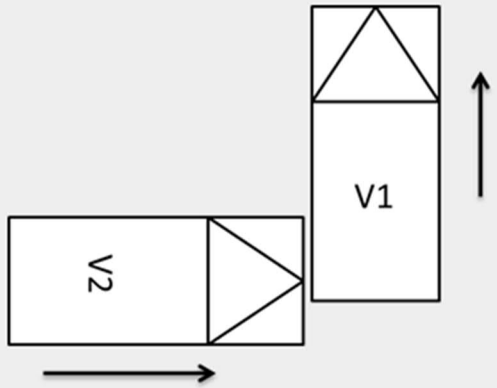
Conditions Fine | Daylight | Good | Single carriageway | Dry

Collision Partners : 1-Lorry 2-Local Bus

Scenario

- An HGV (V1) failed to stop at a give-way crossroads junction.
- V1 drove into the path of a bus (V2) travelling from the left of V1.
- V2 collided with the rear nearside of V1 forcing it to rotate and tip over onto it's offside.

Scene



Causation Factors

- Truck- Careless, reckless or in a hurry
- Truck- Failed to look properly
- Bus- Failed to judge other person's path or speed

Counter Measures

- Cross traffic AEBS
- Training to improve hazard perception skill

Case ID : Case25/OTS/Slight/Rear-end

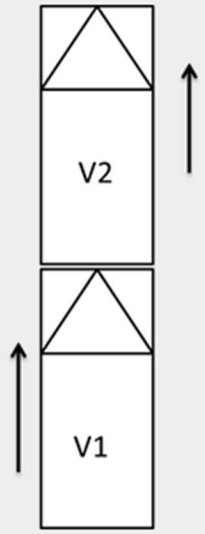
Conditions Fine | Daylight | Good | Single carriageway | Dry

Collision Partners : 1-Car 2-Local Bus

Scenario

- A car (V1) was travelling along an urban, residential road that was subject to a 30mph limit.
- A bus (V2) was stationary and letting off passengers at a bus stop.
- V1 failed to notice the stationary V2 and drove into the rear of V2.
- No injuries were sustained by any of the bus passengers but the occupants of V1 were injured.

Scene



Causation Factors

- Car driver-Failed to look properly

Counter Measures

- Add Signs to indicate Bus stop

Case ID : Case26/OTS/Slight/Rear-end

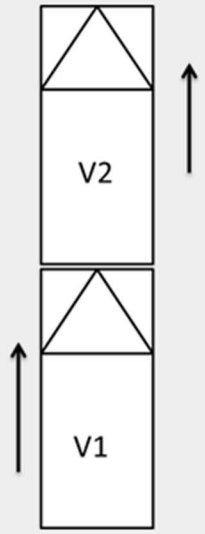
Conditions: Fine | Daylight | Good | Single carriageway | Wet/damp

Collision Partners : 1-Local Bus 2-Car

Scenario

- The driver of a single deck bus (V1) failed to see that a car (V2) in front that had stopped to turn right.
- Driver of V1 was distracted in checking the bus stop for passengers.
- When driver of V1 looked up, it was too late and braked hard.
- Front of V1 collided with rear of V2.

Scene



Causation Factors

- Bus driver- Failed to look properly
- Bus driver– Distraction in vehicle

Counter Measures

- AEBS
- Training to improve hazard perception skill

Case ID : Case27/OTS/Slight/Rear-end

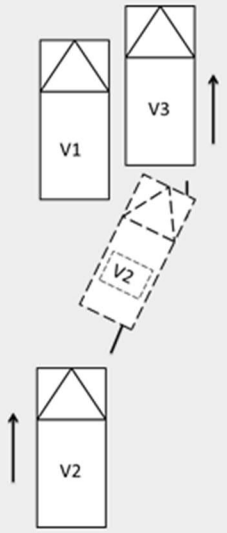
Conditions Fine | Daylight | Good | Single carriageway | Dry

Collision Partners : 1-Unknown car 2-Local Bus 3-Van

Scenario

- An unknown car (V1) stopped abruptly at shops with no indication and just prior to a junction.
- A single decker bus (V2) tried to take evasive action to avoid colliding with the rear of V1.
- V2 moved out into lane two and collided with a van (V3) which was in lane 2 in the blind spot of V2.
- V1 made off from the scene without stopping and giving details to other parties and was not traced.

Scene



Causation Factors

- Vehicle blind spot
- Bus- Failed to judge other person's path or speed
- Bus- Nervous, uncertain or panic

Counter Measures

- AEBS
- Better licensing (increase on-road experience driving in specific situations e.g. weather, busy traffic)

Case ID : Case28/OTS/Slight/Junction

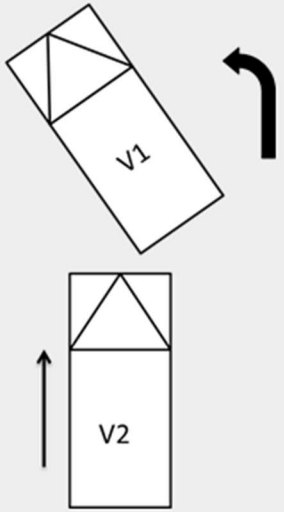
Conditions Fine | Daylight | Good | Single carriageway | Dry

Collision Partners : 1-Car 2-Local Bus

Scenario

- A car (V1) was travelling in lane 1 when the driver decided to turn left.
- V1 had to turn across the bus lane, into a side road.
- The driver of a single decker bus (V2) had no time to react.
- Front of V2 and collided into the rear nearside of V1.

Scene



Causation Factors

- Bus- Failed to judge other person's path or speed
- Car-Poor turn or manoeuvre

Counter Measures

- AEBS (city -low speed shunts ONLY)
- Training to improve hazard perception skill

Case ID : Case29/RAIDS/Serious/Junction

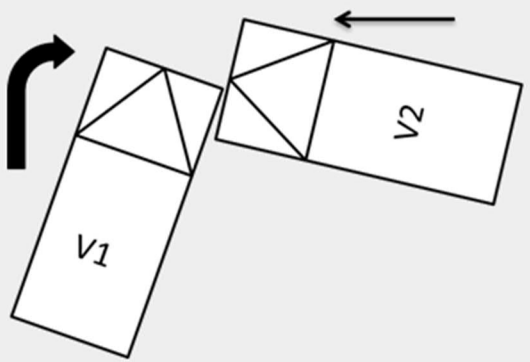
Conditions Rain | Daylight | Good | Single carriageway | Wet/damp

Collision Partners : 1-Car 2-Local Bus

Scenario

- A car (V1) emerged from a minor road, believed to be turning right onto main road into path of a double decker bus (V2) approaching from right.
- V2 driver unable to avoid the collision, struck offside front of V1.
- V1 projected along carriageway, coming to rest approximately 41m from point of impact.
- Driver of V1 suffered serious injury, an occupant in child seat was uninjured, unrestrained V2 driver suffered slight injury.

Scene



Causation Factors

- Car- Failed to judge other person's path or speed
- Bus- Failed to judge other person's path or speed

Counter Measures

- Cross traffic AEBS
- Better licensing (increase on-road experience driving in specific situations e.g. weather, busy traffic)

Case ID : Case30/RAIDS/Slight/Junction

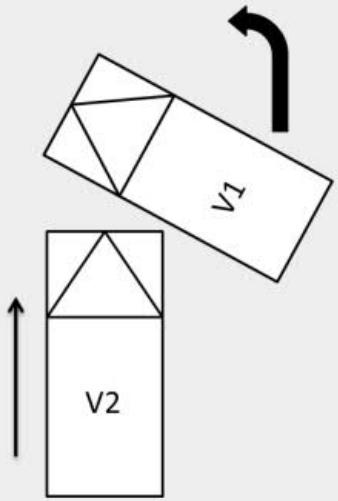
Conditions Fine | Daylight | Good | Single carriageway | Dry

Collision Partners : 1-Van 2-Local Bus

Scenario

- A van (V1) passed a stationary bus (V2) at a bus stop and continued along road for a further 150m.
- V1 indicated left, then turned intending to enter business premises, crossing the adjacent bus lane having failed to check before doing so.
- V2 moving along the bus lane was unable to stop the vehicle and collided with the nearside of V1.
- V1 came to rest across front of V2 in bus lane.
- Driver of V1 suffered pain to right leg.
- Driver & 3 passengers in the V2 suffered slight injury, no hospital attendance for any involved party.

Scene



Causation Factors

- Bus- Failed to judge other person's path or speed
- Van- Careless, reckless or in a hurry
- Van- Poor turn or manoeuvre

Counter Measures

- Cross traffic AEBS
- Better licensing (increase on-road experience driving in specific situations e.g. weather, busy traffic)

Case ID : Case31/RAIDS/Slight/Junction

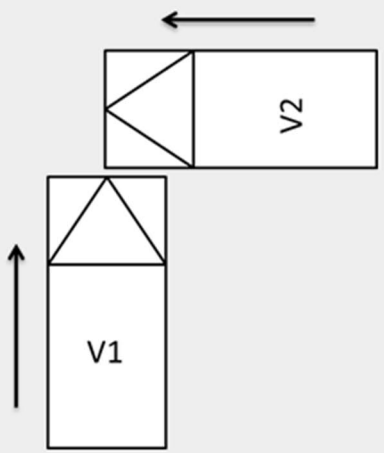
Conditions Fine | Daylight | Good | Roundabout | Dry

Collision Partners : 1-Local Bus 2-Car

Scenario

- On a clear sunny day, a single-decker bus (V1) carrying 6 passengers approached a 4-arm roundabout.
- The sun was shining in the eyes of the driver of V1 who states that the vehicles to her right allowed her to pull out onto the roundabout.
- As V1 has crept out onto the roundabout a car (V2) approached from the right (with right-of-way) intending to continue straight over.
- V1 then collided with the front nearside of V2 as it tried to continue over the roundabout.

Scene



Causation Factors

- Bus- Failed to judge other person's path or speed
- Car- Failed to look properly
- Dazzling sun

Counter Measures

- Cross traffic AEBS
- Better licensing (increase on-road experience driving in specific situations e.g. weather, busy traffic)

Case ID : Case32/RAIDS/Slight/Junction

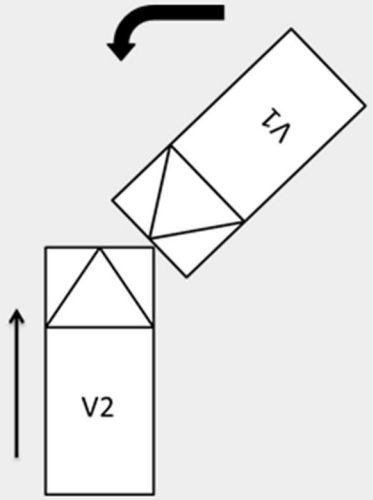
Conditions Fine | Daylight | Good | Single carriageway | Dry

Collision Partners : 1-Car 2-Local Bus

Scenario

- A car (V1), approaches T-Junction with intention of turning left.
- V1 emerges left into the path of a double-decker bus (V2), approaching from the left.
- V2 was driving along the centre of the carriageway, due to the presence of parked vehicles.
- A traffic calming feature and speed humps present along this path.
- The front offside corner of V2 impacts with the front of the V1.
- The subsequent forward motion of V2, rotates the V1 clockwise.
- The driver of the V1 sustained slight injuries.

Scene



Causation Factors

- Bus- Failed to judge other person's path or speed
- Car- Failed to look properly
- Car- Poor turn or manoeuvre
- Dazzling sun

Counter Measures

- Intersection AEB
- Training to improve hazard perception skill

Case ID : Case33/RAIDS/Serious/Head-on

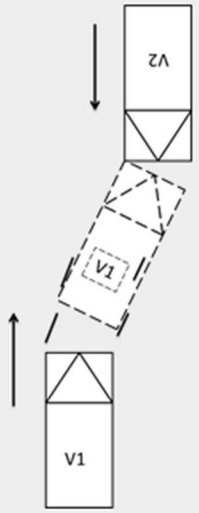
Conditions Fine | Darkness | Good | Single carriageway | Dry

Collision Partners : 1- Car 2-Local Bus

Scenario

- A car (V1) travelling along a single carriageway road drifts into the opposing carriageway
- While drifting V1 collides with the front of a double decker bus (V2).
- Driver of V1 states they fell asleep whilst attempting to overtake another vehicle. No witnesses mentioned any other vehicle.
- Driver of V1 sustained serious injuries and a number of passengers on V2 sustained slight injuries.

Scene



Causation Factors

- Bus- Failed to judge other person's path or speed
- Car—Fatigue
- Car-Poor turn or manoeuvre

Counter Measures

- Intersection AEBS
- Training to improve hazard perception skill

Case ID : Case34/RAIDS/Serious/Pedestrian

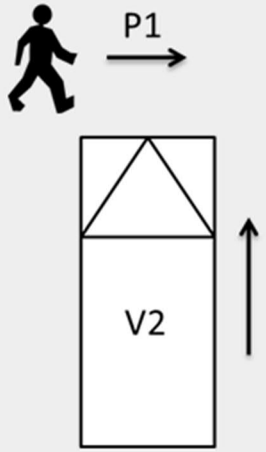
Conditions Fine | Daylight | Good | Single carriageway | Dry

Collision Partners : 1.-Pedestrian 2-Local Bus

Scenario

- A single decker bus (V2) was travelling away from bus stop at slow speed
- A pedestrian (P1) walked off the kerb in front of V1 colliding with the front nearside of it.
- P1 falls back and hits head on the carriageway.

Scene



Causation Factors

- Pedestrian-Failed to look properly
- Pedestrian-Careless, reckless or in a hurry

Counter Measures

- AEBS (Pedestrian/cyclist)
- Training to improve hazard perception skill

Case ID : Case35/OTS/Slight/Sideswipe

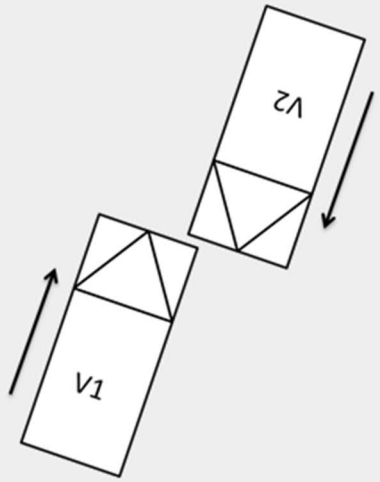
Conditions Fine | Daylight | Good | Single carriageway | Dry

Collision Partners : 1-Local Bus 2-Local Bus

Scenario

- A bus (V1) travels around a sharp and narrow left hand bend .
- While negotiating the curve V1 driver drives over the centre line into opposing lane.
- Another bus (V2) travelling in the opposite direction sideswipes with V1.

Scene



Causation Factors

- Bus1- Aggressive Driving
- Bus1- Poor turn or manoeuvre
- Bus2- Failed to judge other person's path or speed
- Road layout

Counter Measures

- Intersection AEBS
- Training to improve hazard perception skill
- Better licensing (increase on-road experience driving in specific situations e.g. weather, busy traffic)
- Redesign to improve junction visibility (if permanent obscuration)

Appendix E Human Factors & Behaviour Change Workshop Slides

This appendix contains the slides from the Human Factors Workshop held on 13/02/2017 at TfL.

Attendees included:

- Shaun Helman, TRL (presenter)
- Nora Balfe, TRL (presenter)
- Courtney Newbould, TRL
- Jane Lupson, TfL
- Kerri Cheek, TfL
- Alex Moffat, TfL
- George Marcar, TfL
- Jasmine Moss, TfL
- Lizi Mountford, TfL
- Stephan Hatcher, TfL
- James Wooller, TfL
- Joanne Page, TfL
- Peter Evans, RATP Dev
- Keiran McDonnell, Tower Transit

Agenda

- 1200 - 1220: Background and introductions
- 1220 - 1250: Introduction to Human Factors
- 1250 - 1320: Introduction to Behaviour Change
- 1320 - 1330: Break
- 1330 - 1415: Group exercise 1
- 1415 - 1500: Group exercise 2
- 1500 - 1515: Break
- 1515 - 1530: Top three take-home messages
- 1530 - 1600: Report back, discussion, wrap up


Introductions
TRL


TRL
Introduction to Human Factors

What is Human Factors?

Anything that affects human performance

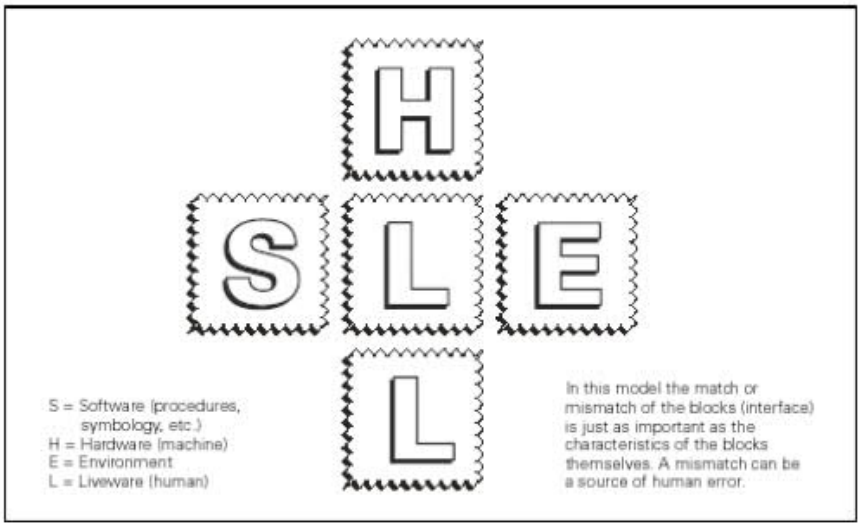
EASA

Ergonomics (or human factors) is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance.

IEA (2002)

5

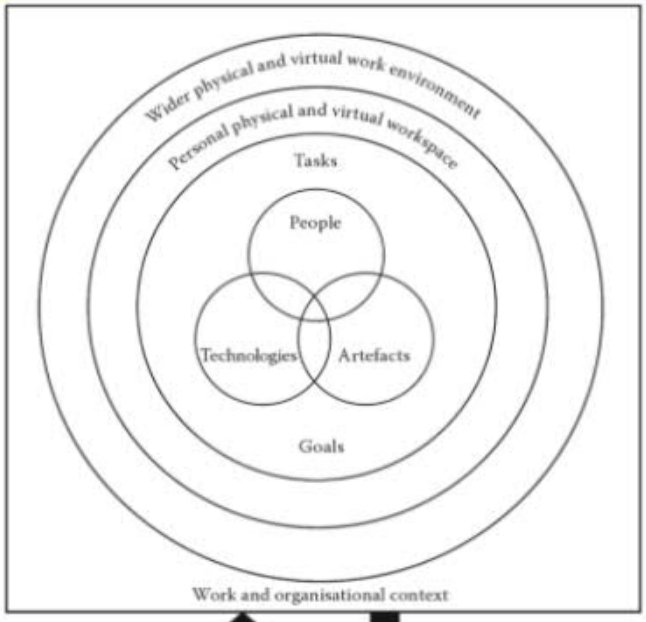
SHELL Human Factors Model



Hawkins, F.H. (1987). Human factors in flight. Aldershot: Ashgate

6

Onion Model

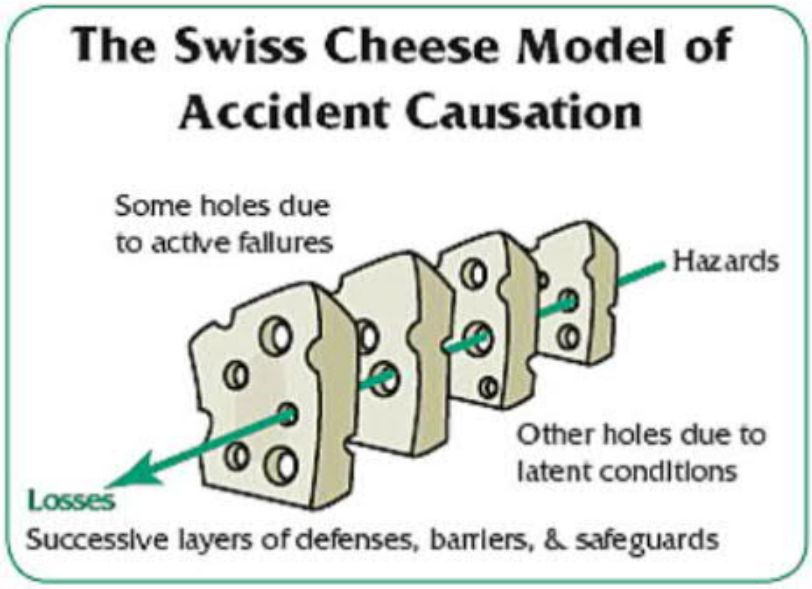


Financial constraints and priorities
Technical developments and capabilities
Legal and regulatory framework
Social influences, expectations and norms

Wilson, J.R. & Sharples, S. (2015). Methods in the understanding of Human Factors. In J.R. Wilson & S. Sharples (Eds) Evaluation of Human Work, 1 – 36. Boca Raton: CRC Press.

7

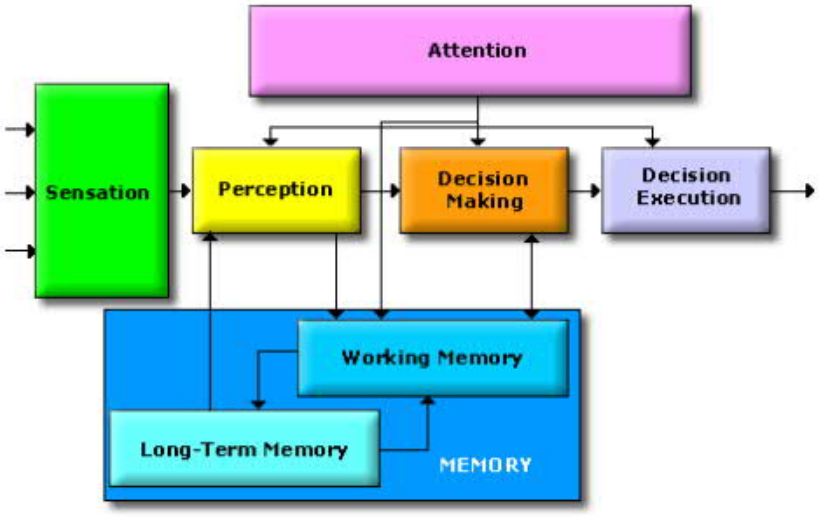
Swiss Cheese Model



Reason, J. (1997). Managing the risks of organisational accidents. Aldershot: Ashgate.

8

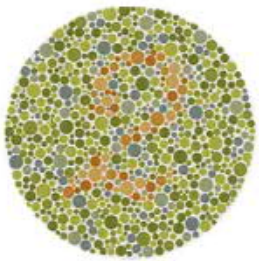
Human Information Processing



Wickens, C.D. et al., (1998). An introduction to human factors engineering. New Jersey: Pearson.

9

Perception



10

Attention

- Attention is the behavioural and cognitive process of selectively concentrating on a discrete aspect of information while ignoring other perceivable information
- Humans have limited information processing capacity, so attention must be allocated or shared (divided attention)
  - It is easier to share attention over tasks that do not use the same type of resources
  - Task performance is reduced when attention is divided
- Attention span is also limited – estimates vary depending on the definition of attention but it is usually around 40 minutes
- Sustained attention over time is also called Vigilance

11

Memory

- Short-term (or working) memory:
  - Holds information for about 30 seconds
  - Has limited capacity (7±2 'chunks' of information)
  - Rehearsing allows information to be retained for longer
- Long term memory:
  - Long term memory encodes information for later retrieval
  - Sleep helps encode information and store it in LTM

12

Human Error

- Human errors are a result of inappropriate or undesirable actions that fail to achieve an intended outcome
- The variation in human performance that results in errors is normal and impossible to completely eradicate
- The design of the socio-technical system can make errors more likely

13

Human Error Classification

- Slip
  - Perceptual slip – error in perceiving information
  - Action slip – right idea, wrong action
- Lapse – forgetting an action
- Mistake – missing some information or knowledge to come to the right decision

Think of an example of an error you made recently – was it a slip, lapse or mistake?

14

Violations

- Differ from errors as they are intentional actions
- Types of violation
  - Routine – Not following the rule or procedure has become normal practice for everyone
  - Situational – Outcomes cannot be met, or easily met, if the rule is followed
  - Optimising – There is a personal benefit to not following the rule
  - Exceptional – Extreme circumstances

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Some Factors Influencing Human Error

Individual	Team	Environment	Equipment	Task	Organisation
Physical Limitations	Communi-cations	Lighting	Complexity	Workload	Culture
Psychological Limitations	Coordination	Temperature	Reliability	Time pressure	Resources
Fatigue	Leadership	Noise	Usability	Complexity	Training provision
Skill/Ability	Supervision	Vibration	State	Information	Regulations
Experience/ Knowledge		Accessibility	Appropriate	Repetitiveness	Rostering

Adapted from Human Error Classification tools: HFACS, ADREP, HEIDI and MEDA

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Individual Factors – Situation Awareness

- "The perception of the elements in the environment within a volume of time and space, the comprehension of their meaning, and the projection of their status in the near future" (Endsley, 1995)
- A person's real time mental model of the world around them
  - Perceiving what's going on around you
  - Understanding what that means
  - Predicting what's going to happen next

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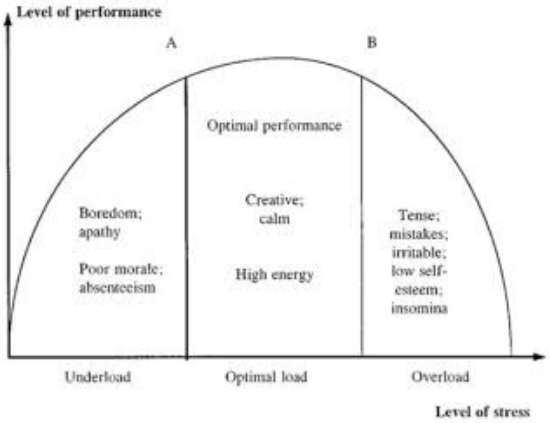
Equipment Factors - Automation

- Benefits
  - More efficient
  - More reliable
  - Faster
  - More precise
  - Reduced workload
  - Smaller workforce
- Human Factors Issues
  - Reliability and trust
  - Increased mental workload
  - Poor feedback
  - Vigilance difficulties
  - Lack of flexibility
  - Manual skill degradation
  - Latent errors

18

Task Factors - Workload



- Workload refers to the load or demand placed on the human, and their individual ability to cope with that load or demand

Sutherland, V.J. and Cooper, C.L. (1993). Identifying distress among general practitioners: Predictors of psychological ill-health and job dissatisfaction. Social science and medicine, 37(5), 575-581.

19

Organisation Factors – Safety Culture

- "Safety culture reflects **the attitudes, beliefs, perceptions, and values** that employees share in relation to safety *(Cox & Cox, 1991)*
- "The way we do things around here"
- Investigation of major accidents has revealed that they are not caused by simple, individual errors, but rather by malpractices that corrupted large parts of the organisation/system

Cox, S and Cox, T. (1991)., The structure of employee attitudes to safety: A European example. Work and stress, 5(2), 93-106.

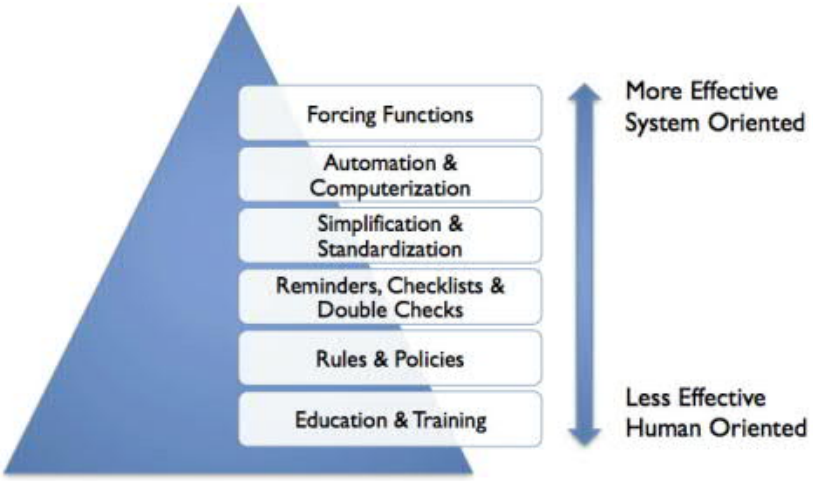
20

Organisation Factors – Safety Culture

Fleming, M. (2001). Safety Culture Maturity Model. London: HSE.

21

Human Factors Hierarchy of Effectiveness



St-Cyr, O. & Cafazzo, J.A. (2012). From discovery to design: The evolution of human factors in healthcare. Healthcare Quarterly, 15, 24-29.

22

Human Centred Design

- An approach to interactive systems development that aims to make systems usable and useful by focusing on the users, their needs and requirements, and by applying human factors/ergonomics and usability knowledge and techniques.
- Enhances effectiveness and efficiency

ISO 9241-210: 2010. Ergonomics of human-system interaction – Part 210: Human centred design for interactive systems.

23

Human Centred Design Key Principles

- The design is based upon an explicit understanding of users, tasks, and environments
- Users are involved throughout design and development
- The design is driven and refined by user-centred evaluation
- The process is iterative
- The design addresses the whole user experience
- The design team includes multidisciplinary skills and perspectives

24

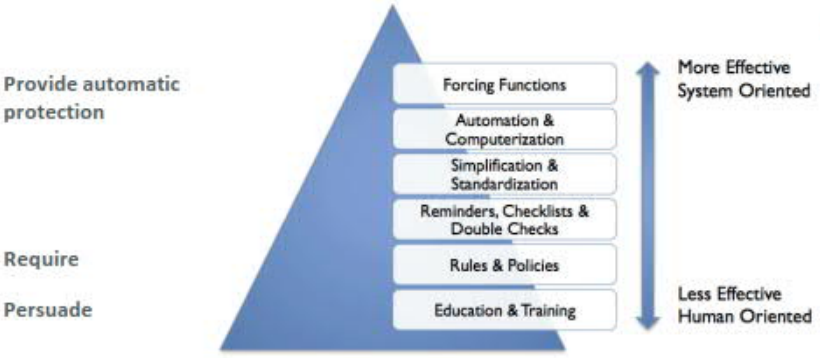
Injury reduction

- In a comprehensive and influential report 'Injury in America' (National Research Council, Committee on Trauma Research, Committee on Trauma Research & Institute of Medicine, 1985) it is suggested that there are three general strategies available to prevent injury (reproduced below from Page 7 of that report):
  - **Provide automatic protection** by product and environmental design—for example, by the installation of seatbelts that automatically encompass occupants of motor vehicles or built-in sprinkler systems that automatically extinguish fires.
  - **Require** individual behavior change by law or administrative rule—for example, by laws requiring seatbelt use or requiring the installation of smoke detectors in all new buildings.
  - **Persuade** persons at risk of injury to alter their behavior for increased self-protection—for example, to use seatbelts or install smoke detectors.

National Research Council (US). Committee on Trauma Research, Committee on Trauma Research (US), & Institute of Medicine (US). (1985).Injury in America: a continuing public health problem. Natl Academy Press.

26

Notice something?



27

Can't we just train people to behave differently?

25

Behaviour versus performance

- Evans (1991; 2004)
  - Driver performance (what the driver CAN do)
  - Driver behaviour (what the driver DOES do)
- In 'normal driving' driver behaviour seems to be more important than driver performance in determining risk

Evans, L. (1991). *Traffic Safety and the Driver*. New York: Van Nostrand Reinhold.
Evans, L. (2008). *Traffic Safety*. Michigan: Science Serving Society.

29

Training for behaviour

- "The only direct benefits imparted by broad driver education and training would appear to be the basic vehicle control skills and knowledge of road rules necessary for entering the driving population. According to the evidence it has no measurable direct effect on collision risk, and its continued use should therefore be set against much lower expectations in terms of what it can contribute directly to the safety of new drivers."

Helman, Grayson and Parkes (2010, p8)

Helman, S., Grayson, G. B., & Parkes, A. M. (2010). How can we produce safer new drivers. *TRL Report*. IN505: Crowthorne: Transport Research Laboratory.

30

Training for behaviour

- Similar inconsistent or null-findings in post-test education and training (Ker et al., 2003).
- Also defensive driving (Lund & Williams, 1985).

Ker, K., Roberts, I., Collier, T., Beyer, F., Bunn, F. & Frost, C. (2003). Post-licence driver education for the prevention of road traffic crashes. Cochrane Database of Systematic Reviews 2003, Issue 3. Art. No.: CD003734. DOI: 10.1002/14651858.CD003734.

Lund, A. K & Williams, A. F. (1985.) A review of the literature evaluating the Defensive Driving Course. *Accident Analysis & Prevention*, 17, 449–460.

31

Training for performance

- Häkkinen(1979) showed that bus driver crash rate was associated with a series of performance tests…
  - …so maybe the regulated nature of professional driving does provide some performance-based opportunities
- Hazard perception training may also be relevant (but not known in non-novice-driver populations)
- The behaviour/performance distinction remains, however – BEHAVIOUR IS CRITICAL

Häkkinen, S. (1979). Traffic accidents and professional driver characteristics: A follow-up study. *Accident Analysis & Prevention*, *11*(1), 7-18.

32

Some notes on campaigns

33

Campaigns

http://think.direct.gov.uk/drink-driving.html

34

Campaigns

http://think.direct.gov.uk/mobile-phones.html

35

Campaigns

http://think.direct.gov.uk/speed.html

36

Campaigns

http://think.direct.gov.uk/drug-driving.html

37

Campaigns

http://www.advertolog.com/office-of-road-safety/print-outdoor/drink-drive-and-score-a-date-with-a-blonde-10176703/

38

Campaigns

https://www.youtube.com/watch?v=h-8PBx7isoM

(Nearly 20m views...)

39

Summary

- Road users **behave** in ways that (occasionally) lead to injury and death
- Part of our 'armoury' in trying to minimise this is persuasion/encouragement, to try and change this **behaviour**
- Example – fear based campaigns

40

Fear-based campaigns

- Basic reasoning:
  - Fear is bad
  - If we make people fearful of crashing they are less likely to do it

41

Carey, McDermott and Sarma (2013)

- Meta-analysis of fear-based campaigns – conclusions:
  - They increase fear
  - They **do not** change behaviour

Carey, R. N., McDermott, D. T., & Sarma, K. M. (2013). The impact of threat appeals on fear arousal and driver behavior: A meta-analysis of experimental research 1990–2011. PloS one, 8(5), e62821.

42

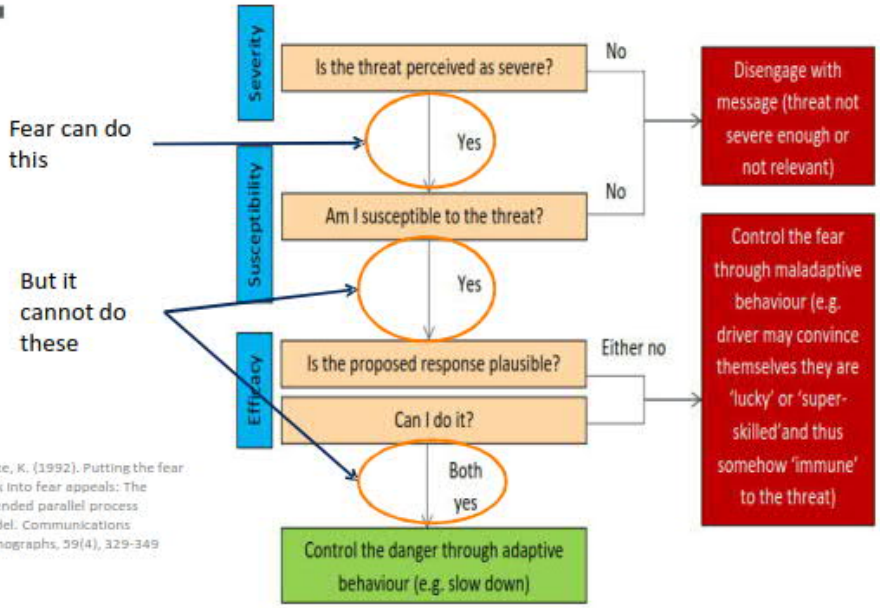
Carey et al. (2013) – recommendations

- Check which emotions are actually being caused (fear, disgust, guilt, anger etc.)
- Focus on susceptibility, response-efficacy and self-efficacy, in addition to causing fear (if you want to do more than simply cause fear)

Carey, R. N., McDermott, D. T., & Sarma, K. M. (2013). The impact of threat appeals on fear arousal and driver behavior: A meta-analysis of experimental research 1990–2011. PloS one, 8(5), e62821.

43

The Extended Parallel Process Model (EPPM – Witte, 1992)



Witte, K. (1992). Putting the fear back into fear appeals: The extended parallel process model. Communications Monographs, 59(4), 329-349

44


Behaviour change models and research examples
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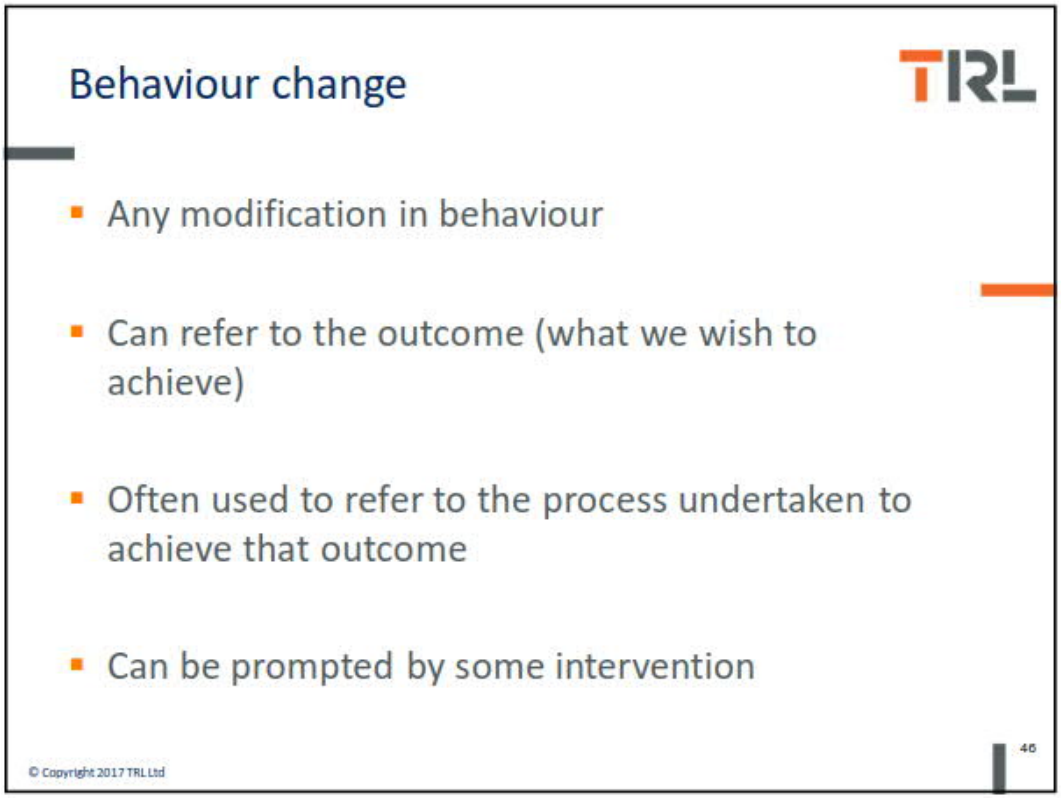
Behaviour change
Any modification in behaviour
Can refer to the outcome (what we wish to achieve)
Often used to refer to the process undertaken to achieve that outcome
Can be prompted by some intervention
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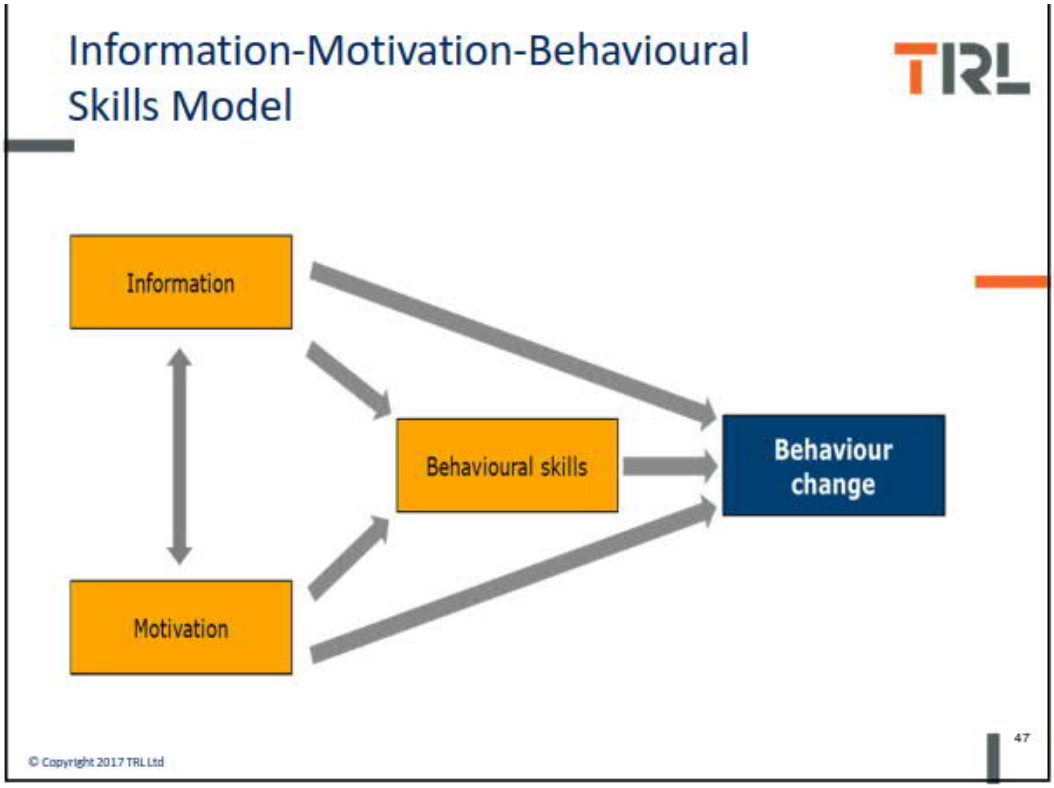
Information-Motivation-Behavioural Skills Model
Information
Behavioural skills
Behaviour change
Motivation
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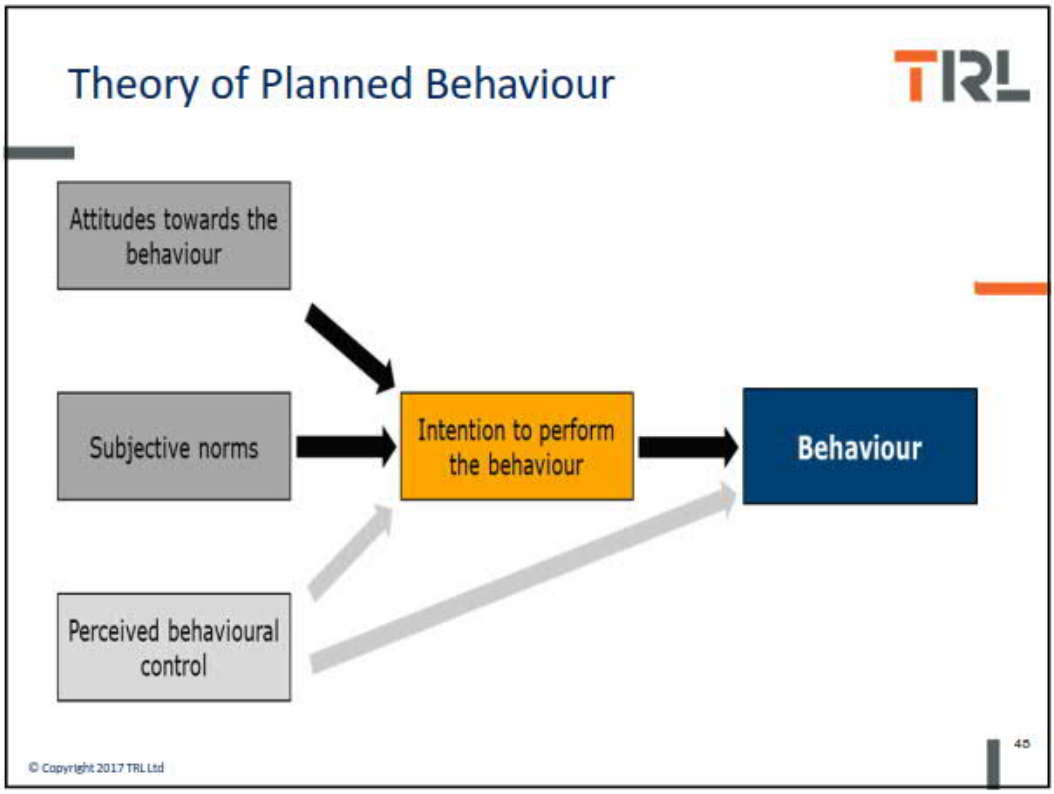
47


Theory of Planned Behaviour
Attitudes towards the behaviour
Subjective norms
Intention to perform the behaviour
Behaviour
Perceived behavioural control
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45

Behaviour Change Techniques

- 40 specific behaviour change techniques have been identified in the literature
- Originally developed (from the models we just discussed) to assist people with health behaviours such as changing their physical activity and diet
- Modified for road safety behaviours

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Behaviour Change Techniques

- Provide information on:
  - Behaviour-health link
  - Consequences
  - Others' approval
- Set graded tasks
- Model or demonstrate behaviour
- Teach or use prompts as cues
- Agree on behavioural contract
- Provide:
  - Contingent rewards
  - Social comparison
  - General encouragement
  - Instruction
  - Feedback
- Use follow-up prompts
- Plan social support or social change
- Relapse prevention
- Management of:
  - Time
  - Stress
- Prompt
  - Identification as a role model
  - Self-talk
  - Intention formation
  - Barrier ID
  - Specific goal setting
  - Review of behavioural goals
  - Self-monitoring
  - Practice
- Motivational interviewing

50

Goal setting and behavioural feedback to increase safe driving

- Hickman and Geller (2005) investigated a self-monitoring intervention for short-haul truck drivers, to reduce speeding and harsh braking

- Drivers assigned to two groups
  - 'Pre-behaviour' group asked to record intentions to speed and brake harshly before the start of each shift
  - 'Post-behaviour' group was asked to record their actual speeding and harsh braking behaviour at the end of each shift

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Goal setting and behavioural feedback to increase safe driving

- Participants attended a training session which included:
  - Identification of precursors and consequences associated with risky and safe driving
  - Goal setting
  - How to administer self-reward after meeting goals
  - Instructions on the incentive component

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Goal setting and behavioural feedback to increase safe driving – findings

- End of each week, drivers received a feedback report displaying their objective behaviour (from telematics), alongside their intended performance (pre-behaviour group) or estimated performance (post-behaviour group)
- Results showed that during the four-week intervention, both groups significantly reduced their mean percentage of over-speeding and their mean frequency of harsh braking incidents

53

Implementation intentions ('If – Then' action plans)

- Elliott and Armitage (2006) – overcoming habit in speeders – using 'implementation intentions'
  - Two groups of drivers asked to specify their goal intention (keep to 30mph limits) including how much they wanted to achieve this – one group just given information and one group asked to form implementation intentions
  - These are are 'If...Then...' statements that can cue intentions
  - 'Implementation intentions' group asked to write these plans to help them remember their intended behaviour (complying with 30mph limits)

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Implementation intentions ('If – Then' action plans)

- Examples

"If I am tempted to speed, then I will think about the regret I would feel if I caused injury to another road user"

"If I am tempted to speed because I am in a hurry, then I will remind myself that I am not saving much time by speeding"

- The implementation intention group reported a significantly greater increase in compliance with 30mph speed limits

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Summary

- There are several models linking behaviours with intentions, motivations, attitudes, skills and so-on
- Behaviour change techniques exploit these models by attempting to provide people with the understanding, motivation and tools to change their behaviour
- Techniques have been shown to be somewhat effective in the driving domain, as well as in the health behaviour literature

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Session 1

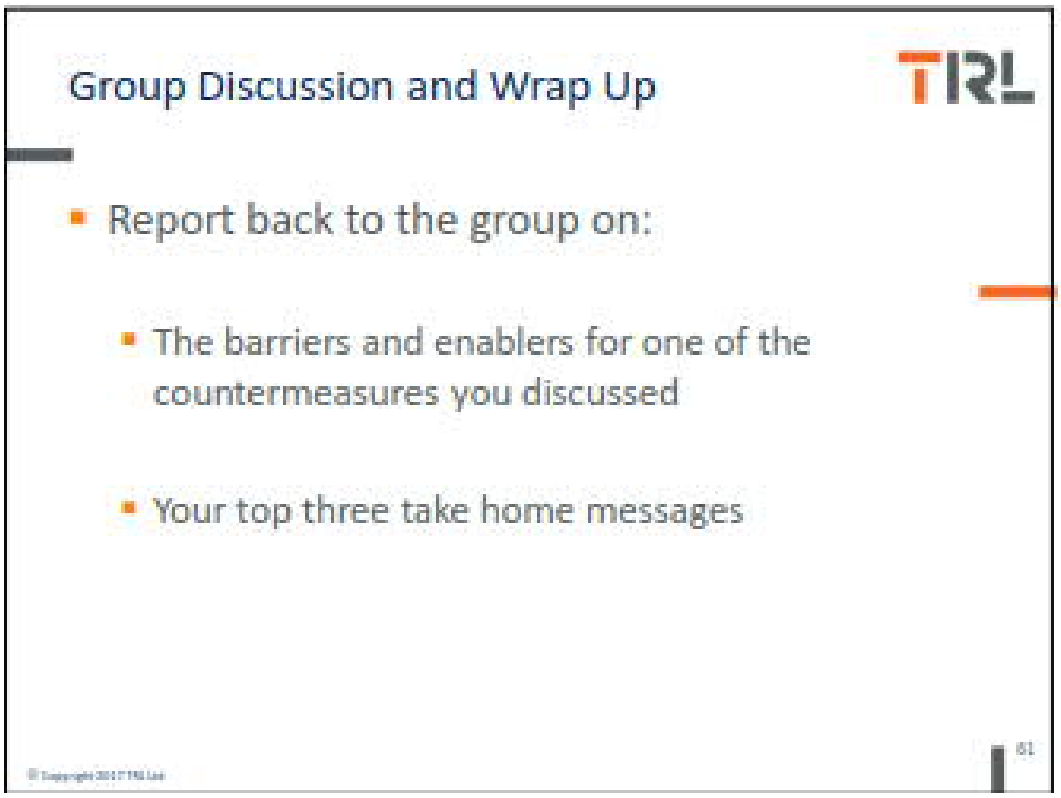
- In groups, discuss each countermeasure, thinking about the HF and behaviour topics covered today
- What are barriers and enablers?
- Pick one 'quick win', one medium and one long term

- Group 1
  - ADAS
- Group 2
  - Vision
  - Occupant safety

Session 2

- In groups, discuss each countermeasure, thinking about the HF and behaviour topics covered today
- What are barriers and enablers?
- Pick one 'quick win', one medium and one long term

- Group 1
  - Improve driver skills/performance
- Group 2
  - Improve driver behaviour


Group Discussion and Wrap Up
Report back to the group on:
The barriers and enablers for one of the countermeasures you discussed
Your top three take home messages

Appendix F Presentation of Findings

This appendix contains the slides from the presentation of the findings of this report on 27th and 30th March at TfL. Attendees included:

From TRL:

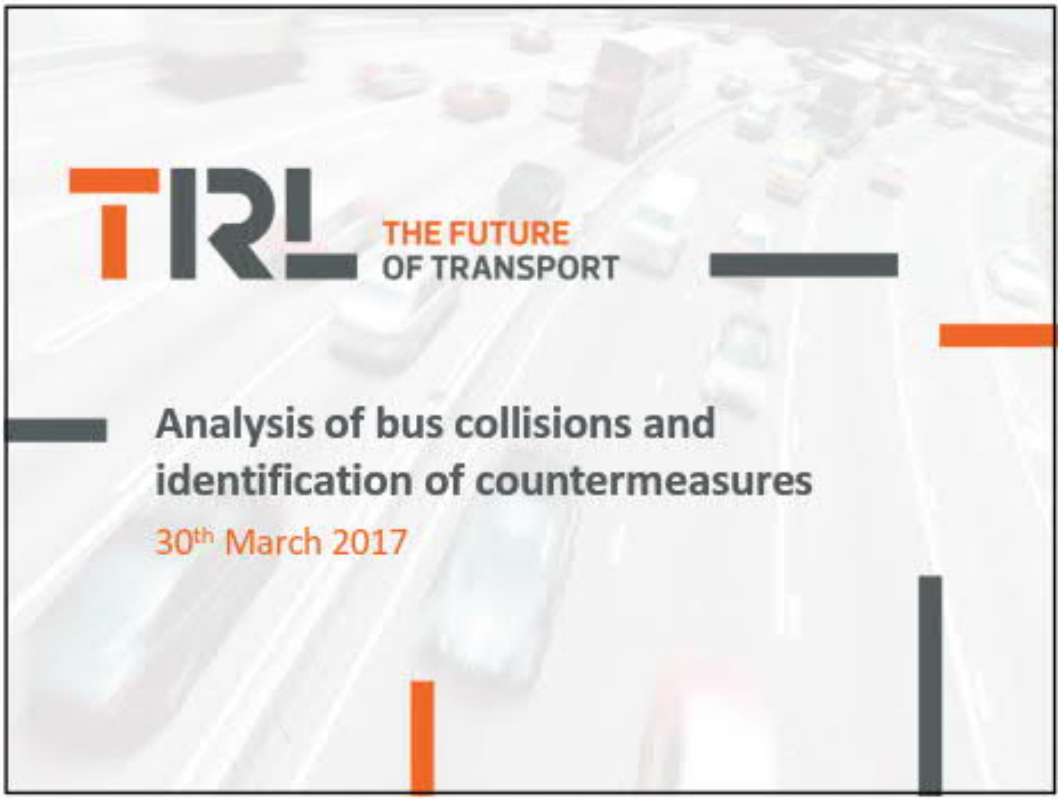
- Alix Edwards, TRL (presenter)
- Shaun Helman, TRL (presenter)
- Iain Knight, Apollo Vehicle Safety (subcontractor and presenter)

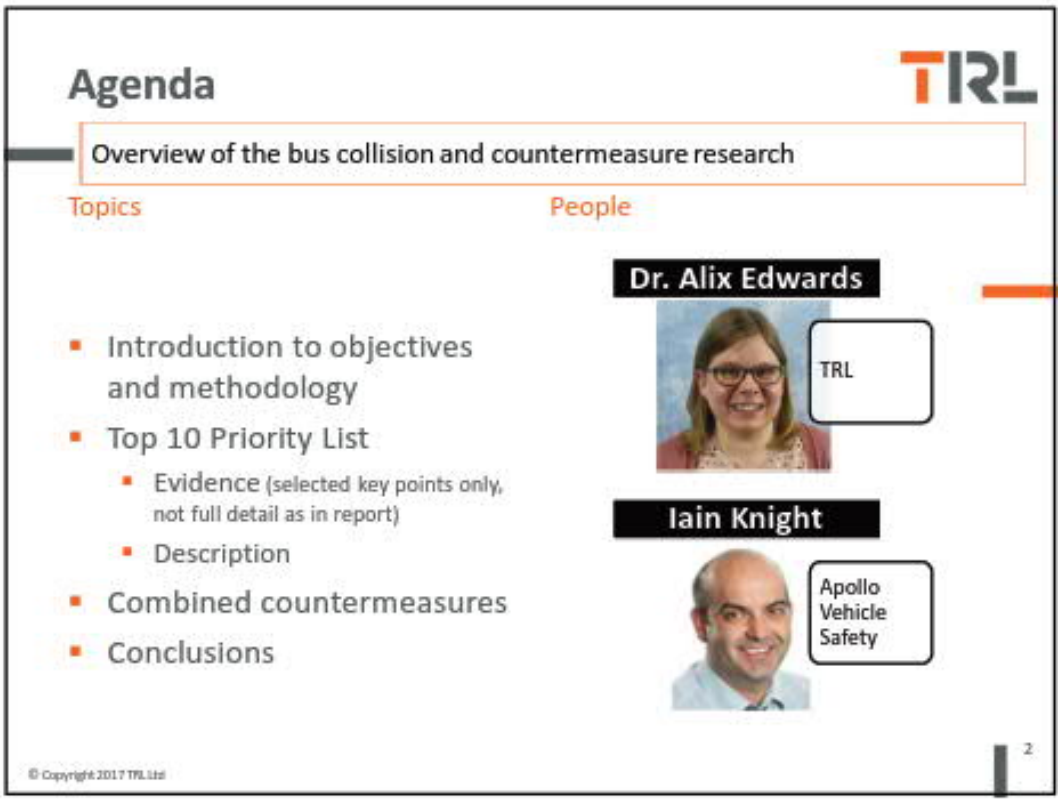
From TfL:

- Jane Lupson
- Valentina Trozzi
- James Wooller
- Cathy Behan
- Tony Daly
- Richard Rampton
- Tony Akers
- Peter Sadler
- Claire Mann
- Andrew Cruickshank

From Bus Operators:

- Tony Wilson – Abellio
- Paula Tansley – Arriva
- Jane Desmond – CT Plus
- Andrew Smith – Go Ahead
- John Trayner – Go Ahead
- Sinead Maguire – HCT Group
- Jon Pike – RATP Dev
- Dareen Roe – Stagecoach
- Charlie Beaumont – Tower Transit


THE FUTURE
OF TRANSPORT
Analysis of bus collisions and identification of countermeasures
30th March 2017


Agenda
Overview of the bus collision and countermeasure research
Topics
People
Introduction to objectives and methodology
Top 10 Priority List
Evidence (selected key points only, not full detail as in report)
Description
Combined countermeasures
Conclusions
Dr. Alix Edwards
TRL
Iain Knight
Apollo Vehicle Safety
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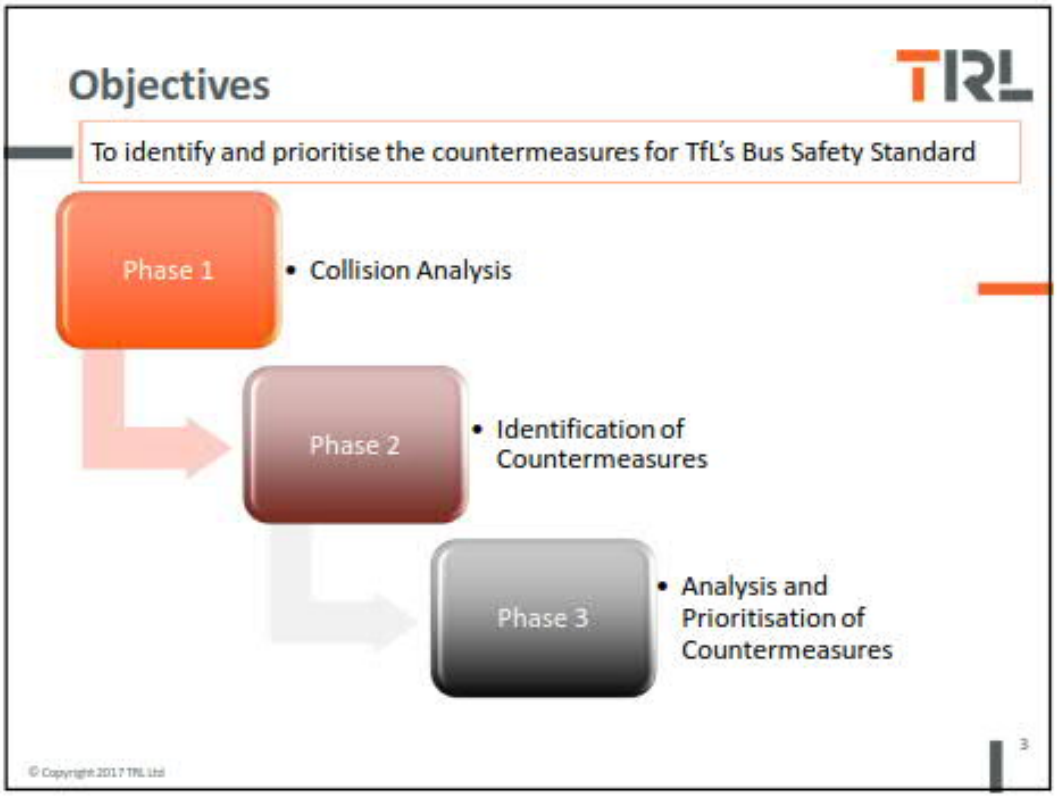
Objectives
To identify and prioritise the countermeasures for TfL's Bus Safety Standard
Phase 1
• Collision Analysis
Phase 2
• Identification of Countermeasures
Phase 3
• Analysis and Prioritisation of Countermeasures
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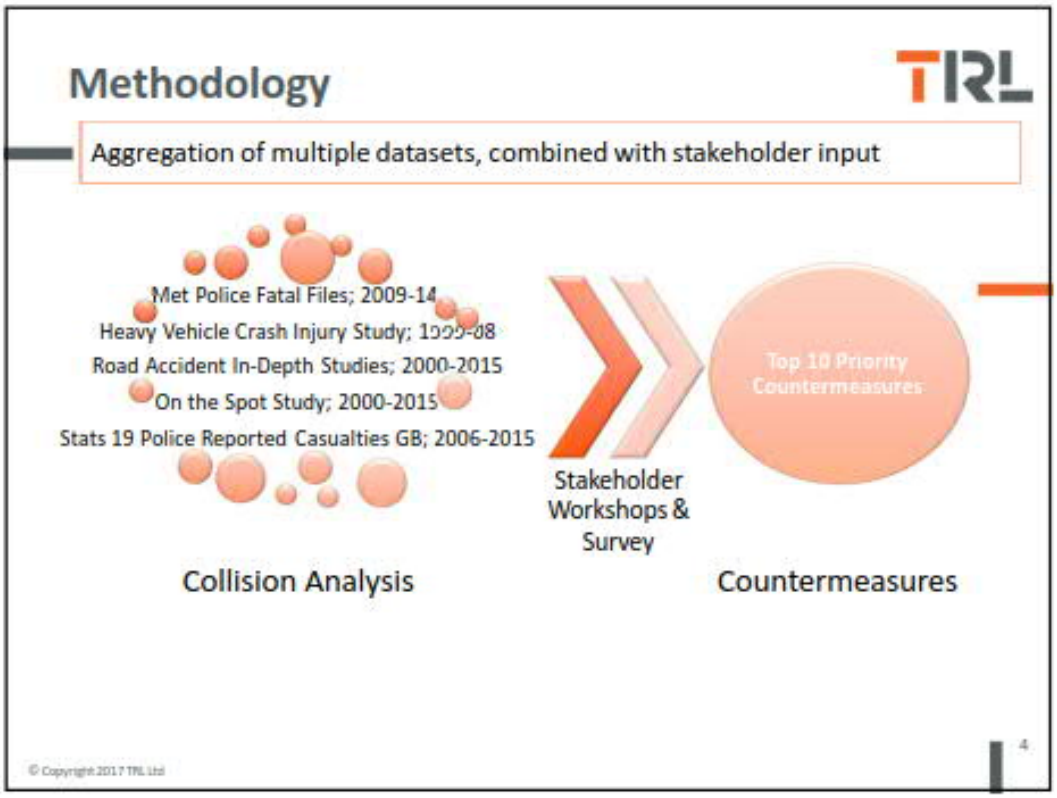
Methodology
Aggregation of multiple datasets, combined with stakeholder input
Met Police Fatal Files; 2009-14
Heavy Vehicle Crash Injury Study; 1999-08
Road Accident In-Depth Studies; 2000-2015
On the Spot Study; 2000-2015
Stats 19 Police Reported Casualties GB; 2006-2015
Collision Analysis
Stakeholder Workshops & Survey
Top 10 Priority Countermeasures
Countermeasures
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Bus Countermeasure Priority List

Top Ten

1. Advanced Emergency Braking System (AEBS) for Vulnerable Road Users (VRU)
2. Bus conspicuity
3. Pedestrian Friendly Front End
4. Improved front/side design (to prevent VRU underrun)
5. Camera/sensor Vulnerable Road User (VRU) systems
6. Improve Direct Vision (front and side)
7. Advanced Emergency Braking System (AEBS) to other vehicle rear
8. Bus interior design
9. Intelligent Speed Adaptation (ISA)
10. Energy-absorbing Front Underrun Protection System (FUPS)

Increasing fatality frequency

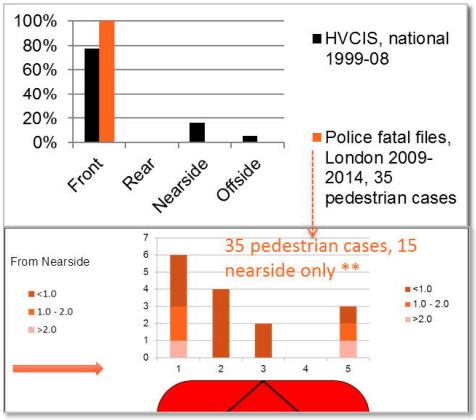
Criteria: Highest scores when summing police fatal files + HVCIS + OTS & RAIDS case counts; then ordered by police fatal files frequency as most relevant to London

5

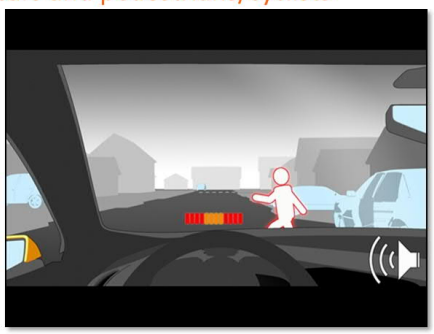
1) Advanced Emergency Braking System (AEBS) for Vulnerable Road Users (VRU)*

Human driver reaction time c0.75 to 2 seconds; AEB reaction time c0.3 seconds

Evidence: Majority of pedestrian fatalities are frontal with short reaction time



Description: AEBS combines sensing of the environment ahead of the vehicle with the automatic activation of braking (without driver input) to mitigate or avoid an accident with cars and pedestrians/cyclists



* Tuned to minimise false activations
** Where sufficient detail available for accident reconstruction calculations

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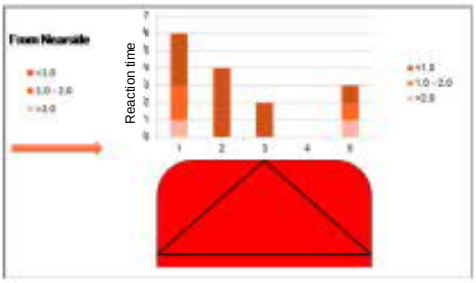
3) Pedestrian Friendly Front End

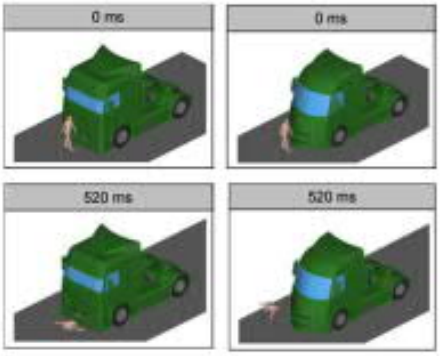
If avoidance is unlikely, provide protection

Evidence: Almost all collisions have short reaction times and many occur near the edges of the bus, making them hard to avoid



Out of 48 police fatal files, 35 pedestrian cases, but this graph shows nearside only

Description: Ensuring that the front of the vehicle is capable of providing a small amount (2-3 cm) of controlled crush in case of a pedestrian impact to soften blow



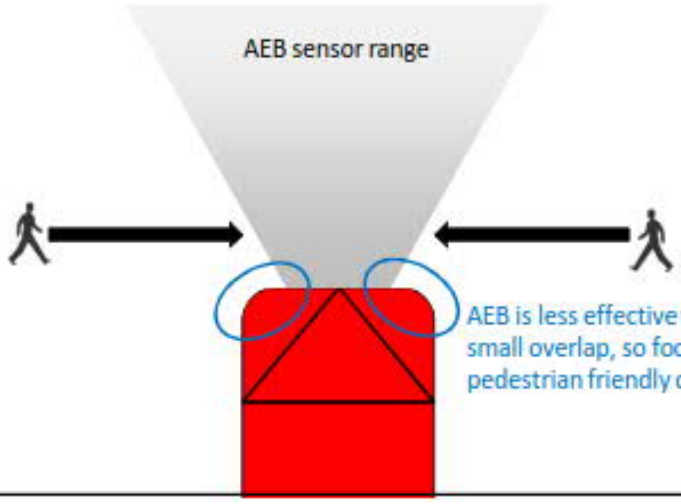
HGV example of nosecone to deflect pedestrians to the side and/or prevent underrun

7

Combined Countermeasures

Implementation of separate countermeasures but designed to complement

- AEB should be paired with pedestrian friendly front end design



8

8) Bus Interior Design

Non-impact injuries are most frequent; improve interior protection

Evidence: Over two thirds of casualties occur where buses were not in a collision

National Stats 19 data, 2006-2015, includes both bus and coach

Description: Design improvements to the interior of the bus to help improve occupant safety

9

Combined Countermeasures

Implementation of separate countermeasures but designed to complement

- AEB and bus interior design should be combined
  - Stakeholder concerns:
  - AEB braking might injury bus occupants

	Scenario	Risk to standing passengers	Notes
1	Normal driving	Very low	In normal driving standing passengers will naturally brace themselves to the movement of the bus
2	The driver braked to try to avoid a collision (whether with a VRU or vehicle)	Yes	Driver is taking correct action
3	The bus suffered an impact with a vehicle	Yes	Deceleration in an impact might pose a risk to standing passengers
4	AEBS braking was activated	Yes	Whether mitigation or avoidance
5	The driver braked post-impact with a VRU	Yes	A common reaction is to brake post-impact
6	The bus suffered an impact with a VRU, with no post-impact braking	Very Low	Unlikely to occur often, see scenario 5. Drivers are required to stop after a collision
7	AEBS was falsely deployed	Yes	This is the only scenario where braking would not otherwise have occurred

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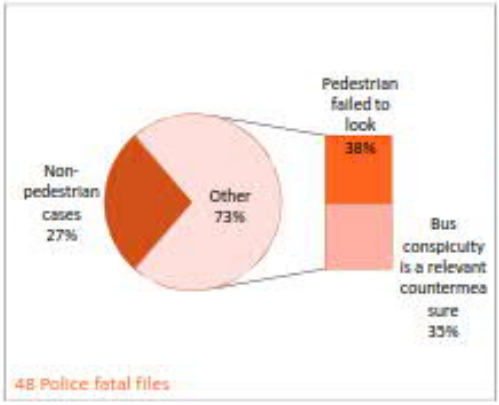
2) Bus conspicuity

Helping pedestrians to see the buses is just as important

Evidence: Improving conspicuity of the buses might help for about one third of the police fatal files



Description: Features to improve conspicuity of buses; e.g. HGV or US School bus conspicuity type requirements, frontal LED displays designed to attract attention? Even sounds?

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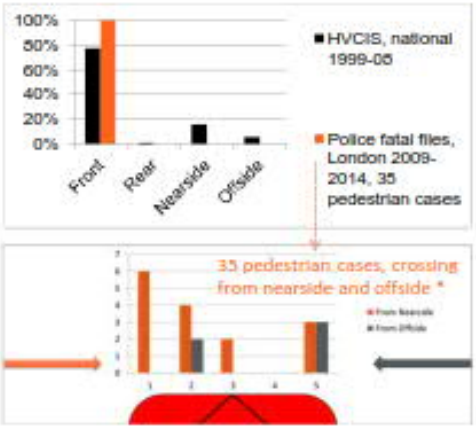
4) Improved front/side design

If avoidance is unlikely, provide protection

Evidence: Majority of VRU collisions are at front/side



Description: A shaped front structure or side guards to help deflect pedestrians from being dragged down and under the bus

* Where sufficient detail available for accident reconstruction calculations

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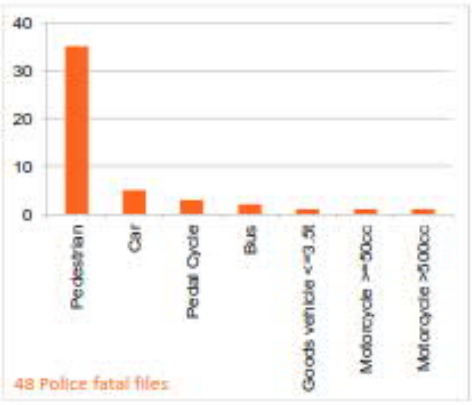
5) Camera/sensor Vulnerable Road User (VRU) systems

Cameras can help, but consider driver workload

Evidence: Pedestrians account for the majority of fatalities

Description: 360 degree 'birds eye' view in single screen and/or collision warnings



To turn off above a certain speed, and to turn on by default in reverse gear

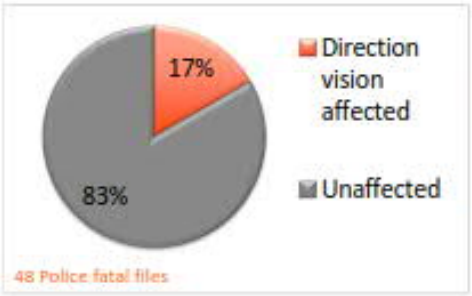
13

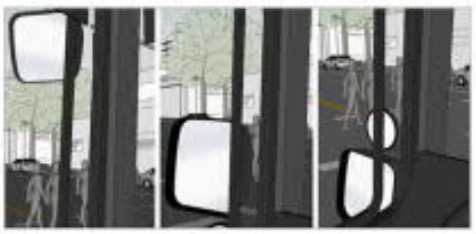
6) Improve Direct Vision (front and side)

Support drivers in collision prevention by improving vision

Evidence: Direct vision improvements identified in 17% of police fatal files

Description: Improved visibility via the windows/vehicle structure





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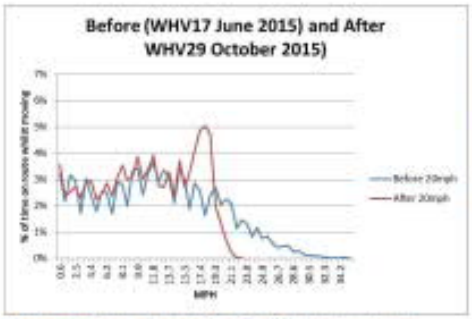
9) Intelligent Speed Adaptation (ISA)

Speed limit compliance improvements

Evidence: speed limit compliance improved, marginal increase in journey time, models showed a £0.5M to £0.6M reduction in costs related to injuries

Description: A range of technologies to aid drivers in observing the appropriate speed for the road environment; either voluntary or mandatory



Example graph from: Greenshields et al. (2016) Intelligent Speed Assistance on London Buses: A trial on two London bus routes, TRL for TfL

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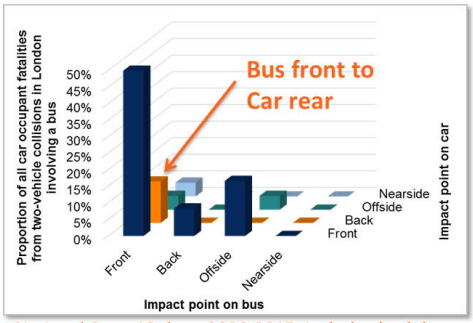
7) Advanced Emergency Braking System (AEBS) to other vehicle rear*

AEB can avoid crashes with other vehicles

Evidence: Car occupant fatalities most often occur in collisions at the front of the bus

Description: AEBS combines sensing ahead of the vehicle with the automatic activation of braking (without driver input) to mitigate or avoid an accident with other vehicles



National Stats 19 data, 2006-2015, includes both bus and coach

* Tuned to minimise false activations

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10) Energy-absorbing Front Underrun Protection System (FUPS)

Protection against underrun

Evidence: 11 cases in HVCIS identified FUPS, 0 in London data*

Description: Energy absorbing structures positioned at a height to interact with car structures protecting car occupants

* difference could be a result of unique London characteristics or small sample size

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Bus Countermeasure Priority List

Top Ten, including combinations

1. Advanced Emergency Braking System (AEBS) for Vulnerable Road Users (VRU)
2. Bus conspicuity
3. Pedestrian Friendly Front End
4. Improved front/side design (to prevent VRU underrun)
5. Camera/sensor Vulnerable Road User (VRU) systems
6. Improve Direct Vision (front and side)
7. Advanced Emergency Braking System (AEBS) to other vehicle rear
8. Bus interior design
9. Intelligent Speed Adaptation (ISA)
10. Energy-absorbing Front Underrun Protection System (FUPS)

Increasing fatality frequency

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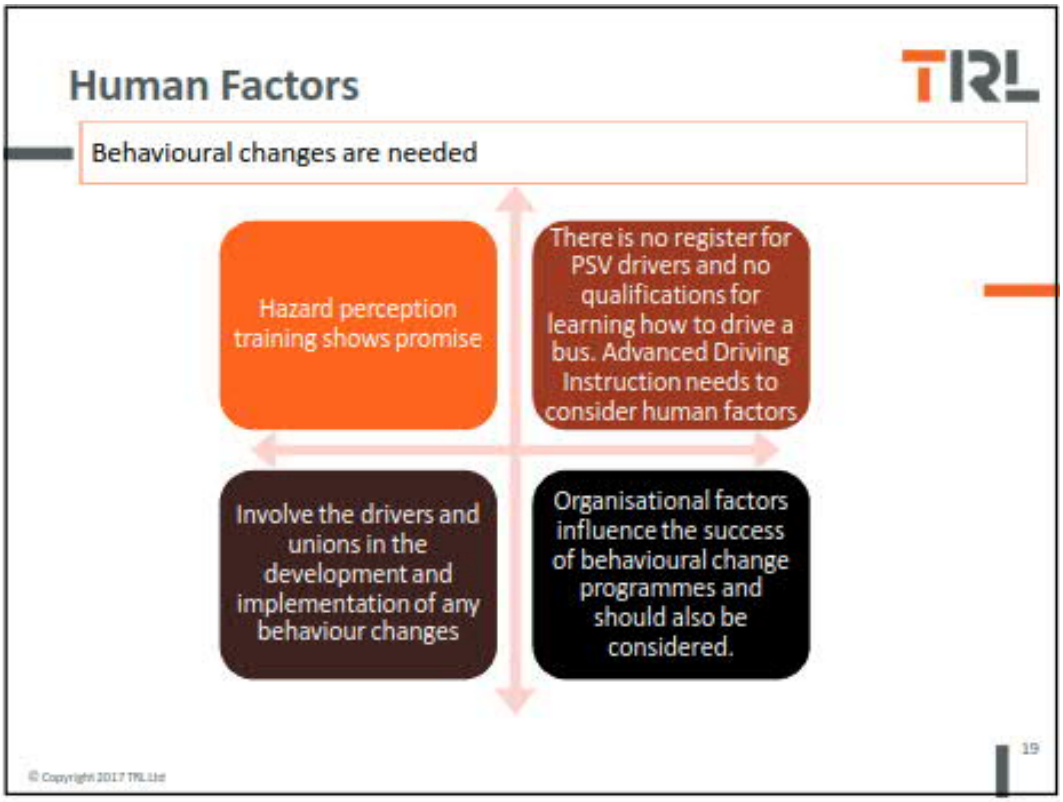
189-301


Human Factors
Behavioural changes are needed
Hazard perception training shows promise
There is no register for PSV drivers and no qualifications for learning how to drive a bus. Advanced Driving Instruction needs to consider human factors
Involve the drivers and unions in the development and implementation of any behaviour changes
Organisational factors influence the success of behavioural change programmes and should also be considered.
19
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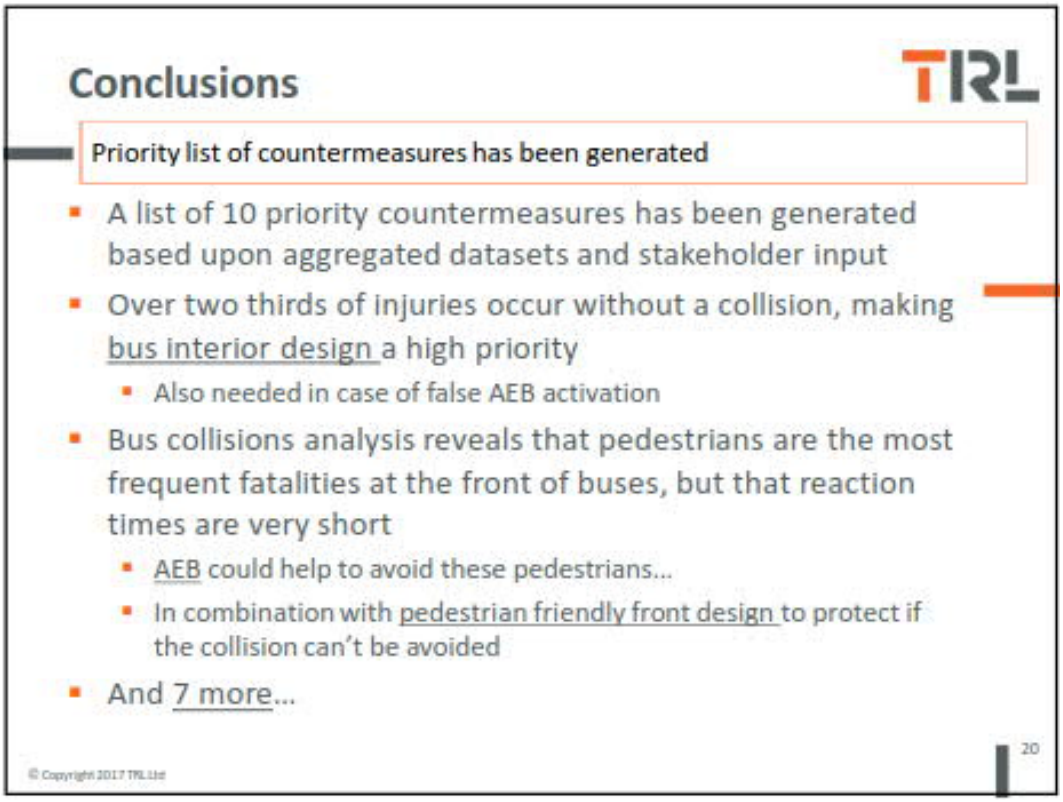
Conclusions
Priority list of countermeasures has been generated
A list of 10 priority countermeasures has been generated based upon aggregated datasets and stakeholder input
Over two thirds of injuries occur without a collision, making bus interior design a high priority
Also needed in case of false AEB activation
Bus collisions analysis reveals that pedestrians are the most frequent fatalities at the front of buses, but that reaction times are very short
AEB could help to avoid these pedestrians…
In combination with pedestrian friendly front design to protect if the collision can't be avoided
And 7 more…
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Analysis of bus collisions and identification of countermeasures

Transport for London (TfL) is working through a programme of research designed to develop a Bus Safety Standard (BSS) with the objective of reducing the frequency of collisions involving buses in London and the associated bus casualties. This report is the first phase of that research and is focussed on examining casualties involving buses and their potential countermeasures in detail.

Data from Stats19, the Police Fatal Archive (police fatal files) the Road Accident In Depth Studies (RAIDS), and the Heavy Vehicle Crash Injury Study (HVCIS), plus research and evidence from literature, stakeholders, and experts in the field, have all been combined to examine bus collisions. The first step was to analyse the distributions of bus collisions, their configurations, circumstances, and the associated casualties. The second step was to then use the in-depth collision details to assign, using engineering judgement, countermeasures that might help to avoid or mitigate the severity of each collision. The approach was based on the Haddon matrix and assigned countermeasures in the pre-crash and crash phases. Causation factors and Countermeasures were classified as related either to the vehicle, human or environment. Finally, the countermeasures that had been assigned were then analysed to quantify the number of fatalities that they might prevent and to develop a prioritised list of countermeasures to be considered as part of the Bus Safety Standard.

The priority list represents the top ten bus coumtermeasures recommended for the BSS. These were prioritised on the basis of: numbers of fatalities (combined from a range of sources), system effectiveness and system applicability, with the final list ordered by the frequency count for the police fatal files becasue this was judged most relevant for the BSS. In terms of reducing fatalities in London the prioritised list indicates that AEBS, improved bus conspicuity, and improved pedestrian friendly front end design are the top three measures.

Other titles from this subject area

PPR753 Vehicle Safety Design Features and Future Safety Benefits in London. Wallbank C, Lloyd L, Scoons J, Muirhead M, McCarthy M, Carroll J and McRae-McKee K. 2015

PPR621 Analysis of Police collision files for motorcyclist fatalities in London, 2006-09. Smith L, Knowles J, Cuerden R. 2013

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PPR819

Bus Safety Standard

Executive Summary

BUSES

TRANSPORT FOR LONDON

in conjunction with TRL THE FUTURE OF TRANSPORT

189-304


Metroline
LK61 BJO

Table of Contents

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Oxford Circus
7
VWH2301
VOLVO
Metroline
LK17 DFZ

Foreword

Safety is at the heart of Transport for London's bus operations. The Mayor of London has made clear that loss of life and serious injuries on London's roads are neither acceptable nor inevitable and Transport for London's has now adopted Vision Zero for London, with a target of zero deaths or serious injuries by 2041. For buses we have an even more ambitious target of no one killed in, or by, a London bus by 2030. This is no doubt a challenging target, but we are determined to meet it and a key part of our strategy is to develop new safety features on buses.

In February 2016 we launched our bus safety programme, including a commitment to develop a 'Bus Safety Standard', to ensure that the safest buses are driven on London's roads.

Since then we have commissioned TRL (the Transport Research Laboratory) to research and develop that standard. This has been an evidence-based and collaborative project, consulting with the bus manufacturers and operators on technical feasibility, timelines and implementation so that we have the confidence that the safety measures will make a real contribution to Vision Zero.

Today we are launching this world-leading Bus Safety Standard. The Bus Safety Standard will provide a substantial proportion of the casualty savings required to meet our targets, and this document summarises the safety measures featured. Not all the technologies are available immediately and some will require development time, so our bus safety roadmap sets out our future plans for the buses, to give the manufacturers time to invest in these new safety features. The standard will continue to evolve to take account of technology innovations in the future.

It is crucial that we all continue to work together to ensure we reduce to zero the number of people killed or seriously injured on our bus network. While we are launching the Bus Safety Standard in London the benefits are potentially global, and we encourage everyone to join the call for raising the safety standard of buses.

Claire Mann, 16/10/2018
Director of Bus Operations,
Transport for London

189-308

1. The Bus Safety Standard (BSS)

The Bus Safety Standard (BSS) is focussed on vehicle design and safety system performance and their contribution to the Mayor of London's Transport Strategy. This sets a target to achieve zero road collision deaths involving buses in London by 2030.

To develop the standard a large body of research and technical input was needed, so Transport for London (TfL) commissioned TRL (the Transport Research Laboratory) to deliver the research and consult with the bus industry. The delivery team has included a mix of engineers and human factors experts, to provide the balance of research required.

All TfL buses conform to regulatory requirements. TfL already uses a more demanding specification when contracting services and this requires higher standards in areas including environmental and noise emissions, accessibility, construction, operational requirements, and more. Many safety aspects are covered in the specification such as fire suppression systems, door and fittings safety, handrails, day time running lights, and others. However, the new BSS goes further with a range of additional requirements, developed by TRL and their partners and peer-reviewed by independent safety experts.

Accompanying the specification there are guidance notes to help inform the bus operators and manufacturers of what the specification is aiming to achieve and some practical tips on how to meet the requirements.

For each safety measure considered, a thorough review was completed covering the current regulations and standards, the specification of the current bus fleet and available solutions.

Full-scale trials and testing were also carried out with the following objectives. Firstly, the tests were used to evaluate the solutions in a realistic environment to ensure that a safety improvement was feasible. Secondly, the testing was used to inform the development of objective test and assessment protocols. These protocols will allow repeatable testing according to precise instructions so that the results are comparable. The assessment protocol provides instructions for how to interpret the test data for a bus or system, which can be a simple pass/fail check, or something more complex intended to encourage best practice levels of performance. These assessment protocols will allow TfL to judge how well each bus performs against the BSS, and will allow a fair comparison in terms of safety if they have a choice between models for a given route.

189-309

It is important to ensure the money is spent wisely on the package of measures that will give the most cost-effective result. If zero fatalities can be achieved at a low cost it remains better than achieving it at a higher cost. TRL has developed a cost-benefit model describing the value of implementing the safety measures, both in terms of casualties saved and the technology and operational costs of achieving that. Input from the bus industry has formed the backbone of all the research and the cost benefit modelling. This modelling has helped inform the decisions of TfL's bus safety development team in terms of implementing the safety measures on new buses.

This Bus Safety Standard booklet sets out the safety measures that are being incorporated. It describes each measure in turn, and it also describes the Bus Safety Roadmap that sets out the future requirements for the bus industry. Finally, it describes the Bus Safety Innovation Challenge which is the framework by which new innovative technologies will be assessed as they become available on buses.

189-310

2. Driver Assist (helping the driver to avoid or mitigate the severity of incidents)

2.1 Advanced Emergency Braking (AEB)

Advanced Emergency Braking (AEB) systems use forward looking sensors such as Lidar, Radar, Camera, or fusions of data from more than one sensor, to identify a risk of an imminent collision. It will typically first warn the driver of the risk and, if the driver does not act, then it will apply braking automatically to avoid the collision or to reduce the collision speed and therefore the potential for injury. It will warn and intervene in an emergency in the last few seconds before an impact, and provides braking much later than during normal driving. Systems will be available that respond in front-to-rear collisions with other vehicles and frontal collisions with pedestrians crossing the road, or cyclists travelling more slowly ahead of the bus.

AEB standards have previously been developed for HGVs and cars, but buses pose a unique additional challenge because of the multiple passengers that are seated and unbelted, or who might be standing. AEB has been proven effective in other vehicle types, in both front-to-rear vehicle collisions and pedestrian collisions. Analysis strongly suggests it will provide considerable benefit when fitted to buses too. However, on very rare occasions, an AEB system can activate when it didn't need to (a false positive) because it incorrectly identified a collision threat.
For all vehicle types this creates a risk of unnecessary collisions with following vehicles, but for a bus, each false activation also carries a risk that it could cause passenger injury.

"Buses pose a unique additional challenge because of the multiple passengers that are seated and unbelted, or who might be standing."

Advanced Emergency Braking (AEB) applies braking (if the driver is unresponsive) to avoid the pedestrian.

189-311

Considerable attention has, therefore, been paid to modelling the balance between collision avoidance and the risk of injury to passengers on board. This includes consideration of the vulnerable road user (VRU) casualty savings, the changes in casualties amongst passengers on board if a collision is prevented, and the risk of additional casualties resulting from false activations. Testing has been used to develop a test track-based assessment procedure, adapted from Euro NCAP's AEB tests for cars. In addition, the test procedure includes some innovative tests designed to discourage false positives that might arise from less robustly developed systems; although it will never be possible to test against all possible situations because driving circumstances are so varied and complex. It also requires manufacturers to show TfL additional evidence to demonstrate the false activation rate will be sufficiently low to ensure substantial net casualty benefits and requires the AEB system to make data available to on-board recording systems to allow close monitoring of performance in service.

In the future, AEB systems are expected to emerge with a greater functionality, not yet feasible on buses. This might include different collision targets such bridge strikes and might include different driving scenarios such as junctions and turning across the path of other vehicles. A system to prevent collisions in the event of pedal application error is another promising area, where incremental technical developments of the system could help TfL achieve their targets.

2.2 Intelligent Speed Assistance (ISA)

TfL has previously committed to rolling out buses fitted with Intelligent Speed Assistance (ISA). This is an aid to the driver for keeping to the speed limit. The system is based on a digital speed map of London containing road speed limit information. The system interprets the speed limits and prevents the driver from accelerating the bus above the limit. The test and assessment protocols have now been developed to verify the performance of the ISA systems against TfL's existing specification. The numbers of ISA equipped buses in TfL's fleet continue to increase in line with their roll out plan.

"ISA interprets the speed limits and prevents the driver from accelerating the bus above the limit."

Intelligent Speed Assistance (ISA) supports the driver with keeping to the speed limit.

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2.3 Improved Direct and Indirect Vision

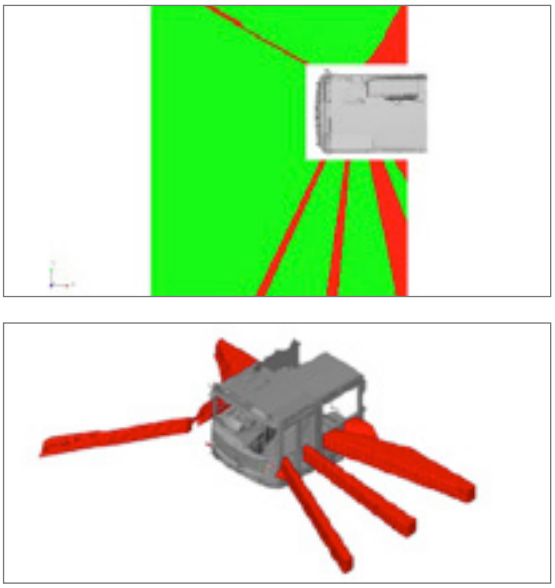
A driver's ability to respond to imminent collisions is dependent on how well they can see out of and around the bus. Direct vision is concerned with what is in the driver's sightline, whereas indirect vision concerns blind spot visibility by use of mirrors or camera systems. Compared with Heavy Goods Vehicles (HGVs), buses generally have very good direct vision because they are relatively low to the ground with large windows. However, the regulatory requirements for indirect vision are much less demanding for buses than for HGVs and some blind spots remain. The BSS will incorporate requirements to minimise direct vision obstructions from pillars and improve indirect vision via the use of mirrors, or blind spot information systems and Camera Monitor Systems (CMS) in the future.

"Direct vision is concerned with what is in the driver's sightline, whereas indirect vision concerns blind spot visibility by use of mirrors or camera systems."

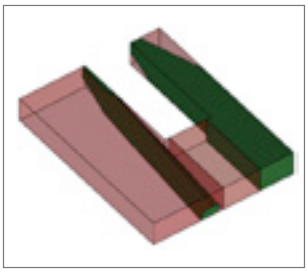
2.3.1 Bus Vision Standard

The assessment approach is based on the similar standard TfL are implementing for HGVs. However, it has been adapted to suit the different technical challenges presented by buses. It is based on defining a volume of space around the bus, where other road users may be positioned and at risk when the bus is manoeuvring. It measures how much of the volume can be seen by the driver. It considers the view from both direct and indirect vision and includes consideration of potential internal obstructions such as those that can be caused either by pillars or reflections on some assault screens. It uses sophisticated computer techniques to ensure a complex measurement process can be undertaken with minimal effort and be easily incorporated in the design process by bus manufacturers.

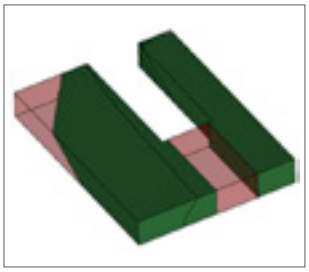
The assessment zones are divided into different areas and weighted in terms of the number of casualties associated with them. Separate research by the TfL freight team has shown direct vision to be preferable to mirrors so minimum standards have been set separately for the score that must be achieved by direct vision alone, and the overall score that must be achieved by both direct and indirect vision together.



Vision assessment involves measuring how much is in the driver's sightline (green) and how much can't be seen (red).



Driver view (green) rearward of cab using standard Class II mirror only.



Driver rearward view increased by combining Class II mirror with blind spot mirror.

The test and assessment protocol permits the substitution of mirrors by camera monitor systems (CMS), provided they comply with the relevant regulations. This approach removes the risk of a mirror hitting a pedestrian, but is very new and the effect on driver workload and behaviour is not yet well documented. There may be opportunities for further benefits in minimising blind spots and helping drivers to see hazards around them, but there may be risks if drivers do not find them as natural to use. These will be considered a requirement in future, subject to evidence confirming the balance of risks and opportunities, and research to better define their specification.

A Camera Monitor System (CMS) can replace the wing mirror and help to reduce blind spots.

2.3.2 Information, Warning & Intervention Systems

Good direct and indirect vision alone will not eliminate all casualties in manoeuvring collisions; the driver must still be looking in the right direction at the right time. Systems that give the driver additional information about the hazards around the bus, or warn of imminent collision, still have an important role to play. How these information and warnings are communicated to the driver is critical to their success and a draft standard accounting for different functionalities, the avoidance of false alarms, and the appropriateness of the human machine interface (HMI) has been developed.

Additional sensors on buses can help to detect cyclists in blind spots.

Software algorithms can distinguish cyclists from the background.

2.4 Pedal Application Error

"The driver presses the accelerator when they think they are pressing the brake pedal."

Pedal Application Error refers to situations where the driver presses the accelerator when they think they are pressing the brake pedal, which leads to an unintended acceleration. It happens extremely rarely but carries a risk of very severe outcomes. It is very difficult to understand exactly what happens in these events, and drivers are unaware of their mistake. TfL is now requiring CCTV cameras to be fitted in the footwell to provide evidence in case of future incidents. In the meantime, there are a variety of measures to help a driver place their foot correctly or recover from an unintended acceleration incident.

2.4.1 Foot Placement

One solution that might help driver's to correctly place their foot on the brakes is brake 'toggling'. This refers to an additional press of the brake pedal at a bus stop or bus stand (not in flowing traffic) to update the driver's recent memory of the brake pedal position. The idea is that if the driver's brain has more frequent memory updates of where the brake pedal is, then they are less likely to place their foot incorrectly.

Another theory about pedal application error is that the driver's feet might become misaligned from the pedals if the driver must move to see into a blind spot. The Bus Vision Standard is intended to reduce the blind spots, and as a consequence might also help to reduce the risk of pedal foot placement error.

Pedal application error is a rare but high risk event when the accelerator is pressed instead of the brake pedal.

The design of bus pedals is controlled by regulation, and many manufacturers build following ISO standards. However, there is still some variation between models, and if a driver drives different buses, they may become confused by different pedal layout or feel. In an ideal world, all the bus pedal configurations would be identical.

2.4.2 Recovery

It may be possible to help the driver recover from an error if a pedal application error incident does occur. CCTV evidence shows that a small proportion of incidents last for a surprisingly long time, with some even approaching a minute in duration. The driver is so convinced that they have their foot on the brake, they just keep pressing it. In these cases, a driver feedback system may help the driver to realise their mistake. Feedback could include visual indication or the addition of engine noise simulation in quiet (electric/hybrid) vehicles.

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2.4.3 Intervention

Future Advanced Emergency Braking (AEB) systems might be able to intervene in the case of pedal application error. AEB is intended to help the driver when they are distracted or cannot react fast enough, so an AEB is generally overridden if there is a strong input (braking or acceleration or steering) from the driver. However, it would be feasible to adapt the logic and allow advanced emergency braking if the accelerator pedal was depressed fully, and the AEB system detected an imminent collision, particularly if the system could distinguish between normal throttle activation and one where the driver really meant to hit the brake.

2.5 Runaway Bus Prevention

In rare circumstances runaway buses can occur. These are exceptional occasions where the driver leaves their seat without properly applying the park brake and the bus subsequently rolls away. These incidents are very rare but carry a risk of very severe outcomes.

The research for this safety measure included task analysis and interviews with drivers about the extreme circumstances that might lead to a runaway incident. This analysis was used to generate a checklist of conditions whereby the bus should not roll away. The BSS will require a system of interlocks to prevent the bus rolling away if the driver leaves their seat without properly applying the park brake. The checklist is used to assess the performance of the runaway bus prevention interlocks.

"A system of interlocks to prevent the bus rolling away if the driver leaves their seat without properly applying the park brake."

System on, driver in control and in seat so bus can roll.

System on, driver out of seat, interlock engages and bus held on brakes.

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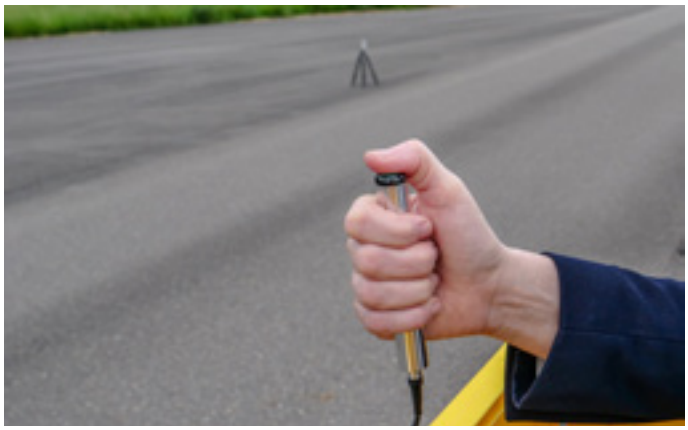
3. Partner Assist (helping the other road users involved, the collision partners, to avoid the collision)

3.1 Acoustic Conspicuity

An Acoustic Vehicle Alerting System (AVAS) is a system to make quiet running (e.g. electric) buses as identifiable to pedestrians, and other road users outside the vehicle, as a standard diesel bus. This is intended to help Vulnerable Road Users (VRUs) detect the presence of a bus and the collision risk it represents if they were to cross in front of it. Regulation will require that electric and hybrid buses are fitted with AVAS, on new models from September 2019, and on all new builds from 2022. TfL is mirroring the regulatory requirements but has chosen to implement them sooner, subject to legal review. TfL is also investigating the development of a “city bus” sound. The aim of this is to harmonise the AVAS sounds across the bus fleet, regardless of which company has manufactured the bus, thereby minimising the number of new sounds introduced into an already very busy and noisy environment, and avoid the risk of confusing VRUs. An evaluation procedure has been developed to assess solutions and aid the design/selection of the city bus sound.

Participants were blindfolded so they focused only on what they could hear.

Acoustic conspicuity trials showed a greater effectiveness of the sound coming from the front of the bus.



Participants pressed the button when they heard the bus.

“An Acoustic Vehicle Alerting System (AVAS) is a system to make quiet running (e.g. electric) buses as identifiable to pedestrians, and other road users outside the vehicle, as a standard diesel bus.”

189-317

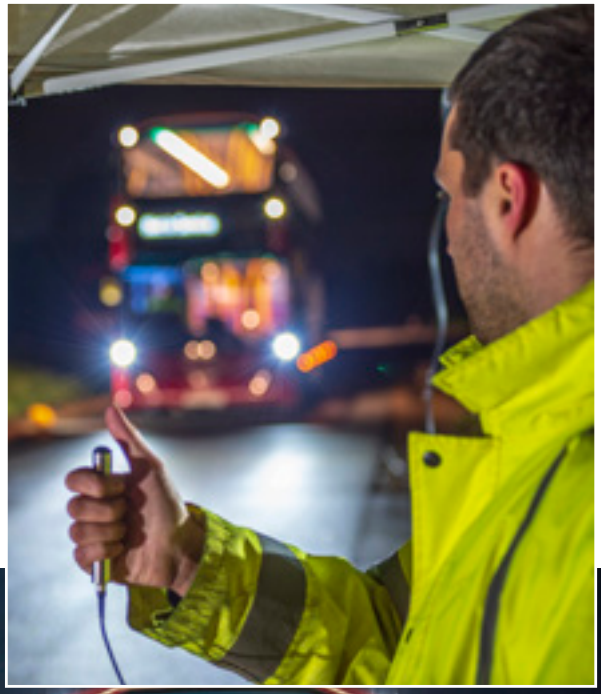
3.2 Visual Conspicuity

"TfL is requesting innovative solutions to be evaluated."

Visual conspicuity is about making the bus more noticeable to other road users, particularly VRUs. This might help VRUs to detect the presence of a bus and the collision risk it represents if they were to cross in front of it. There are a variety of solutions available that might help, and TfL is requesting innovative solutions to be evaluated. Test and assessment procedures will have to be developed for specific solutions that are selected in the future.

The assessment of the visual conspicuity solutions has required the development of a new evaluation procedure. This consists of a laboratory-based test reviewing photos of buses in a variety of conditions. This assesses the participants' ability to search and recognise the bus in a London visual scene. A second phase of testing is track-based and assesses how well participants judge their ability to successfully cross in front of an approaching bus (by releasing the button, but not stepping out). These procedures were designed to assess the 'looked but failed to see' and 'time to collision' (or saw but misjudged the risk) errors respectively.

Participants let go of the button when they felt it was no longer safe to cross.



Within the regulatory requirements it is possible to add extra marker lights to buses. Additional reflective tape was also investigated, as well as the combination with both lights and tape. The idea is that by creating a rectangular frame of the shape of the bus front then VRUs might better identify and predict the speed of the bus as the rectangle enlarges whilst moving towards them. These conditions were tested against a baseline bus, but were not proved to be more effective for fully able people. However, TfL intends to look at whether these solutions could be effective for impaired persons, such as visually impaired or intoxicated people.

Trials assessed the effect of adding a reflective tape outline, additional top marker lights, and both together.

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4. Partner Protection (reducing severity of injuries for road users outside the bus in a collision)

4.1 Vulnerable Road User (VRU) Frontal Crashworthiness

This safety measure concerns the protection of VRUs if a collision with the front of a bus is unavoidable. The aim is to provide better protection and lessen the injury severity. This can include changes to the geometric front end design of the bus, impact energy performance assessment, and runover prevention systems. Also included is the impact performance of wing mirrors and their potential replacement with camera monitor systems (CMS).

"Protection of Vulnerable Road Users (VRUs) if a collision with the front of a bus is unavoidable."

4.1.1 Impact Protection – Energy absorption

When a collision between the bus and a pedestrian occurs, there is often an impact between the bus and the pedestrian's head. It is possible to reduce the accelerations experienced by the head through the use of energy absorbing materials, avoiding hard points under the front panels in the design stage, or even by altering the front profile of the bus. The BSS sets minimum head impact performance requirements to ensure that the accelerations experienced by the head do not exceed specified injury criteria.

Windscreens with a flatter curvature offer a better head impact protection.

4.1.2 Impact Protection – Windscreen wiper protection

The windscreen wipers can have an effect on pedestrian injuries, should a bus-to-pedestrian collision occur. The wiper mount points are hard and can potentially cause injury. Two potential solutions exist, depending on the bus styling and wiper sweep. First is moving the mount points up to the top of the screen and out of likely impact range. If this is unfeasible, a second option is for manufacturers to provide evidence that a protective or energy absorbing covering for bottom-mounted wipers has been fitted and is effective.

Windscreen wiper protection must be provided, unless they are located at the top of the screen out of harm's way.

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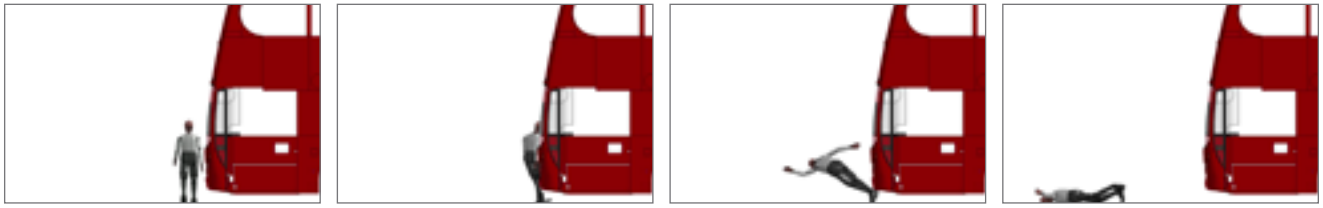
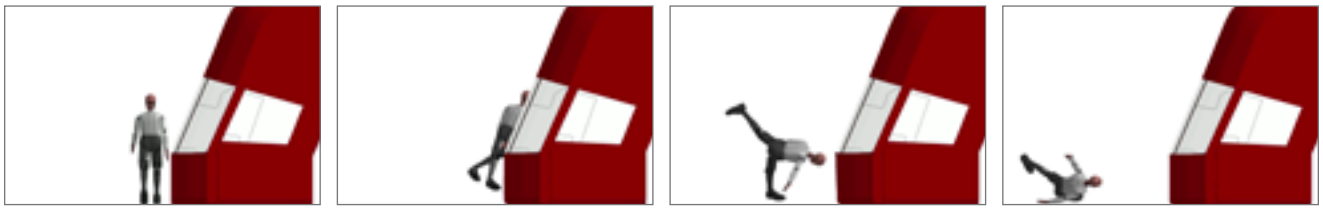
4.1.3 Bus Front End Design

Changes to the front end design, or shape of the bus front, can help to deflect the pedestrian out of the path or to scoop them up and along, instead of pushing them down onto the ground. Shape changes for the bus front have been investigated in innovative research using computer simulations. As a result, the BSS will require rounded corners at the front of the bus, combined with a slightly sloped front. These combine to create design envelope requirements to deflect VRUs laterally and upwards away from the bus to reduce injury and run-over risk. Some of TfL's bus fleet already has these features, and this set of minimum requirements will be adopted in the BSS for new build buses. Future research to generate more optimised requirements will consider different speeds, different material properties, and cyclists.



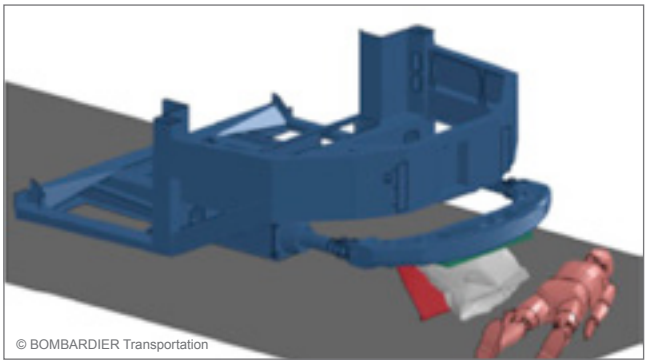
Previous generation bus impacting an average male pedestrian who is pushed downwards to the ground.



Future buses will have a more sloped windscreen and more rounded corners to help deflect pedestrians more upwards and laterally to reduce run-over risk.

4.1.4 Run-Over Protection

Pedestrians are at the greatest risk of fatality if they are run over after an impact. TfL is keen to see innovative designs from bus manufacturers that will help to prevent run-overs. This might include a mechanical or airbag device located under the bus that is only dropped down on contact with a pedestrian. Bombardier has developed the BodyGuard™ system for trams. Run-over protection solutions need development on buses so cannot yet be incorporated into the BSS, but TfL calls for innovation in this area.



A run-over protection system has been developed for trams, but innovation is needed for buses.

4.1.5 Mirror Strikes

Camera Monitor Systems (CMS) are now entering the market for buses, with these systems replacing the wing mirrors with cameras that provide the same view. Images are shown on a monitor that is mounted inside the bus in a similar place to the wing mirror, e.g. on the A-pillar. These systems have the advantage of removing the wing mirrors, which will remove the risk of mirror strike injuries to pedestrians and other road users. The BSS will require that CMS are fitted, but some further research is needed to define exactly how these should be implemented on buses for a suitable cab layout and in a way that does not over-burden the driver with information.

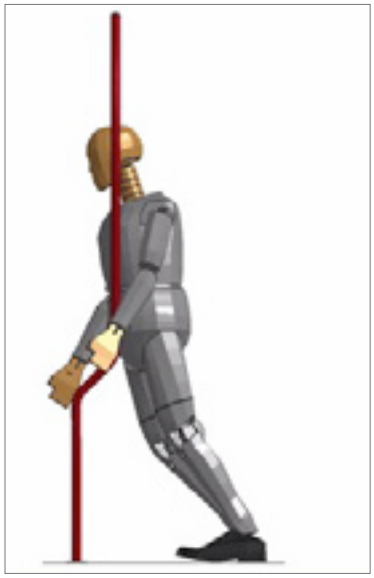
5. Occupant Protection (reducing severity of injuries for people on board the bus)

5.1 Occupant-Friendly Interiors

Considering bus passenger injuries, the majority of the more severe casualties and fatalities occur in collisions, but a large number of slight injuries occur in non-collision incidents such as harsh braking. TfL's BSS is supporting safety improvements for bus passengers as a priority. This involves an assessment of the protection provided to passengers on-board the bus. A visual inspection of the interior during the design process aims to help identify and design-out potentially injurious features and encourage better positioning and selection of features.

The occupant-friendly interiors measure has been particularly challenging. Current regulations heavily constrain designs for reasons of accessibility, so making safety improvements without conflicting with regulations and other priorities such as passenger flow and comfort is difficult. Nevertheless, beneficial changes have been identified. The process has been to examine CCTV footage to help understand how passengers are injured in harsh manoeuvre (e.g. emergency braking) and collision events. Following this, existing bus designs were reviewed to identify potentially injurious features and how they could be redesigned to reduce the risk of injury, e.g. move the handrail to reduce risk of a head strike. An assessment scheme for occupant-friendly interiors has been developed to allow bus manufacturers to incorporate safety considerations alongside the existing constraints from regulation, accessibility, flow etc. It is hoped that this will give the manufacturers a guide for producing the best compromise, without being too design prescriptive.

Some passenger injuries occur from impacts with the grab poles on buses. Computer simulation was used to model a grab pole and a passenger impact onto the pole. The regulation is quite restrictive because the pole has to remain small enough to grip, so it is not possible to add a lot of protective foam. The particular solution tested did not show a consistent improvement, so TfL calls for innovation in this area.



Baseline pole

Pole with compliant mount at the top under emergency braking.

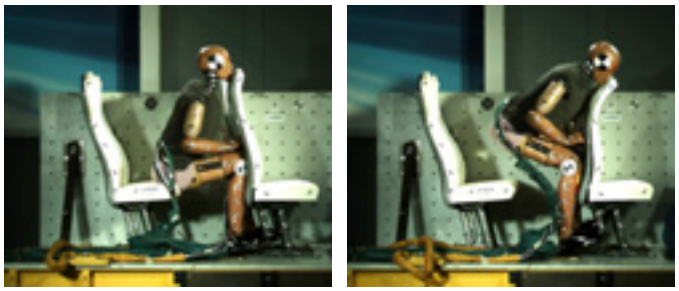
Pole with compliant mount at the top in a severe crash.

189-321

Low back

Passenger is poorly restrained.

Medium back



Passenger is better restrained by a medium back seat.

Low back

Low back allows large neck extension when rear facing.

High back

High back reduces neck extension when rear facing.

Passengers can also be injured in frontal impacts or when the bus brakes because this causes them to move forward into the seat in front. The development of the BSS included seat testing, both in computer simulation and sled testing (which replicates the collision forces in a repeatable way, but for testing just the seat in isolation and not the whole vehicle). This testing compared traditional low-back seats against medium (taller) back seats and high back (for example coach style) seats. In rear-facing seats the BSS will encourage high-back seats. The additional weight of these different seats makes them difficult to implement throughout the entire bus. TfL calls for innovation to develop a seat design that can provide greater protection, particularly against whiplash injury in rear-facing seats, but also be lightweight and robust for implementation on a public bus.

"Passengers can also be injured in frontal impacts or when the bus brakes because this causes them to move forward into the seat in front."

5.2 Slip Protection

Slips on buses are also a cause of injury for bus passengers. There are well established methods of measuring the slip resistance of flooring, and these have been modified to suit buses. The test method involves using a pendulum device with a swinging shoe plate; the greater the resistance the less the shoe plate moves after it hits the floor. The BSS will require a minimum skid resistance of the anti-slip flooring fitted in the buses.

The Portable Skid Resistance Tester (PSRT).

Slip resistance in use was investigated; measurements will use samples for new buses.

"A minimum skid resistance of the anti-slip flooring fitted in the buses."

189-322

6. Implementation of the Bus Safety Standard

The BSS will be implemented on all new buses entering the London fleet. The timings of the implementation will be as predefined in the bus safety roadmap.

The tests and assessments are tailored to suit the nature of each safety measure. They are either a simple pass/fail or a more complex performance assessment. Injury and collision data have been used to define the scenarios and/or injury mechanisms to be addressed. As such it is an objective, performance-based assessment. The assessments have been written in a way that is open for the bus industry to deliver new innovative safety features that achieve the goal, without being restricted as to how it is attained. Guidance notes have been developed to help the bus manufacturers and operators with some practical advice.

"The BSS will be implemented on all new buses entering the London fleet."

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7. The Bus Safety Roadmap

A roadmap has been developed by TRL to provide a guide for future developments of the BSS. This is needed because not all the safety features and systems are available immediately on buses. Some features will take time to develop and implement on buses because they are new and innovative. The bus industry has been consulted through the research process so that the timescales are realistic but challenging. The bus manufacturers will have to work with their supply chains to meet this demand.

This roadmap is the key tool for bus manufacturers and operators in understanding TfL's requirements and will enable them to plan for the future. It will be an evolving document with regular updates so as to remain relevant. The Euro NCAP (European New Car Assessment Program) roadmap for passenger car safety has been used as the model approach.

Historically, TfL's bus procurement has been based on the specification of buses, and its requirements, which is essentially setting a minimum standard. The roadmap is now presenting a 'Preferred' date earlier than any 'Required' date. This 'preferred' date reflects when the vehicle or system might first enter the market in production by the market leader, to encourage the earlier adoption of safety systems. The 'required' date represents when multiple bus models would be expected to be available to the market and will typically follow a few years later.

"The bus industry has been consulted through the research process so that the timescales are realistic but challenging."

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8. The Bus Safety Innovation Challenge

The BSS marks a fundamental change in the approach to safety for London's buses, but there are many other safety systems that could be implemented on buses, or innovations yet to come. The bus industry and its supply chain can offer a vast range of safety improvements. To encourage and guide the development of these improvements TfL aims to provide support through the Bus Safety Innovation Challenge.

Applicants will need to provide a dossier of evidence describing a safety system and its effectiveness for assessment. The purpose of this assessment is to provide consistent targets to innovators so that they know what TfL is trying to achieve, what their innovation will need to do, and what proof will be needed, for TfL to consider allowing or requiring it on London buses. TfL has evidence underpinning the range of ongoing bus safety projects, and the innovation challenge is intended to encourage innovators to focus on that evidence to really help TfL to reduce or eliminate fatalities and injuries on London's bus network.

A two-stage approach is used to assess the submission. The first stage covers a description of the innovation and how it works, alongside a description of the safety problem and casualty population that it is intended to avoid or mitigate. The second stage is more complex, with three sections. Evidence of how the innovation has been tested should be used to demonstrate its effectiveness and suitability for buses, and this should then be used to describe the expected benefit in terms of the number of casualties it is expected to avoid in real service. Finally, any real world evidence should be use to quantify the observed safety benefits that were actually achieved, operational implications such as driver or passenger reactions to the system, and costs.

"There are many other safety systems that could be implemented on buses, or innovations yet to come."

"To encourage and guide the development of these improvements TfL aims to provide support through the Bus Safety Innovation Challenge."

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9. Conclusion

Ultimately, the goal of the Bus Safety Standard research was to develop an independent standard and framework for assessing the safety of TfL's buses. Bringing all the safety measures together and ensuring that they work in a complimentary manner was complex. The BSS programme has delivered innovative research into new areas of bus safety.

The BSS is intended to be a rolling programme, so this initial large programme of research is just the starting point for TfL. Testing and trials will continue to investigate the capability of new technologies and bus features via the Bus Safety Innovation Challenge. The specifications will be updated regularly to keep extending the preventative and protective benefits of these and future safety measures on buses. The roadmap will be updated to help inform the bus industry of these forthcoming requirements.

Strong steps towards safer buses for London are achievable through this world-leading Bus Safety Standard, which we hope will be taken up by other safety-conscious transport authorities, bus manufacturers and operators wherever they are based across the globe.

"The BSS programme has delivered innovative research into new areas of bus safety."

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Acknowledgements:

TfL and TRL would like to thank the input and efforts from their Delivery Partners on the research, Alexander Dennis Ltd, and Wrightbus Ltd. Other bus manufacturers and their suppliers have also helped by providing information and prototypes for testing. The research would not have been possible without all the advice, information, and co-operative support with access to buses provided by the London bus operators.

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BUSES TRANSPORT FOR LONDON in conjunction with TRL THE FUTURE OF TRANSPORT 189-327

Bus Safety Roadmap for new build buses

TRANSPORT FOR LONDON

			2018	2019	2020	2021	2022	2023	2024	2025	2026	onwards
Driver Assist	**Intelligent Speed Assistance (ISA)**	Standalone mandatory	Required									
	Advanced Emergency Braking (AEB)	Car, Pedestrian & Cyclist partners			Preferred				Required			
	Runaway Bus Prevention	Interlock system		Preferred		Required						
	Pedal Application Error – Foot placement	Brake toggling		Preferred		Required						
		Pedal standardisation			Preferred	Required						
	Pedal Application Error – Recovery	Pedal indicator lights		Required								
		Pedal acoustic feedback		Preferred		Required						
	Pedal Application Error – Intervention	AEB logic			Preferred				Required			
	Vision – Direct & indirect vision standard	Direct vision		Preferred		Required						
		Enhanced indirect vision			Preferred				Required			
		Class II CMS			Preferred	Required						
		Blind spot Mirrors		Required								
		Blind spot CMS			Preferred	Required						
		Reversing CMS		Required								
		Front & Nearside			Preferred				Required			
	Vision – Internal obscuration	Driver assault screens		Required								
Partner Assist	**Acoustic Conspicuity**	Acoustic Vehicle Alerting System		Required								
Partner Protection	**VRU Frontal Crashworthiness** – Bus front end design	Minimum geometry		Preferred		Required						
		Optimised geometry					Preferred		Required			
	VRU Frontal Crashworthiness – VRU impact protection	Energy absorption				Preferred			Required			
		Wiper protection		Preferred		Required						
	VRU Frontal Crashworthiness – Mirror strike protection	Class II CMS			Preferred	Required						
Occupant Protection	**Occupant Friendly Interiors** – Visual inspection & design	Level 1 requirements		Preferred		Required						
		Level 2 requirements			Preferred				Required			
	Occupant Friendly Interiors – Slip protection	Surface friction requirements		Required								

Bus Safety Roadmap for new build buses

Preferred – refers to a best practice approach and the first to market.

Requirement – refers to a minimum or mandatory requirement. This would represent a wider adoption throughout the London bus market, potentially 3+ models.

Years – indicate the year in which the preferred/required safety measure will be on the road. For manufacturers and operators it is important to note that this is not the tender, which may come 6-9 months prior to the buses becoming operational.

The coloured lines refer to TfL's roadmap according to their section:

- **Driver Assist**
- **Partner Assist**
- **Partner Protection**
- **Occupant Protection**

What is the Bus Safety Roadmap?

A roadmap has been developed by TRL to provide a guide for future developments of the BSS. This is needed because not all the safety features and systems are available immediately on buses. Some features will take time to develop and implement on buses because they are new and innovative. The bus industry has been consulted through the research process so that the timescales are realistic but challenging. The bus manufacturers will have to work with their supply chains to meet this demand.

This roadmap is the key tool for bus manufacturers and operators in understanding TfL's requirements and will enable them to plan for the future. It will be an evolving document with regular updates so as to remain relevant. The Euro NCAP (European New Car Assessment Program) roadmap for passenger car safety has been used as the model approach. Historically, TfL's bus procurement has been based on the specification of buses, and its requirements, which is essentially setting a minimum standard. The roadmap is now presenting a 'Preferred' date earlier than any 'Required' date. This 'preferred' date reflects when the vehicle or system might first enter the market in production by the market leader, to encourage the earlier adoption of safety systems. The 'required' date represents when multiple bus models would be expected to be available to the market and will typically follow a few years later.

香港專營巴士服務
獨立檢討委員會

香港金鐘道66號
金鐘道政府合署21樓

Independent Review Committee on
Hong Kong's Franchised Bus Service

21/F, Queensway Government Offices,
66 Queensway, Hong Kong

本函檔號 Our Ref.: CSO/IRC-BUS/CR/7-15/3
來函檔號 Your Ref.:

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1 November 2018

By email ([redacted]) & BY AIRMAIL

Mr Mike Weston
[redacted]

Dear Mr Weston,

Independent Review Committee on Hong Kong's Franchised Bus Service ("the Committee")

The Committee thanks you for attending the hearing on 27 September 2018 to provide oral evidence as well as for submitting on 24 October 2018 the supplementary report on the Transport for London ("TfL")'s proposed Bus Safety Standard ("BSS"), which serves as an update on the development of the BSS after its formal launch by the TfL on 16 October 2018. Set out below are some matters in respect of which the Committee seeks your opinion and/or assistance in obtaining information.

A. Safety Performance Indicators ("SPI")

2. In the expert report you submitted to the Committee in September 2018, section 7.8 states that "as part of the Bus Safety Programme TfL have developed a Safety Performance Indicator (SPI) based on an approach already used within the rail industry" *[EXP bundle[1] page 150; internal pagination of the report page 36]*. During the hearing on 27 September 2018, the Committee also explored the issue of SPI. The Committee learnt that the details of the SPI had not been made available to the public at the time of the hearing, although an announcement on the SPI was expected to be made shortly afterwards *[lines 7 to 13 on page 47 of the Day 18 transcript[2]]*.

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1 The document bundle is available at: www.irc-bus.gov.hk/bundles/Bundle%20EXP-1_20181030.pdf.

2 The transcript is available at: www.irc-bus.gov.hk/eng/pdf/transcript20180927.pdf.

3. The issue of SPI is also discussed in one of the documents prepared by the TfL that was identified by the Committee and included in the document bundles. In the document entitled "Update on Bus Safety Programme – Transport for London response to London Assembly Committee Transport Committee Report" prepared by the TfL in October 2017 *[MISC-3 bundle[3] pages 1189 to 1206]*, the word box on page 1194 of the bundle states that the TfL "introduced a network-wide SPI providing a comprehensive and detailed measure of network safety performance" in "April 2017", while the word box on page 1195 sets out two milestones that were yet to be completed at the time of the report, namely the "development of an operator SPI and improved assurance programme to be used as the basis for regular safety performance meetings and discussions between TfL HSE Managers, Performance Managers and operating companies" and to "consider options to introduce the SPI and Safety maturity measure into our contract evaluation process", both expected to be delivered in "summer 2018".

4. It is in connection with the above that the Committee wishes to seek further information on the following:

(i) it is noted that there are discussions on the SPI in both your latest Supplementary Report and the Transport for London Bus Safety Standard Executive Summary *[vide footnote 2 on page 7 of the supplementary report]*. Is it correct for the Committee to understand that the introduction of SPI in the monitoring of London bus operators is an initiative under the Bus Safety Programme, but not the BSS which is only part of the Bus Safety Programme and is focused solely on the vehicle standards of London buses?

(ii) TfL stated on the website[4] that:

> "We are updating our bus contracting system to improve how we use road safety Key Performance Indicators (KPIs) and promote an even greater focus on safety. We are developing a safety scorecard which will combine all of our monitoring systems and KPIs. We will use this in our contracting and performance management with bus operators….."
>
> Have there been any further developments with respect to the announcement and promulgation of the details of the SPI by the TfL, having regard to the fact that TfL planned to complete the introduction of the SPI in "summer 2018" as set out in paragraph 3 above and the statement on TfL's website as noted above?

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[3] The document bundle is available at: www.irc-bus.gov.hk/bundles/Bundle%20MISC-(1%20to%203)%2020181101.pdf.

[4] tfl.gov.uk/corporate/safety-and-security/road-safety/bus-safety

B. Requirement for London Bus Operators to Submit Accident Data

5. In the expert report you submitted to the Committee in September 2018, section 6.2 states that:

> "As part of bus operators' contractual requirements, they are required to submit comprehensive data relating to incident and accidents which have occurred across the network. This data is submitted through IRIS (Incident Reporting Information System) although in the case of serious incidents these will be reported and monitored in real time through TfL's central control room who will work with other agencies to manage the intermediate response to the incident" *[EXP bundle page 141; internal pagination of the report page 27]*.

6. The Committee held a further hearing with the Transport Department ("TD") on 4, 6 and 16 October 2018. During the hearing on 6 October 2018, the Committee explored the possibility of requiring bus operators in Hong Kong to make more comprehensive accident reporting to the TD. Reference was made to the IRIS in London, but there were some difficulties in identifying the exact clause that makes it an obligation for London bus operators to make use of IRIS *[lines 12 to 20 on page 135 of the Day 20 transcript[5]]*. In this connection, the Committee wishes to seek your assistance in identifying that particular contract clause. The Committee also wishes to know whether TfL would validate the data submitted by respective operators to ensure their accuracy.

C. Route Risk Assessments ("RRA")

7. In the expert report you submitted to the Committee in September 2018, section 6.4 states that:

> "As part of the Framework Agreement operators are required to produce a Route Risk Assessment (RRA) for each route it operates. The aim of this RRA is to identify potential risks along a route, for example a difficult junction or the presence of a school which might generate a lot of pedestrian movement at certain times of the day. Drivers allocated to that route would be expected to be familiar with the RAA" *[EXP bundle page 142; internal pagination of the report page 28]*.

8. At the hearing with the TD on 16 October 2018, the Committee was informed that the TD had no systematic route risk assessment mechanism at present, but that the TD considered that:

> "...any systematic assessments of routes will certainly help to consolidate our existing practice and discussions with the operators to ensure road safety in respect of routes..." *[lines 24 on page 117 to line 8 of page 121 of the Day 21 transcript[6]]*.

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[5] The transcript is available at: www.irc-bus.gov.hk/eng/pdf/transcript20181006.pdf.

[6] The transcript is available at: www.irc-bus.gov.hk/eng/pdf/transcript20181016.pdf.

9. As the issue of RRA is not mentioned in Chapter 8 of the expert report, which compares the franchised bus regimes in London and Hong Kong, the Committee wishes to seek your opinion on whether there would be merit in introducing a formal RRA system in Hong Kong and whether this ought to be a recommendation of the Committee.

10. In addition, the Committee seeks information as to whether the RRA for London bus operators is conducted for each and every route of the respective bus operators prior to commencement of the contract, and whether or not it is reviewed at periodic intervals to take account of any possible changes to the road environment and traffic conditions. Further, what are the detailed considerations that will be taken into account in the RRA and is the assessment required to be endorsed by TfL? Finally, what are their respective roles in assessing the risks involved and taking necessary follow-up action?

D. Release of Bus Accident Statistics

11. In the expert report you submitted to the Committee in September 2018, section 8.4 states that:

> "It is clear from London's experience that greater transparency of data in relation to the safety performance of the bus network…leads to a sharper focus from both the transport authority and its contracted bus operators on the safety agenda….Consideration should be given to what safety data in relation to the Hong Kong franchised bus network could be placed into the public domain" *[EXP bundle page 153; internal pagination of the report page 39]*.

12. During the hearing, you gave evidence on the issue of providing safety-related data or statistics to the public, but did not condescend to detail of the exact type of information that should be considered for public promulgation in Hong Kong *[line 14 on page 47 to line 24 on page 49 of the Day 18 transcript]*. The Committee notes that Professor Stanley suggested that the bus accident statistics included in the Bus Safety Sections on the Forward Planning Programmes submitted by Hong Kong franchised bus operators were an example of information that should be made available to the public *[EXP bundle page 66, as well as lines 11 to 15 on page 178 of the Day 16 transcript[7]]*.

13. Do you agree with Professor Stanley's view regarding the merits of making the bus accident statistics included in the Bus Safety Sections on the Forward Planning Programmes available to the public?

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[7] The transcript is available at: www.irc-bus.gov.hk/eng/pdf/transcript20180915.pdf.

E. Background information on Stats19

14. The Committee wishes to obtain further background information on the use of the Stats19 form in the United Kingdom, in particular the date when it was first used. The current Stats19 form is available publicly[8] and the words "Sept. 2004" is printed on the top-right corner of the form. Please confirm whether it is the case that the current version of the Stats19 form came into use in September 2004, and that only the provisional data provided by the police on a quarterly basis are published (as the final number of casualties and personal injuries can change).

F. Determination of Speed Limits

15. In the document entitled "Setting Local Speed Limits" issued by the Department for Transport of the United Kingdom in 2013 *[SEC-3 bundle[9] pages 1003 to 1044]*, there are a number of paragraphs explaining the underlying principles for setting speed limits for roads as well as the adoption of 20 mph zones.

16. For instance, paragraph 27 on page 1012 states that:

> "The aim of speed management policies should be to achieve a safe distribution of speeds consistent with the speed limit that reflects the function of the road and the road environment. This should imply *a mean speed* appropriate to the prevailing road environment, and all vehicles moving at speeds below or at the posted speed limit, while having regard to the traffic conditions" *[italics added]*.

17. Paragraph 97 on page 1027 states in the context of setting up 20mph zones that:

> "The implementation of 20 mph limits over a larger number of roads, which the previous Speed Limit Circular (01/2006) advised against, should be considered where *mean speeds* at or below 24 mph are already achieved over a number of roads. Traffic authorities are already free to use additional measures in 20 mph limits to achieve compliance, such as some traffic calming measures and vehicle activated signs, or safety cameras. Average speed cameras may provide a useful tool for enforcing compliance with urban speed limits" *[italics added]*.

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[8] At: http://docs.adrn.ac.uk/888043/mrdoc/pdf/888043_stats19-road-accident-injury-statistics-report-form.pdf.

[9] The document bundle is available at: www.irc-bus.gov.hk/bundles/Bundle%20SEC-(1%20to%203)%2020181022.pdf.

18. While the mean speed of vehicles travelling on a road appears to be a crucial factor that the Department for Transport considers should be taken into account in setting speed limits, there are also sections in the document that refer to the use of 85th percentile speeds. For example, paragraph 66 on page 1020 states, in the context of the speed limit assessment tool designed by the Department for Transport, that:

> "The tool has been designed to enable local highway authority officers and other professionals to...forecast *mean and 85th percentile speeds* for speed limit changes" *[italics added]*.

19. Please inform the Committee, as a matter of practice, whether and how the mean speeds and 85th percentile speeds are taken into account in the United Kingdom in setting speed limits for roads. Specifically, if both mean speeds and 85th percentile speeds are considered in the process, is any one of the two considered more important by relevant authorities in the United Kingdom in the setting of speed limits? You may wish to note that during the hearing on 16 October 2018, representatives of the TD stated that from the descriptions of the document issued by the Department for Transport, they were not sure whether mean speeds were in fact used by relevant United Kingdom authorities in setting speed limits *[line 20 on page 68 to line 23 on page 69 of the Day 21 transcript]*.

G. Bus Safety Standard

20. Under the heading "The Bus Safety Standard (BSS)" in the executive summary of the report of that name, published by TfL on 16 October 2018, the following statement was made:

> "It is important to ensure that money is spent wisely on the package of measures that will give the most cost-effective result. If zero fatalities can be achieved at a low-cost it remains better than achieving it at a higher cost. *TRL has developed a cost-benefit model describing the value of implementing the safety measures, both in terms of casualties saved and the technology and operational costs of achieving that.* Input from the bus industry has formed the backbone of all the research and the cost benefit modelling. This modelling has helped inform the decisions of TfL's bus safety development team in terms of implementing the safety measures on new buses" *[internal pagination 7 of the report; italics added]*.

21. If you are in a position to do so, please provide the Committee with more information about the TRL cost-benefit model, providing if possible an example of a decision(s) reached in terms of the implementation of enhanced franchise bus safety measures, having regard to that cost-benefit model.

H. Competition Commission

22. The Committee has received a written submission from the Competition Commission on 31 October 2018 presenting their views on how competition can play a role, alongside regulation, in enhancing safety and other aspects of franchised bus services. For your background information, the Competition Commission is an independent statutory body established under the Competition Ordinance (Cap. 619). The functions of the Commission include, inter-alia : "to promote public understanding of the value of competition and how this Ordinance promotes competition", "to advise the Government on competition matters in Hong Kong and outside Hong Kong", and "to conduct market studies into matters affecting competition in markets in Hong Kong" (Sections 130(b), (d), and (e) of the Ordinance). The submission has been included in the MISC-3 bundle from pages 1374 to 1378.

23. The **main contention** of the submission is that **competitive elements should be included in the franchise tendering and renewal processes**, as summarised following sentence on page 1375 of the MISC-3 bundle, which states:

> "...the lack of an open competitive process for the granting of bus franchises since the late 1990s effectively removes a powerful incentive for incumbents to improve their performance and services: the incentive in this case being the genuine possibility of losing the franchise."

24. The Commission expresses the view above as it opines that enhanced competition can bring about additional benefits in terms of safety *[2nd full paragraph, page 1376 of MISC-3 bundle]* provided that the system is designed properly *[1st full paragraph, page 1376 of MISC-3 bundle]*. The Commission also considers that:

> "...with a competitive process where the contracting criteria includes systems for upholding and enhancing safety, operators will face competitive pressure to improve quality and safety, or risk losing franchises to new entrants or existing bus services or other transportation providers looking to expand." *[MISC-3 bundle; page 1376]*

25. The submission **acknowledges that there will be challenges and difficulties** in revising the existing franchise tendering and renewal arrangements, for example in the management and transferral of assets (e.g. buses, depots, etc.) *[2nd and 3rd full paragraphs, page 1377 of MISC-3 bundle]* as well as in the changes to other existing practices *[last paragraph, page 1377 of MISC-3 bundle]*. This notwithstanding, the Commission **suggests that**:

> "...the Government to fully consider the costs associated with any required change in asset treatment relative to the benefits, including the safety benefits of competition. In that regard, the Commission further notes that the costs to any change in system are likely to be one-off or, at least, more time-constrained, while the benefits to safety and other aspects of quality and value for money would be ongoing." *[MISC-3 bundle; page 1378]*

26. It is in connection with the above that the Committee wishes you to express an opinion, if you wish to do so, in respect of what appears to be a suggested recommendation to be made to the Chief Executive.

27. The Committee has completed its hearings after the session with the TD on 16 October 2018. Before the Committee finalised its recommendations and prepares its report for submission to the Chief Executive, counsel assisting the Committee have been asked to provide closing submission to the Committee by late-November 2018, including suggested recommendations to make to the Chief Executive and in doing so to summarise the evidence relevant to those recommendations. As such, I would be grateful if you could provide your opinions and the information in respect of the matters identified above by **9 November 2018** so that material can be taken into account by counsel assisting the Committee in their submissions.

Yours sincerely,

(Chan Ping-fai, Peter)
Secretary, Independent Review Committee on
Hong Kong's Franchised Bus Service

cc Messrs. Wilkinson & Grist (Attn: Ms Rebecca Lau)

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☐ Urgent ☐ Return receipt ☐ Sign ☐ Encrypt ☐ Mark Subject Restricted ☐ Expand personal&public groups

Re: Hearing on 27 September for Mr Weston - Supplementary Report (seeking opinions and further information)

09.11.2018 23:23

From: mike weston [redacted]
To: <peter_chan@irc-bus.gov.hk>,
Cc: [redacted] haddy_lee@irc-bus.gov.hk, yt_to@irc-bus.gov.hk, annaau@irc-bus.gov.hk, iris_yu@irc-bus.gov.hk, lawrence_chung@irc-bus.gov.hk

4 attachments

M Weston HK IRC Report TfL Supplementary Information Letter.pdf
Route 160 revised NEW (1).pdf
Route B12 revised NEW (1).pdf
Annex C - C-I (9).pdf

Peter,
Please find attached my response to your letter dated 1st November.
I am still in discussion with Transport for London about what information they can provide on both the Cost Benefit Analysis methodology used by TRL and the proposed SPI process. A lot of this information hasn't yet been placed in the public domain hence they are currently considering what information they can provide. They have indicated that they will come back to me early next week, so I will provide a further update following receipt of this additional information.
If my response, which is in the form of a letter, in placed on your website I would be grateful if you could redact my address as it is also my home address.
Regards
Mike

WESTON CREWE LIMITED

[redacted]
Email: [redacted]
M: [redacted]

Mr P Chan, Secretary
Independent Review Committee on Hong Kong's Franchised Bus Services
21/F Queensway Government Offices
66 Queensway, Hong Kong

9th November 2018

Dear Peter

Additional Information in response to letter dated 1st November 2018

Further to your letter dated 1st November 2018, please find below the additional information requested. If you require any clarification or further information, please do not hesitate to contact me.

A. SAFETY PERFORMANCE INDICATORS (SPI)

The introduction of the new SPI system is an initiative under the Bus Safety Programme. TfL have confirmed that details of the SPI have not yet been made public, but they will be in due course. I will provide them to the committee as soon as they are made available.

As Mr Lunn and I learnt from TfL during our meeting in August that the SPI system is based on the approach already adopted by the UK rail industry. The following link to the Rail Standards Safety Board provides some background to the their scheme http://safetyculturetoolkit.rssb.co.uk/safety-culture-information/safety-culture-assessment/safety-performance-indicators.aspx

B. REQUIREMENT FOR LONDON BUS OPERATORS TO SUBMIT INCIDENT DATA

Schedule V of the Framework Agreement [1] details the arrangements in place for TfL to monitor overall performance of their contractors. Section 4.2.8 deals with the requirement for the reporting of incidents as follows:

> 4.2.8 Incidents
>
> The Operator shall supply to the Corporation information concerning all incidents in accordance with and at the frequency specified in "Incident Monitoring" (as set out in Annex C).
>
> In addition, the Operator shall inform the Corporation of any serious incident immediately after the event in accordance with the provisions of "Incident Monitoring" (as set out in Annex C).

Appendix A of this letter contains Annex C "Incident Reporting" which details the information required by TfL. Sections 4.1 and 4.2 of Annex C refer to the requirement to submit incident data using the IRIS system.

In terms of data validation TfL adopt several approaches. Firstly, the TfL Safety Team undertake periodic data validation to assess whether the reporting levels submitted by each operator for each period are within the normal range expected. Also, the team will make a cursory review for quality and ensure the correct use of the categories. The IRIS system also enforces some validation rules, but this is limited to certain conditions where the inputter fails to make the correct entry.

In addition to the above Section 15 Annex B Terms & Conditions of the Framework Agreement covers "rights to information, rights to access to the operator's premises and rights of audit". As part of a regular programme the TfL bus audit and safety teams will visit bus depots and validate the accuracy of several reports including incident reporting.

C. ROUTE RISK ASSESSMENTS

London bus operators are expected to produce a Route Risk Assessment (RRA) for each route they operate under contract to TfL. Subsequently they are expected to review each RRA every two years, following a major incident or material variation such as a change to the road layout.

[1] TfL Bus Framework Agreement http://content.tfl.gov.uk/metroline-bus-contract.pdf

Due to the sheer number of bus routes TfL does not systematically review the RRAs, but as part of its regular audit approach does check to see that they are in place and up to date.

Appendix B contains examples of RRA produced by Arriva for routes B12 & 160.

The RRA is considered an effective way of capturing the potential risk along a bus route and a useful tool to then communicate these risks to drivers allocated to that route. TfL does not specify the approach to be taken but leaves it to individual bus contractors to determine the approach best suited to their company. In terms of communication to drivers different approaches could be adopted including placement of notice board, accessible to drivers on the internet or individual issue to drivers.

Arriva, for example, adopt several approaches to cascade the contents of the RRA to drivers including posting them on garage notice boards, having folders available for drivers to review and providing them to driver buddies/mentors who will talk through the contents of them with drivers when assigned to a new route.

There would appear to be no reason why the RRA process used in London shouldn't be adopted by the Hong Kong franchised bus operators although in the view of the author it is important that these are "live" documents which are regularly reviewed and cascaded.

D. RELEASE OF BUS ACCIDENT STATISTCS

The release of safety information and greater transparency around this subject is clearly in the public interest and will encourage greater accountability amongst the franchised bus operators. Initially the approach adopted by TfL of releasing raw incident data without any commentary or analysis could be a useful starting point in greater transparency. Initially perhaps it's not so important exactly what information is published but that there is greater transparency. Also, important that all franchised bus operators publish the same data set to the same frequency.

As highlighted in the original report to the committee (section 6.2), greater transparency and the publication of incident data leads to greater accountability and focus in safety and the operation of the network. A distinction needs to be made between the publication of raw data and the analysis of such data. In the first instance it would be recommended that the TD should specify a framework of data required by all bus operators and to publish this on a regular basis – either monthly or quarterly. The production of performance dashboards and further analysis of this data can be developed once the data set and its publication has been established.

E. BACKGROUND INFORMATION ON STATS 19

Statistics on road safety in Great Britain are mostly based on accidents reported to the police via the Stats 19 system. This system allows police forces to report all personal-injury accidents to the Department of Transport. It does not collect any information about damage-only accidents.

The Department of Transport produces an annual 'best estimate' of the total number of road casualties in Great Britain each year, including those not reported to police. This is derived primarily from National Travel Survey (NTS) data. The latest such estimates, along with a description of how they have been derived and their limitations, are set out in an annual article published in the 'Reported road casualties Great Britain: annual report' https://www.gov.uk/government/statistics/reported-road-casualties-great-britain-annual-report-2016

I have been unable to determine the history of Stats 19 data with any accuracy although the following link provides some (unverified) information on the history of road accident data collection in the UK.

https://en.wikipedia.org/wiki/Reported_Road_Casualties_Great_Britain

F. DETERMINATION OF SPEED LIMITS

I am not able to provide any expert advice on this subject, but the following documents may be of interest to the committee. If the committee wants to explore this subject in more detail, I could identify an expert in the UK to provide further advice.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/2733/setting-local-speed-limits.pdf

http://glostext.gloucestershire.gov.uk/documents/s2644/Road%20Safety%20-%2020mph%20Guidelines%2014%207%2010.pdf

https://www.rospa.com/road-safety/advice/drivers/speed/20mph-zones-and-limits/

G. BUS SAFETY STANARD

Following discussions with TfL it has been established that whilst they are intending to publish details of the cost benefit model including the results for individual measures, they are not at present in a position to put this information into the public domain. However, I will keep in touch with TfL and provide this information to the committee as soon as it is published by TfL.

H. COMPETITION COMMISION

Experience from the London bus tendering system, including my own experience of managing the tendering process in London for many years, supports the view that enhanced competition will bring additional benefits to the transport authority and customers. The exact nature of the benefits will be highly influenced by the structure of the tendering process, the specification issued, and the evaluation and performance management processes adopted. Whilst any competitive tendering process needs to include both commercial and technical evaluations the technical criteria can be weighted to provide focus on the key areas of importance to the transport authority.

In terms of the technical evaluation the criteria can allocate whatever weight/scoring to safety the authority deems appropriate. However, as previously discussed TfL views safety as a “red line” in terms of the tender evaluation with operators expected to meet a minimum standard before the tender will be considered.

The introduction of a competitive tendering process also leads to improvements on the incumbent’s current operations as they will be incentivised by the threat of future competition to improve their offering.

As identified by the Competition Commission the costs and benefits of introducing such change would need to be fully considered with special attention being paid to the barriers to entry to the market to ensure a fully open and competitive tendering process can take place.

In the Hong Kong market the main barrier to entry is clearly the provision of garages, and to a lesser extent the bus fleet. Bus depots would almost certainly have to be provided by the Transport Department if an open competition was to attract new operators and create a truly competitive market.

The approach of providing both bus depots and vehicles has been successfully adopted by the Land Transport Authority in Singapore when it introduced competitive tendering in 2015. The first contract for the Bulim network was awarded to Tower Transit and attracted eight bidders and the second contract for the Loyang network, which was awarded to Go Ahead, attracted ten bidders. The above illustrates the level of international interest if the main barriers to entry can be reduced.

Encouraging international transport operators into the Hong Kong franchised bus market would certainly bring benefits to the market not only in terms of safety but operational performance, innovation and financial efficiency.

Yours sincerely

Mike Weston
Director, Weston Crewe Ltd

APPENIDIX A – TfL Framework Agreement Annex C – Incident Reporting

APPENDIX B – Examples of Route Risk Assessments

C-I INCIDENT REPORTING

1. INCIDENT REPORTING BY THE CORPORATION

1.1 The Corporation is required to report incident statistics for the Services to Government and other agencies on a regular basis.

1.2 The Corporation also uses incident data for monitoring and investigation purposes.

1.3 The Corporation is required to provide incident data requested under the Freedom of Information Act of 2000.

2. WHAT IS AN INCIDENT?

2.1 For the purposes of incident reporting, an incident is any event:

2.1.1 resulting in damage to the bus, third party vehicles or inanimate objects;

2.1.2 causing injury to bus passengers, bus staff or members of the public (including assaults) or animate objects; or

2.1.3 which results in actual damage to the environment or has the potential to damage the environment

2.1.4 which could be considered to have safety implications (such as mechanical failure, fire or wheel loss); and including road traffic accidents and vandalism.

2.1.5 any reportable incident that has impacted on service provision resulting in the recording and reporting of lost mileage, with the exception of road closures, road blocks or diversions shall include;

Slip/Trip/Fall: All fall related events whether on bus or other transport systems. This also covers falls on same level and from height.

Activity Incident Event: An event which has caused damage to asset or has the potential to do so but has not been classified elsewhere.

Assault: This relates to acts of violence and aggression towards a transport worker or another person.

Collision: This relates to all instances where a vehicle is involved in collision with a third party vehicle, person, tree, building, street furniture, bridges or other objects.

Environmental Incident: These are events not safety related but have resulted in harmful substances being released to the environment in an uncontrolled manner.

Fire: All fire events including those started intentionally.
Medical Incident: Health related incident not as a direct result of transport activities or the actions of others.

Personal Injury Event: Any other event which has caused an injury but has not been classified elsewhere.

Near Miss Incident: An event that did not result in injury, illness, or damage – but had the potential to do so giving a different circumstance.

Robbery: This involves robbery from a member of staff or a passenger or theft of an asset

Safety Critical Failure: These are mechanical and electrical failures which resulted in an injury of have the potential to do so.

Vandalism / Hooliganism: Malicious act leading to damage of an asset or act of hooliganism which impacts on service.

2.2 A comprehensive list of reportable incidents shall be set out in guidance provided by the Corporation from time to time. The Operator shall make every endeavour to put internal systems in place to support full compliance with such guidance.

3. OPERATOR INCIDENT REPORTING PROCEDURE

3.1 The incident reporting procedure supports the Corporation's reporting requirements and provides further safety-related information to assist the Corporation in monitoring the Services.

3.2 The procedure is designed to ensure that a record of all incidents occurring in relation to the Services is provided to the Corporation.

3.3 The Corporation will maintain a system to gather real-time incident information from Operator incident reports in a central spatial database to identify incident trends (see section 4 below). The system allows for timely and effective analysis and response to assist the Corporation in reducing risks and operational problems, and to improve safety performance.

3.4 The Corporation requires details of all incidents (including alleged incidents) that involve any bus:

3.4.1 operating on a London Buses contracted route;

3.4.2 operating on a Rail Replacement Service;

3.4.3 operating on a London Local Service Agreement route (LLSA);

3.4.4 running out of service including a journey to / from the garage, depot or other location and undertaking driver training;

3.4.5 otherwise in use whilst displaying identification as a London Buses route, for example, when on a road test for engineering purposes or on a route test; or

3.4.6 in the garage or depot where the incident involves:

3.4.6.1. acts of vandalism affecting service delivery;
3.4.6.2. any person requiring treatment in hospital due to accidental injury; or
3.4.6.3. fatality to employee, contractor, transport user or member of the public (excluding suicide or suspected suicide, non-work related medical fatality or crime-related); or
3.4.6.4. incidents (including environmental incidents) where prosecution is likely, there is HSE, Environmental Agency or Local Authority interest or there is (or there is likely to be) significant media attention.

3.5 Such incidents referred to in paragraph 3.4 must be reported, regardless of extent or severity, or whether they result in an insurance claim for or against the Operator. This includes alleged incidents that the driver is not aware of.

4. REAL-TIME DATA COLLECTION SYSTEM

4.1 Incident data is collected by the Corporation using the incident reporting information system (IRIS), or such other system specified by the Corporation from time to time, using a method of online electronic transmission acceptable to the Corporation.

4.2 IRIS can be used as a round-the-clock reporting tool to enter, search and update incident records. All reportable incidents must be promptly entered onto IRIS for submission to the Corporation. The time-scale for entry onto IRIS is dependent on the severity of the incident.

4.2.1 The process for “serious” incidents is described in section 5 below.

4.2.2 The process for “other” incidents is described in section 7 below.

4.3 Incident data will be transferred automatically to the Corporation on a daily basis so the Operator must ensure that IRIS is accessible at all times to enable system updates.

4.4 The Corporation shall oversee the administration of the IRIS system including providing user accounts to employees suggested by the Operator.

4.5 The Operator shall comply with security and connectivity protocol stipulated from time to time by the Corporation.

4.6 Such user accounts shall be solely for the purpose of recording incidents defined in 2.1 and for retrieving incident information.

4.7 The IRIS system shall be web based and the Operator shall make necessary arrangements to ensure it is able to connect to the IRIS system through the internet.

4.8 Instructions for proper completion of incident data, guidance on the application of IRIS and the classification of major injuries shall be provided by the Corporation and may be amended from time to time. These may also be obtained on request from the Corporation's Surface Health & Safety Team, Palestra Building, 197 Blackfriars Road, London SE1 8NJ.

5. IMMEDIATE REPORTING OF SERIOUS INCIDENTS

5.1 The Operator shall inform the Corporation's CentreComm and/or such other department as the Corporation may nominate from time to time immediately by code red or code blue or telephone of any of the following in so far as they relate to the provision of the Services:

Serious Incident Event	Details

Serious Incident Event	Details
Fatalities	• All fatalities including suspected medical related cases

Major Road Traffic Collisions	• Life changing injuries or injuries requiring being held overnight in hospital for treatment to a:
	  ○ Transport worker
	  ○ Passenger
	  ○ Vulnerable Road Users (VRU) - pedestrian, cyclist or motorcyclist
	• Where three or more people were injured and taken from scene of incident to hospital for treatment
	• Where three or more vehicles were involved and leading to an injury.
	• Involving a tree with a branch overhanging the roadway
	• Involving a bridge or other signposted overhead structures
	• Serious Road Traffic Collison (RTC) involving a building, a tree, street furniture, TfL bus infrastructure and scaffolding
	• Involving two or more buses within a bus station/stand environment
	• An RTC arising from a run-away bus situation (unattended bus)
	• Where the bus driver was medically incapacitated
	• Involving a tram or railway infrastructure

Safety Critical Failures	• Bus fires due to mechanical or electrical failure • Brake failure whether or not an accident resulted • Steering failure whether or not an accident resulted • Wheel loss
Security, crime and disorder	• Accidental fire to a bus or property involved in bus operation • Arson on a bus or to a property involved in bus operation • Where the driver is arrested for failing a drug/alcohol test
Other serious incidents	• Serious injury to a wheelchair user or a child in a pushchair • Serious injury after a fall from the rear platform of vehicles with open rear platform and operating on two crew mode • Noteworthy incident involving new technologies (not limited to buses) • Any incident not listed above with significant cost implications to the operator and/or TfL • Any serious incident not listed above with significant operational impact on bus operations or on third parties. • Any incident investigated by the HSE or where

Serious Incident Event	Details
	prosecution is likely by an enforcement authority. • Any incident not listed above where there is significant media interest. • Any other incident where there are substantial learning opportunities for industry

5.2 The Operator shall supply CentreComm immediately after such an event referred to in paragraph 5.1 has taken place, with the following information:

5.2.1 route number;

5.2.2 date, time and location of incident;

5.2.3 vehicle details;

5.2.4 a meaningful description of the incident;

5.2.5 details of any injuries sustained; and

5.2.6 any other information that may be requested from time to time.

5.3 The Operator shall then complete a full report in IRIS as soon as is practically possible, and no later than 48 hours from the time of the incident, to allow the Corporation to follow up investigate and respond.

6. INVESTIGATION OF SERIOUS INCIDENTS

6.1 The Operator shall investigate serious incidents as defined by the Corporation from time to time. Such investigations shall be in line with the **Notification and Investigation of Major Incidents (NIMI) Operator Guidance 2015** and as detailed in the attached Appendix A and as amended by the Corporation from time to time.

6.2 The Operator shall liaise with relevant authorities to ensure a robust and comprehensive investigation is undertaken in order that it is able to identify the cause of the incident.

6.3 In certain circumstances, the Corporation shall jointly investigate the incident with the Operator. The Operator will be notified of this and advised of the role of the Corporation.

6.4 The Operator shall notify the Corporation of the findings of the investigations incidents classed as serious by the Corporation.

6.5 The Corporation shall advise the Operator of the process for the notification of serious incident investigation from time to time. Such process shall seek to;

6.5.1 Confirm the extent of the serious incident including parties injured

6.5.2 Establish the cause of the incident

6.5.3 Establish actions taken to reduce the likelihood of a similar incident reoccurring

6.5.4 Establish lessons learned to ensure the safety of buses.

6.6 The Operator shall provide such information within such timeframe stipulated by the Corporation.

6.7 The Corporation shall provide a template which the Operator shall use when supplying such information.

6.8 The Corporation shall provide guidance on incident investigation reporting to the Operator from time to time.

6.9 The Corporation shall use such information to improve the safety performance of buses.

6.10 The Corporation shall disseminate relevant lessons learned from serious incident investigations to all Operators as it considers appropriate.

7. WEEKLY REPORTING OF OTHER INCIDENTS

7.1 A full report for “other” incidents; i.e. those that do not fall under the definition of “serious” incidents in section 5 above, shall be completed in IRIS within seven days from the incident date.

7.2 The Operator shall ensure all incident reporting on the IRIS system include all mandatory information.

8. WITHDRAWAL OF SERVICES

8.1 All exceptional occurrences that result in a service withdrawal being considered necessary for security reasons or any other reason must be brought to the attention of CentreComm immediately, in accordance with the network operations's procedure for dealing with service withdrawals.

For "out-of-hours" assistance and reporting please contact:

LONDON BUSES 24-HOUR EMERGENCY COMMUNICATIONS CENTRE

"CENTRECOMM"

TEL NO: 0844 251 0160 (option 3)

E-MAIL: ndm@tfl.gov.uk

Route B12

Route Risk Assessment

Erith, Bexley Road

To

Joydens Wood Loop

189-352

Dated: 21 January 2017
Review date: 21 January 2019

This information has been designed as a guide for all staff members and is a reflection of the company's ongoing commitment to Health & Safety.

This information has been produced to remind each and every member of staff of the correct procedures to follow when in service and not in service (light running).

It is extremely important that all members of staff READ and UNDERSTAND the information contained in this guide.

Normal Vehicle Type	Persons Exposed to Hazards
Single Decker	• Drivers and other employees as a result of collision or assault. • Passengers as a result of collision, slip, trips or falls. • Members of the public / pedestrians / contractors as a result of collision. • Other road users, such as cyclists/motor cyclists as a result of collision.

Risk Rating Matrix		Likelihood					Residual Risk Rating
		Very Low / Very Unlikely / Rarely or never occurs (1)	Low / Unlikely / occurs occasionally (2)	Medium / Fairly Likely / occurs more than occasionally (3)	High / Likely / occurs regularly (4)	Very High / Certain / occurs very frequently (5)	Score 16-25 HIGH RISK Cease activity immediately until further controls can be introduced. Escalate where significant resources are needed to mitigate the risk. Score 9-15 MEDIUM RISK Implement existing controls, monitor regularly and try to improve further. Score 1-8 LOW RISK No further action required but ensure controls are maintained.
Severity	Superficial Injury or discomfort, no first aid (1)	Low Risk (1)	Low Risk (2)	Low Risk (3)	Low Risk (4)	Low Risk (5)	
	Minor Injury or Illness, first aid required (2)	Low Risk (2)	Low Risk (4)	Low Risk (6)	Low Risk (8)	Medium Risk (10)	
	Injury or Illness requiring medical attention (3)	Low Risk (3)	Low Risk (6)	Medium Risk (9)	Medium Risk (12)	Medium Risk 15)	
	RIDDOR reportable / Major Injury or Illness (4)	Low Risk (4)	Low Risk (8)	Medium Risk (12)	High Risk (16)	High Risk (20)	
	Fatal Injury to one or more persons (5)	Low Risk (5)	Medium Risk (10)	Medium Risk (15)	High Risk (20)	High Risk (25)	

Location	Hazards	Risk no Controls			Controls/Actions Required	Residual Risk Rating		
		S	L	R		S	L	R
Generic 1. Entering/exiting the garage 2. Tube stations on route 3. Schools on route 4. Shopping areas	Pedestrians/road users/cyclists Pedestrians/road users/cyclists Young children/parked vehicles/cyclists Pedestrians looking the opposite way to oncoming traffic/unexpected actions of pedestrians	4	3	1	PCV licence holders. BTEC training for drivers. Driving standards as per Highway Code. Route learning. CCTV.	4	1	4

CONTROL MEASURES: The route has been assessed by the Risk Management Department, they have identified incident hotspots and produced this Risk Assessment booklet in conjunction.

This booklet highlights these potential incident hotspots and offers advice to drivers, where possible, to help them deal with such hazards.

The Risk Management Department has identified any areas of the route infrastructure that are deemed to represent an undue hazard.

The Risk Management Department keeps a database that will log all incidents and provide thorough analysis.

ACTION REQUIRED FOR THESE LOCATIONS:
All hotspots to be highlighted in the Route Risk Assessment information.
Additional advice to be given to drivers where appropriate.

SUMMERHOUSE DRIVE

- Residential area – look out for pedestrians at all times.
- Take care when moving in and out of bus stops – check your mirrors.
- Look out for cyclists.
- Watch your speed.
- Allow vulnerable passengers to be seated before moving away from the bus stop.
- Look out for vehicles emerging from side roads/driveways.

Risk Rating Medium 5-9

Dated: 21 January 2017
Review date: 21 January 2019

BIRCHWOOD ROAD

- Take care when moving in and out of bus stops – check your mirrors.
- Allow vulnerable passengers time to be seated before moving off from the stop.
- Look out for cyclists.
- Watch your speed.
- Be aware of vehicles emerging from side roads and driveways.
- Take care when passing parked vehicles as vehicles sometimes park on the roadside/grass verge.

Risk Rating Medium Risk 5-9

Dated: 21 January 2017
Review date: 21 January 2019

OLD BEXLEY LANE

- Check mirrors when moving in and out of bus stops.
- Allow vulnerable passengers to be seated before moving away from the bus stop.
- Look out for cyclists at all times.
- Road can narrow in places– proceed with caution.
- Slow down on approach to pedestrian crossings.

Risk Rating Medium Risk 5-9

Dated: 21 January 2017
Review date: 21 January 2019

NORTH CRAY ROAD

- Residential area – proceed with caution.
- Road can narrow due to parked vehicles.
- Check mirrors when entering and leaving bus stops, look out for vehicles overtaking your vehicle.
- Be aware of cyclists at all times.
- Allow vulnerable passengers time to be seated before moving off from the stop.

Risk Rating Medium Risk 5-9

BOURNE ROAD

- Look out for pedestrians, especially children, on approach to local shopping area.
- Road can narrow in places due to parked vehicles, proceed with caution.
- Be aware of cyclists at all times.
- Check mirrors when approaching and leaving bus stops.
- Allow vulnerable passengers time to be seated before moving off from the stop.

Risk Rating Medium Risk 5-9

GRAVEL HILL

- Check mirrors when moving into and out of bus stops.
- Look out for vehicles emerging from side roads and driveways.
- Allow vulnerable passengers to be seated prior to moving off from the stop.
- Proceed with caution on approach to **Gravel Hill Primary School.**
- Look out for cyclists.

Risk Rating Medium Risk 5-9

Dated: 21 January 2017
Review date: 21 January 2019

MARKET PLACE/FRISWELL PLACE

- On approach to shopping area proceed with caution and look out for pedestrians who may be rushing or distracted.
- When leaving and exiting – ensure you check mirrors and be aware of your surroundings.
- Look out for cyclists.
- Allow vulnerable passengers to be seated prior to moving off from the stop.

Risk Rating Medium Risk 5-9

BEXLEYHEATH BROADWAY

- Shopping area – proceed with caution.
- Area can be busy with pedestrians' – watch your speed at all times and check your mirrors.
- Allow vulnerable passengers to be seated prior to moving off from the stop.
- Look out for cyclists.
- Check mirrors when moving into and out of bus stops – bus stops can become very busy.
- Look out for vehicles moving off from parking spaces.

Risk Rating Medium Risk 5-9

Dated: 21 January 2017
Review date: 21 January 2019

AVENUE ROAD

- Residential area – proceed with caution.
- Look out for cyclists.
- Check mirrors when moving into and out of bus stops.
- Look out for vehicles emerging from driveways/side roads.
- Proceed with caution on approach to **Bexleyheath Station** – look out for pedestrians who may be rushing or distracted.
- Proceed with caution on approach to local shops.

Risk Rating Medium Risk 5-9

Dated: 21 January 2017
Review date: 21 January 2019

BEDONWELL ROAD

- Residential area – proceed with caution.
- Look out for cyclists.
- Check mirrors when moving into and out of bus stops.
- Slow down on approach to **Belmont Primary School** – look out for pedestrians, especially children, who may be rushing or distracted.
- Look out for vehicles emerging from driveways/side roads.

Risk Rating Medium Risk 5-9

Dated: 21 January 2017
Review date: 21 January 2019

LIGHT RUNNING

Route A – Dartford Depot to Erith Bus Stand

Central Road, Millpond Road, Victoria Road, Burnham Road, Thames Road, Northend Road, South Road, Queens Road, James Watt Way, High Street, Pier Road, Colebrook Street, Wharfside Close, Bexley Road, Erith Bus Stand.

DO NOT CHANGE UNLESS INSTRUCTED TO DO SO BY YOUR CONTROL TEAM

Route B – Dartford Depot to Summerhouse Drive

Central Road, Millpond Road, Hythe Street, Home Gardens, High Street/Market Street, Lowfield Street, Princes Road, Shepherds Lane, Old Bexley Lane, Oakfield Lane, Leyton Cross Road, Birchwood Road, Summerhouse Drive.

DO NOT CHANGE UNLESS INSTRUCTED TO DO SO BY YOUR CONTROL TEAM

BE AWARE OF LOW HANGING TREES AND REPORT ACCORDINGLY

If you have any questions or concerns about this route please contact a member of your garage management team.

SAFER
planning for incident-free journeys

189-366

Dated: 21 January 2017
Review date: 21 January 2019

Route 160

Route Risk Assessment

Catford, Thomas Lane

To

Sidcup Station

189-367

Dated: 15 September 2018
Review date: 15 September 2020

This information has been designed as a guide for all staff members and is a reflection of the company's ongoing commitment to Health & Safety.

This information has been produced to remind each and every member of staff of the correct procedures to follow when in service and not in service (light running).

It is extremely important that all members of staff READ and UNDERSTAND the information contained in this guide.

Normal Vehicle Type	Persons Exposed to Hazards
Double Decker	• Allow vulnerable passengers time to be seated before moving off from bus stop. • Drivers and other employees as a result of collision or assault. • Passengers as a result of collision, slip, trips or falls. • Members of the public / pedestrians / contractors as a result of collision. • Other road users, such as cyclists / motor cyclists as a result of collision.

Risk Rating Matrix		Likelihood					Residual Risk Rating
		Very Low / Very Unlikely / Rarely or never occurs (1)	Low / Unlikely / occurs occasionally (2)	Medium / Fairly Likely / occurs more than occasionally (3)	High / Likely / occurs regularly (4)	Very High / Certain / occurs very frequently (5)	Score 16-25 HIGH RISK Cease activity immediately until further controls can be introduced. Escalate where significant resources are needed to mitigate the risk. Score 9-15 MEDIUM RISK Implement existing controls, monitor regularly and try to improve further. Score 1-8 LOW RISK No further action required but ensure controls are maintained.
Severity	Superficial Injury or discomfort, no first aid (1)	Low Risk (1)	Low Risk (2)	Low Risk (3)	Low Risk (4)	Low Risk (5)	
	Minor Injury or Illness, first aid required (2)	Low Risk (2)	Low Risk (4)	Low Risk (6)	Low Risk (8)	Medium Risk (10)	
	Injury or Illness requiring medical attention (3)	Low Risk (3)	Low Risk (6)	Medium Risk (9)	Medium Risk (12)	Medium Risk 15)	
	RIDDOR reportable / Major Injury or Illness (4)	Low Risk (4)	Low Risk (8)	Medium Risk (12)	High Risk (16)	High Risk (20)	
	Fatal Injury to one or more persons (5)	Low Risk (5)	Medium Risk (10)	Medium Risk (15)	High Risk (20)	High Risk (25)	

Location	Hazards	Risk no Controls			Controls/Actions Required	Residual Risk Rating		
		S	L	R		S	L	R
Generic 1. Entering/exiting the garage 2. Tube stations on route 3. Schools on route 4. Shopping areas	Pedestrians/road users/cyclists Pedestrians/road users/cyclists Young children/parked vehicles/cyclists Pedestrians looking the opposite way to oncoming traffic/unexpected actions of pedestrians	4	3	1	PCV licence holders. BTEC training for drivers. Driving standards as per Highway Code. Route learning. CCTV.	4	1	4

CONTROL MEASURES: The route has been assessed by the Risk Management Department, they have identified incident hotspots and produced this Risk Assessment booklet in conjunction.

This booklet highlights these potential incident hotspots and offers advice to drivers, where possible, to help them deal with such hazards.

The Risk Management Department has identified any areas of the route infrastructure that are deemed to represent an undue hazard.

The Risk Management Department keeps a database that will log all incidents and provide thorough analysis.

ACTION REQUIRED FOR THESE LOCATIONS:
All hotspots to be highlighted in the Route Risk Assessment information.
Additional advice to be given to drivers where appropriate.

JUBILEE WAY

- Residential area, proceed with caution.
- Check your mirrors when moving into and out of bus stops.
- Look out for cyclists.
- Vehicles may move from driveways without looking – be vigilant at all times.
- Slow down on approach to **Sidcup Station** and look out for pedestrians who may be rushing or distracted.
- Approach bend in road at low speed and with caution.

Risk Rating Medium Risk 5-9

STATION ROAD

- Check mirrors when moving into and out of bus stops.
- Allow vulnerable passengers to be seated prior to moving off from the stop, always check door area before closing.
- Local shopping area – proceed with caution and look out for pedestrians who may be rushing or distracted.
- On approach to residential areas look out for vehicles merging from side roads and driveways.
- Slow down on approach to **West Lodge Preparatory School** – look out for pedestrians, especially children, who may be rushing or distracted.

Risk Rating Medium Risk 5-9

Dated: 15 September 2018
Review date: 15 September 2020

CHISLEHURST ROAD

- Allow vulnerable passengers to be seated before moving off from bus stops.
- Residential area – look out for vehicles reversing from driveways.
- Look out for cyclists at all times.
- On approach to local shopping areas, check your speed and look out for pedestrians who may be rushing or distracted.
- Slow down on approach to **St Mary's and St Joseph's Catholic School.** Look out for pedestrians, especially students, who may be rushing or distracted.
- Watch your speed.

Risk Rating Medium Risk 5-9

PERRY STREET

- Allow vulnerable passengers to be seated prior to moving away from the bus stop.
- Check your mirrors when moving off from bus stops.
- Report any low hanging trees that can be hazardous for other vehicles.
- Vehicles may stop suddenly – keep your distance from the vehicle in front.
- Road can narrow in places, proceed with caution.
- Look out for vehicles emerging from side roads and driveways.
- Look out for cyclists.

Risk Rating Medium Risk 5-9

CHISLEHURST HIGH STREET

- Check mirrors when moving into and out of bus stops.
- Allow vulnerable passengers to be seated prior to moving off from bus stops.
- Approach pedestrian crossings with caution.
- Area can be busy with shoppers, proceed with caution and low speed at all times.
- Look out for vehicles reversing from parking bays.
- Look out for cyclists at all times.

Risk Rating Medium Risk 5-9

EDGEBURY

- Residential area – look out for vehicles reversing from driveways.
- Check mirrors when moving into and out of bus stops.
- Look out for oncoming vehicles.
- On approach to **Edgebury Primary School,** proceed with caution and look out for school children, who may be rushing or distracted.
- Look out for cyclists at all times.
- Take care when overtaking parked vehicles.

Risk Rating Medium Risk 5-9

Dated: 15 September 2018
Review date: 15 September 2020

FOOTSCRAY ROAD

- Take care on approach to **New Eltham Station** – look out for pedestrians who may be rushing or distracted.
- Road can narrow in places, proceed with caution.
- Look out for vehicles emerging from side roads and parked positions.
- Slow down on approach to **Wyborne Primary School** and look out for pedestrians, especially children, who may be rushing or distracted.

Risk Rating Medium Risk 5-9

Dated: 15 September 2018
Review date: 15 September 2020

ELTHAM HIGH STREET

- Take care when proceeding through local shopping area – look out for pedestrians who may be rushing or distracted.
- Allow vulnerable passengers to be seated before moving away from bus stops.
- Check mirrors before moving into and out of bus stops.
- Look out for vehicles moving from parking spaces.
- Take care when proceeding through narrow sections of road, due to parked cars, allow yourself space and time to proceed.

Risk Rating Medium Risk 5-9

ELTHAM HILL

- Look out for cyclists in cycle lane when passing parked vehicles.
- Look out for vehicles emerging from side roads.
- Slow down on approach to **Eltham High School**, look out for students who may be rushing or distracted.

Risk Rating Medium Risk 5-9

Dated: 15 September 2018
Review date: 15 September 2020

WESTHORNE AVENUE

- Allow vulnerable passengers to be seated before moving away from bus stops.
- Check mirrors before moving into and out of bus stops.
- Look out for vehicles moving off from parking spaces.
- Look out for cyclists at all times.

Risk Rating Medium Risk 5-9

Dated: 15 September 2018
Review date: 15 September 2020

LIGHT RUNNING

Route A – Dartford Garage to Thomas Lane Bus Stand
Central Road, Millpond Road, Hythe Street, Home Gardens, High Street/Market Street, Lowfield Street, Princes Road, Shepherds Lane, Old Bexley Lane, A2/Rochester Way, Westhorne Avenue, St Mildreds Road, Brownhill Road, Plassey Road, Sangley Road, Rushey Green, Catford Road, Doggett Road, Holbeach Road**, Thomas Lane Bus Stand**

DO NOT CHANGE UNLESS INSTRUCTED TO DO SO BY YOUR CONTROL TEAM

Route B – Dartford Garage to Sidcup Station

Central Road, Millpond Road, Hythe Street, Home Gardens, High Street/Market Street, Lowfield Street, Princes Road, Shepherds Lane, Old Bexley Lane, A2/Rochester Way, Danson Interchange, Blendon Road, Penhill Road, Footscary Lane, Faraday Avenue, Jubilee Way,

Sidcup Station Bus Stand

BE AWARE OF LOW HANGING TREES AND REPORT ACCORDINGLY

If you have any questions or concerns about this route please contact a member of your garage management team

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189-381

Dated: 15 September 2018
Review date: 15 September 2020

Home
Safety culture information
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Safety Performance Indicators

Safety Performance Indicators	
Description	• Measures of safety performance, eg. RIDDOR reportable incidents; loss time injuries etc. • Key indicators of aspects of safety culture, eg. number of safety tours performed; safety observations made; near misses reported etc.
Advantages	• Selected leading indicators can be very useful for monitoring key inputs that will enhance safety culture, eg. number of safety tours, safety observations. • Safety performance outcome (or 'lagging') indicators' (eg. Lost Time Injuries, etc.) give insights into the current safety culture at a macro level. • Selected combinations of indicators can be very useful to overall monitoring of an organisation's safety culture – can help to prompt more detailed investigations.
Limitations	• Do not reveal underlying attitudes at all. • Do not readily identify the underlying problems – just show the outputs. • Do not give any insights into how to improve.
When and how to use	• Should be a key part of the overall safety monitoring arrangements. • Can prompt need for further investigations and/or action.

189-382

FRAMEWORK AGREEMENT NO: QC0009

THIS FRAMEWORK AGREEMENT is dated the .....First.....day of ....April..... 2011

BETWEEN:

1. LONDON BUS SERVICES LIMITED (and its successors in title) whose registered office is at Windsor House, 42 – 50 Victoria Street, London, SW1H 0TL ("the Corporation") of the one part; and

2. METROLINE TRAVEL LIMITED of company number 2328401 whose registered office is at ComfortDelGro House, 329 Edgware Road, Cricklewood, London NW2 6JP (" Operator") of the other part.

WHEREAS:

(1) The Mayor and the Greater London Authority (the "Authority") have a duty to develop and implement policies for the promotion and encouragement of safe, integrated, efficient and economic transport facilities and services to, from and within Greater London under Section 141 of the Greater London Authority Act 1999 (the "GLA Act").

(2) Transport for London ("TfL"), a body corporate has functions conferred or imposed on it by the GLA Act which it exercises for the purpose of facilitating the discharge by the Mayor and the Authority of the duties referred to in recital (1) above.

(3) The Corporation as a subsidiary of TfL has powers under Section 169(2) of the GLA Act to enter into transport subsidiary agreements with any person for the provision of any public transport services.

(4) The Corporation and the Operator (the "Parties") originally entered into a framework agreement on [date] and pursuant to a deed between the Parties have subsequently agreed to enter into this amended and restated framework agreement (the "Framework Agreement") to govern the terms upon which the Operator provides or will provide certain bus passenger services for the Corporation, the particulars of which are or will be contained in agreements for specific routes the ("Route Agreements").

(5) The Framework Agreement and any Route Agreements are or will be London local services agreements in accordance with Section 182(1) of the GLA Act.

NOW THIS DEED WITNESSETH:

1. FRAMEWORK AGREEMENT AND ROUTE AGREEMENT

1.1 The purpose of this Framework Agreement is to:

1.1.1 provide a mechanism whereby the Parties may enter into Route Agreements;

1.1.2 provide the framework to administer each Route Agreement; and

1.1.3 set out the obligations of the Parties.

1.2 This Framework Agreement includes this Framework Agreement together with Annex A, Annex B and Annex C attached hereto.

1.3 Whenever the Parties enter into a Route Agreement, pursuant to this Framework Agreement, the Route Agreement shall comprise Annex A (completed and/or amended and/or with such other documents incorporated, as appropriate), Annex B and Annex C of this Framework Agreement as if they were incorporated in the Route Agreement provided that only Part 1 of Annex C shall be legally binding and all other documents contained in Annex C are for guidance and information only.

1.4 The Corporation reserves the right at any time to make any changes to all or any part of Annex C provided that in relation to Part 1 only, the Corporation shall comply with any express conditions which may be set out in the Framework Agreement relating to such changes.

1.5 In each Route Agreement this Framework Agreement shall be referred to as the Framework Agreement.

1.6 This Framework Agreement shall commence on the date hereof and shall continue until 31 December 2014 unless terminated earlier provided always that the Corporation reserves the right exercisable at its sole discretion to extend the Framework Agreement by a further period of up to 2 years by notifying the Operator at least one month prior to the expiry of the period specified in this clause 1.6.

1.7 Termination or expiry of this Framework Agreement shall be without prejudice to any rights accruing to the Parties under this Framework Agreement. For the avoidance of doubt, the expiry (but not termination) of this Framework Agreement shall not affect any Route Agreement which is in force at the date of expiry of this Framework Agreement, and any and all such Route Agreements shall continue in force and effect in accordance with their terms.

2. CONSIDERATION

In consideration of the sum of £5 (five pounds) paid by the Corporation to the Operator (the receipt and sufficiency of which is hereby acknowledged by the Operator) the Operator hereby agrees to observe and perform the terms and conditions of this Framework Agreement.

3. ASSIGNMENT, NOVATION AND DISPOSALS

This Framework Agreement is personal to the Operator who shall not assign, novate or otherwise dispose in whole or in part of its rights hereunder nor assign, sub-contract or otherwise delegate in whole or in part any of its obligations hereunder without the prior written consent of the Corporation (which may for the avoidance of doubt be granted subject to such conditions as the Corporation considers appropriate). For the avoidance of doubt a disposal shall be deemed to

include but not be limited to any reorganisation of the Operator which would affect the Operator's ability to perform any of its obligations under this Framework Agreement including without limitation any reorganisation which affects the resources, technical competence and/or financial standing (or the technical and financial resources available) to enable the Operator to perform its obligations.

4. VARIATIONS

4.1 The Corporation may vary this Framework Agreement with the written consent of the Operator save where this Framework Agreement provides that variation or adjustments may be made by the Corporation and the consent of the Operator is not expressly required in which case the Corporation may vary this Framework Agreement on giving written notice to the Operator.

4.2 A variation shall take effect:

4.2.1 from the date specified by the Corporation in the written notice to the Operator where the Operator's written consent to the variation is not required;

4.2.2 from the date agreed by the Corporation and the Operator where the Operator's written consent is required; or

4.2.3 forthwith where no date is specified.

5. TERMINATION

5.1 It shall be a default event (a "Default Event") in relation to the Operator if:

5.1.1 an order is made by a court of competent jurisdiction, or a resolution is passed, for the dissolution or administration of the Operator (otherwise than in the course of a reorganisation or restructuring previously approved in writing by the Corporation);

5.1.2 any step is taken to appoint a manager, receiver, administrator, trustee or other similar officer in respect of any assets;

5.1.3 the Operator convenes a meeting of its creditors or makes or proposes any arrangement or composition with, or any assignment for the benefit of, its creditors;

5.1.4 the Operator ceases or threatens to cease to carry on trading or to carry on any part of its operation;

5.1.5 the Operator, its employees, agents or contractors make, offer or promise any improper loan, fee, reward or advantage of any kind to any employee, agent or contractor of the Corporation;

5.1.6 the Operator fails to obtain the Corporation's prior written approval to a Change of Control in accordance with clause 21;

5.1.7 the Operator commits any persistent or material breach of this Framework Agreement and in the case of such a breach which is capable of remedy fails to remedy the same within 14 days of notification of the breach by the Corporation (and in which notice the Corporation expresses its intention to exercise its rights under this sub-clause);

5.1.8 Not used

5.1.9 the Operator fails to provide a parent company guarantee in accordance with clause 12; or

5.1.10 the Operator fails to obtain the Corporation's written consent prior to an assignment, novation, sub-contract, delegation or any other disposal in accordance with clause 3.

5.2 If a Default Event arises the Corporation may terminate this Framework Agreement by notice in writing giving such period of notice as the Corporation considers appropriate in the circumstances.

5.3 Where a Default Event occurs, the Corporation may in its absolute discretion elect to terminate all or some of the Route Agreements effective under this Framework Agreement, and this Framework Agreement and any Route Agreements not so terminated shall continue in full force and effect.

5.4 The termination of this Framework Agreement under this clause 5 shall be without prejudice to any rights of either Party in respect of any antecedent breach of contract by the other Party.

5.5 On termination of this Framework Agreement, the Corporation shall not be liable to the Operator for any loss of profit, loss of contract or any other losses and/or expenses of whatsoever nature arising out of or in connection with such termination.

6. SUMS RECOVERABLE FROM OR PAYABLE BY THE OPERATOR

6.1 Whenever under this Framework Agreement or under any Route Agreement any sum of money shall be recoverable from or payable by the Operator, the same may be deducted from any sum then due or which at any time thereafter may become due to the Operator under this or any other contract with the Corporation.

6.2 Exercise by the Corporation of its rights under this clause 6 shall be without prejudice to any other rights or remedies available to the Corporation under this Framework Agreement or any Route Agreement or at common law.

7. ARBITRATION

If any claim, question, dispute or difference whatsoever shall arise between the Parties out of or in relation to or in connection with this Framework Agreement or any Route Agreement either Party shall as soon as reasonably practicable give notice to the other in writing of the existence of such claim, question, dispute or

difference specifying its nature and the point at issue and if the same shall not be resolved within a period of ninety (90) days from the date of the notice it may be referred in writing by either Party to be determined by a sole arbitrator (the "Arbitrator") who shall be appointed by mutual agreement or failing agreement by the President of The Chartered Institute of Arbitrators of England and Wales on the application of either Party. This submission shall be deemed to be a submission to arbitration within the meaning of the Arbitration Act 1996 or any statutory modification or amendment thereof and the award of the Arbitrator shall be final and binding on the Parties. The law governing this arbitration agreement, the curial law and every reference to arbitration hereunder shall be English Law. For the purposes of limitation of action the arbitral proceedings shall be deemed to have commenced on the service of the written reference to arbitration referred to in this clause 7.

8. STATUTORY PROVISIONS

Except where the context requires otherwise reference to any statute, enactment, order, regulation or other similar instrument shall be construed as a reference to the statute, enactment, order, regulation or instrument as amended or re-enacted by any subsequent statute, enactment, order, regulation or instrument and shall include all statutory instruments or orders made pursuant to it whether replaced before or after the date of this Framework Agreement;.

9. WAIVER

9.1 No failure or delay on the part of either Party to exercise any right or remedy under this Framework Agreement shall be construed or operate as a waiver thereof, nor shall any single or partial exercise of any right or remedy preclude the further exercise of such right or remedy as the case may be.

9.2 No waiver by either Party of a failure or failures by the other Party to perform any provision of this Framework Agreement shall operate or be construed as a waiver in respect of any other or further failure whether of a like or different character.

10. JURISDICTION

10.1 Without prejudice to clause 7 this Framework Agreement shall be governed by and construed in accordance with the law of England and Wales.

10.2 Without prejudice to any of the Parties' rights under this Framework Agreement or any Route Agreement, the Parties shall continue to perform their obligations under this Framework Agreement or any Route Agreement pending the resolution of any claim, question, dispute or difference.

11. CONSTRUCTION

11.1 In this Framework Agreement unless the context otherwise requires:

11.1.1 references to the singular shall include the plural and vice versa and references to the masculine shall include the feminine and vice versa;

11.1.2 references to clauses shall be to the clauses contained in this Framework Agreement, references to Schedules shall be to the schedules in Annex A or B as the context so requires and references to paragraphs shall be to the relevant paragraph of the Schedule in which the reference occurs;

11.1.3 headings are inserted for convenience only and shall not affect its interpretation or construction; and

11.1.4 capitalised terms shall have the meanings assigned to them in clause 1 of the Route Agreement terms and conditions.

11.1.5 except as otherwise expressly provided in any Route Agreement if there is any inconsistency between this Framework Agreement, the Schedules hereto , any Route Agreement or any other document referred to in or incorporated into this Framework Agreement or any Route Agreement the order of priority for the purposes of construction is:

11.1.5.1 each Route Agreement;

11.1.5.2 this Framework Agreement;

11.1.5.3 the Schedules to this Framework Agreement;

11.1.5.4 any other document referred to in or incorporated by reference into this Framework Agreement or any Route Agreement.

12. PARENT COMPANY GUARANTEE

12.1 Subject to clause 12.2, the Operator shall within 14 days of any request by the Corporation at any time during the continuance of this Framework Agreement provide to the Corporation a parent company guarantee acceptable to the Corporation and if also requested, a legal opinion both substantially in the form set out in Schedule XV.

12.2 The Operator shall not be required to provide a parent company guarantee in accordance with clause 12.1 until the Operator has entered into (or is about to enter into) a Route Agreement pursuant to this Framework Agreement.

13. ENTIRE AGREEMENT

13.1 Subject to clause 13.2:

13.1.1 this Framework Agreement (and any Route Agreements to which the Operator is a Party) and all documents referred to in the same, contain all of the terms which the Parties have agreed relating to the subject matter of this Framework Agreement and any Route Agreement and supersede and extinguish any prior drafts agreements undertakings representations

warranties and arrangements of any nature whatsoever whether or not in writing relating to the provision of the Services under Route Agreements. Neither Party has been induced to enter into this Agreement by a statement which it does not contain; and

13.1.2 (without prejudice to the Operator's obligations under this Framework Agreement and the Route Agreement) the Operator is responsible for and shall make no claim against the Corporation in respect of any misunderstanding affecting the basis of the Operator's tender in respect of this Framework Agreement and/or Route Agreement and any incorrect or incomplete information howsoever obtained.

13.2 Nothing in this clause 13 excludes any liability which one Party would otherwise have in respect of any statement it has made fraudulently to the other Party.

14. VALIDITY, LEGALITY, ENFORCEABILITY

If any of the provisions of this Framework Agreement (in whole or in part) is or becomes invalid, illegal or unenforceable, the validity, legality or enforceability of the remaining provisions shall not in any way be affected or impaired provided always that if in the Corporation's reasonable opinion such a provision is so fundamental as to prevent the accomplishment of the purpose of this Framework Agreement, the Corporation and the Operator shall immediately commence good faith negotiations to remedy such invalidity.

15. NOTICES

15.1 Any notice or other communication affecting the Framework Agreement or which is required to be given under the Framework Agreement shall in the case of:

15.1.1 the Corporation be addressed to the Performance Director Palestra, 10th Floor, 197 Blackfriars Road, London SE1 8NJ or such other person or address as the Corporation may from time to time specify in writing to the Operator; and

15.1.2 the Operator be addressed to The Managing Director at the address set out at the front of this Framework Agreement or such other person or address as the Operator may from time to time specify in writing to the Corporation.

15.2 Any notice or other communication to be given under this Framework Agreement shall be in writing and shall be deemed to have been duly given if delivered by hand or by pre-paid first class post or by facsimile (or by electronic mail where expressly provided for in this Framework Agreement) to a Party at the address set out in clause 15.1 for such Party.

15.3 In the event of any postal or other strike or industrial action affecting post or communications in the United Kingdom, notices shall be given personally or by facsimile (or by electronic mail where expressly provided for in this Framework Agreement).

15.4 Any Notices or other communications shall be deemed to have been received by the addressee two Working Days following the date of despatch if the notice or other document is sent by pre-paid first class post, or the next Working Day after delivery is sent by hand or facsimile (or the next Working Day after being opened by the addressee if sent by electronic mail).

15.5 Notices and communications not governed by this clause 15 may be given in such manner as the Parties may from time to time agree.

16. PUBLICATION OF TENDER RESULTS

The Operator acknowledges and agrees that the results of any tender process (including without limitation any information relating to tender prices submitted by the Operator) in which it participates for the award of any Route Agreement pursuant to this Framework Agreement may be made publicly available by the Corporation and/or disclosed to any third party who may request such information, whether or not the Operator is awarded such, or any other, Route Agreement.

17. STAFF PASS AGREEMENT

17.1 Subject to clause 17.2, the Operator shall upon request by the Corporation, become a party to a staff pass agreement (the form of which will be provided by the Corporation and will be substantially in accordance with the principles contained in "Bus Operator Passes and Identity Cards" from time to time in force (current version set out at Annex C) between any member of the TfL Group and certain other parties and the Operator shall comply with the obligations contained in such an agreement.

17.2 As at the date of this Framework Agreement if the Operator is not already a party to a staff pass agreement (by virtue of providing bus services under agreement with the Corporation which are not subject to this Framework Agreement), the Operator shall not be required to become a party to any staff pass agreement until the Operator enters into a Route Agreement with the Corporation.

18. CONTRACTS (RIGHTS OF THIRD PARTIES) ACT 1999

Any third party who is not a Party to this Framework Agreement shall have no right under the Contracts (Rights of Third Parties) Act 1999 ("the Third Party Act") to enforce any term of this Framework Agreement notwithstanding that any such term may purport to confer or may be construed as conferring a benefit on such third party. This does not affect any right or remedy of such third party which exists or is available apart from the Third Party Act.

19. NON-EXCLUSIVITY

This Framework Agreement shall not be an exclusive arrangement between the Parties either as to the contracts that the Parties shall enter into between

themselves or as to the Corporation being bound to offer Route Agreements to the Operator in preference to any other contractor or operator or at all.

20. BEST VALUE

The Operator acknowledges that TfL is a best value authority for the purposes of Section 1 of the Local Government Act 1999 and as such TfL must make arrangements to secure continuous improvement in the way its functions are exercised, having regard to a combination of economy, efficiency and effectiveness. The Operator agrees where requested by the Corporation to participate in any related reviews and negotiate in good faith (acting reasonably) any changes to this Framework Agreement and any Route Agreement entered into pursuant to this Framework Agreement in order for TfL and/or the Corporation to achieve best value.

21. CHANGE OF CONTROL OR OWNERSHIP OF THE OPERATOR

21.1 Without prejudice to clause 21.2, the Operator shall immediately inform the Corporation of any event that may give rise to a Change of Ownership and or a future Change of Ownership and provide such information as the Corporation reasonably requires in relation to such a Change of Ownership.

21.2 The Operator shall obtain the Corporation's written approval prior to any Change of Control of the Operator during the duration of the Framework Agreement and such approval may at the Corporation's discretion be:

21.2.1 given with or without any conditions being attached; or

21.2.2 denied on any grounds.

21.3 The Operator shall notify the Corporation as soon as it becomes aware of a proposed Change of Control and shall provide the Corporation with all information (within its possession) relating to the proposed transferee.

21.4 For the avoidance of doubt if the Corporation gives its approval under clause 21.2.1 subject to conditions being attached and any condition is not satisfied in full the Corporation shall be entitled to withdraw its approval and approval shall be deemed to have been denied.

22. SURVIVAL

22.1 Clause 12 shall survive the expiry of this Framework Agreement until the later of the following:

22.1.1 expiry or termination of the last Route Agreement entered into pursuant to this Framework Agreement; or

22.1.2 the expiry or termination of any route agreement (substantially on the same terms and conditions as contained in Annex B) assigned or novated to the Operator.

22.2 Any other provisions which are intended expressly or impliedly to survive the termination or expiry of this Framework Agreement, including the provisions necessary to give effect to clause 22.1 shall survive the termination or expiry of his Framework Agreement.

IN WITNESS whereof the Parties hereto have caused this document to be executed and delivered as a Deed the day and year first above written.

Executed as a deed by)
LONDON BUS SERVICES LIMITED)
acting by a Director and the)
Secretary or two Directors

[redacted]
Director

[redacted]
Director/Secretary

Executed as a deed by
METROLINE TRAVEL LIMITED
acting by a Director and the
Secretary or two Directors

[redacted]
Director

[redacted]
Director/Secretary

OR

The common seal of)
METROLINE TRAVEL LIMITED)
was affixed to this deed in the) [seal to be affixed]
presence of:)

.....
Director

.....
Director/Secretary

FRAMEWORK AGREEMENT

FOR

THE PROVISION OF BUS SERVICES
IN GREATER LONDON

BETWEEN

LONDON BUS SERVICES LIMITED

AND

…….

FRAMEWORK AGREEMENT

CONTENTS

VOLUME 1

QUALITY INCENTIVE AND GROSS COST CONTRACT

FRAMEWORK AGREEMENT

CONTENTS

VOLUME 2

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FRAMEWORK AGREEMENT NO: ……..

THIS FRAMEWORK AGREEMENT is dated the .....day of 2011

BETWEEN:

1. LONDON BUS SERVICES LIMITED (and its successors in title) whose registered office is at Windsor House, 42 – 50 Victoria Street, London, SW1H 0TL ("the Corporation") of the one part; and

2. …….. of company number [ ] whose registered office is at …… ("the Operator") of the other part.

WHEREAS:

(1) The Mayor and the Greater London Authority (the "Authority") have a duty to develop and implement policies for the promotion and encouragement of safe, integrated, efficient and economic transport facilities and services to, from and within Greater London under Section 141 of the Greater London Authority Act 1999 (the "GLA Act").

(2) Transport for London ("TfL"), a body corporate has functions conferred or imposed on it by the GLA Act which it exercises for the purpose of facilitating the discharge by the Mayor and the Authority of the duties referred to in recital (1) above.

(3) The Corporation as a subsidiary of TfL has powers under Section 169(2) of the GLA Act to enter into transport subsidiary agreements with any person for the provision of any public transport services.

(4) The Corporation and the Operator (the "Parties") originally entered into a framework agreement on [date] and pursuant to a deed between the Parties have subsequently agreed to enter into this amended and restated framework agreement (the "Framework Agreement") to govern the terms upon which the Operator provides or will provide certain bus passenger services for the Corporation, the particulars of which are or will be contained in agreements for specific routes the ("Route Agreements").

(5) The Framework Agreement and any Route Agreements are or will be London local services agreements in accordance with Section 182(1) of the GLA Act.

NOW THIS DEED WITNESSETH:

1. FRAMEWORK AGREEMENT AND ROUTE AGREEMENT

1.1 The purpose of this Framework Agreement is to:

1.1.1 provide a mechanism whereby the Parties may enter into Route Agreements;

1.1.2 provide the framework to administer each Route Agreement; and

1.1.3 set out the obligations of the Parties.

1.2 This Framework Agreement includes this Framework Agreement together with Annex A, Annex B and Annex C attached hereto.

1.3 Whenever the Parties enter into a Route Agreement, pursuant to this Framework Agreement, the Route Agreement shall comprise Annex A (completed and/or amended and/or with such other documents incorporated, as appropriate), Annex B and Annex C of this Framework Agreement as if they were incorporated in the Route Agreement provided that only Part 1 of Annex C shall be legally binding and all other documents contained in Annex C are for guidance and information only.

1.4 The Corporation reserves the right at any time to make any changes to all or any part of Annex C provided that in relation to Part 1 only, the Corporation shall comply with any express conditions which may be set out in the Framework Agreement relating to such changes.

1.5 In each Route Agreement this Framework Agreement shall be referred to as the Framework Agreement.

1.6 This Framework Agreement shall commence on the date hereof and shall continue until 31 December 2014 unless terminated earlier provided always that the Corporation reserves the right exercisable at its sole discretion to extend the Framework Agreement by a further period of up to 2 years by notifying the Operator at least one month prior to the expiry of the period specified in this clause 1.6.

1.7 Termination or expiry of this Framework Agreement shall be without prejudice to any rights accruing to the Parties under this Framework Agreement. For the avoidance of doubt, the expiry (but not termination) of this Framework Agreement shall not affect any Route Agreement which is in force at the date of expiry of this Framework Agreement, and any and all such Route Agreements shall continue in force and effect in accordance with their terms.

2. CONSIDERATION

In consideration of the sum of £5 (five pounds) paid by the Corporation to the Operator (the receipt and sufficiency of which is hereby acknowledged by the Operator) the Operator hereby agrees to observe and perform the terms and conditions of this Framework Agreement.

3. ASSIGNMENT, NOVATION AND DISPOSALS

This Framework Agreement is personal to the Operator who shall not assign, novate or otherwise dispose in whole or in part of its rights hereunder nor assign, sub-contract or otherwise delegate in whole or in part any of its obligations hereunder without the prior written consent of the Corporation (which may for the avoidance of doubt be granted subject to such conditions as the Corporation considers appropriate). For the avoidance of doubt a disposal shall be deemed to

include but not be limited to any reorganisation of the Operator which would affect the Operator's ability to perform any of its obligations under this Framework Agreement including without limitation any reorganisation which affects the resources, technical competence and/or financial standing (or the technical and financial resources available) to enable the Operator to perform its obligations.

4. VARIATIONS

4.1 The Corporation may vary this Framework Agreement with the written consent of the Operator save where this Framework Agreement provides that variation or adjustments may be made by the Corporation and the consent of the Operator is not expressly required in which case the Corporation may vary this Framework Agreement on giving written notice to the Operator.

4.2 A variation shall take effect:

4.2.1 from the date specified by the Corporation in the written notice to the Operator where the Operator's written consent to the variation is not required;

4.2.2 from the date agreed by the Corporation and the Operator where the Operator's written consent is required; or

4.2.3 forthwith where no date is specified.

5. TERMINATION

5.1 It shall be a default event (a "Default Event") in relation to the Operator if:

5.1.1 an order is made by a court of competent jurisdiction, or a resolution is passed, for the dissolution or administration of the Operator (otherwise than in the course of a reorganisation or restructuring previously approved in writing by the Corporation);

5.1.2 any step is taken to appoint a manager, receiver, administrator, trustee or other similar officer in respect of any assets;

5.1.3 the Operator convenes a meeting of its creditors or makes or proposes any arrangement or composition with, or any assignment for the benefit of, its creditors;

5.1.4 the Operator ceases or threatens to cease to carry on trading or to carry on any part of its operation;

5.1.5 the Operator, its employees, agents or contractors make, offer or promise any improper loan, fee, reward or advantage of any kind to any employee, agent or contractor of the Corporation;

5.1.6 the Operator fails to obtain the Corporation's prior written approval to a Change of Control in accordance with clause 21;

5.1.7 the Operator commits any persistent or material breach of this Framework Agreement and in the case of such a breach which is capable of remedy fails to remedy the same within 14 days of notification of the breach by the Corporation (and in which notice the Corporation expresses its intention to exercise its rights under this sub-clause);

5.1.8 Not used

5.1.9 the Operator fails to provide a parent company guarantee in accordance with clause 12; or

5.1.10 the Operator fails to obtain the Corporation's written consent prior to an assignment, novation, sub-contract, delegation or any other disposal in accordance with clause 3.

5.2 If a Default Event arises the Corporation may terminate this Framework Agreement by notice in writing giving such period of notice as the Corporation considers appropriate in the circumstances.

5.3 Where a Default Event occurs, the Corporation may in its absolute discretion elect to terminate all or some of the Route Agreements effective under this Framework Agreement, and this Framework Agreement and any Route Agreements not so terminated shall continue in full force and effect.

5.4 The termination of this Framework Agreement under this clause 5 shall be without prejudice to any rights of either Party in respect of any antecedent breach of contract by the other Party.

5.5 On termination of this Framework Agreement, the Corporation shall not be liable to the Operator for any loss of profit, loss of contract or any other losses and/or expenses of whatsoever nature arising out of or in connection with such termination.

6. SUMS RECOVERABLE FROM OR PAYABLE BY THE OPERATOR

6.1 Whenever under this Framework Agreement or under any Route Agreement any sum of money shall be recoverable from or payable by the Operator, the same may be deducted from any sum then due or which at any time thereafter may become due to the Operator under this or any other contract with the Corporation.

6.2 Exercise by the Corporation of its rights under this clause 6 shall be without prejudice to any other rights or remedies available to the Corporation under this Framework Agreement or any Route Agreement or at common law.

7. ARBITRATION

If any claim, question, dispute or difference whatsoever shall arise between the Parties out of or in relation to or in connection with this Framework Agreement or any Route Agreement either Party shall as soon as reasonably practicable give notice to the other in writing of the existence of such claim, question, dispute or

difference specifying its nature and the point at issue and if the same shall not be resolved within a period of ninety (90) days from the date of the notice it may be referred in writing by either Party to be determined by a sole arbitrator (the "Arbitrator") who shall be appointed by mutual agreement or failing agreement by the President of The Chartered Institute of Arbitrators of England and Wales on the application of either Party. This submission shall be deemed to be a submission to arbitration within the meaning of the Arbitration Act 1996 or any statutory modification or amendment thereof and the award of the Arbitrator shall be final and binding on the Parties. The law governing this arbitration agreement, the curial law and every reference to arbitration hereunder shall be English Law. For the purposes of limitation of action the arbitral proceedings shall be deemed to have commenced on the service of the written reference to arbitration referred to in this clause 7.

8. STATUTORY PROVISIONS

Except where the context requires otherwise reference to any statute, enactment, order, regulation or other similar instrument shall be construed as a reference to the statute, enactment, order, regulation or instrument as amended or re-enacted by any subsequent statute, enactment, order, regulation or instrument and shall include all statutory instruments or orders made pursuant to it whether replaced before or after the date of this Framework Agreement;.

9. WAIVER

9.1 No failure or delay on the part of either Party to exercise any right or remedy under this Framework Agreement shall be construed or operate as a waiver thereof, nor shall any single or partial exercise of any right or remedy preclude the further exercise of such right or remedy as the case may be.

9.2 No waiver by either Party of a failure or failures by the other Party to perform any provision of this Framework Agreement shall operate or be construed as a waiver in respect of any other or further failure whether of a like or different character.

10. JURISDICTION

10.1 Without prejudice to clause 7 this Framework Agreement shall be governed by and construed in accordance with the law of England and Wales.

10.2 Without prejudice to any of the Parties' rights under this Framework Agreement or any Route Agreement, the Parties shall continue to perform their obligations under this Framework Agreement or any Route Agreement pending the resolution of any claim, question, dispute or difference.

11. CONSTRUCTION

11.1 In this Framework Agreement unless the context otherwise requires:

11.1.1 references to the singular shall include the plural and vice versa and references to the masculine shall include the feminine and vice versa;

11.1.2 references to clauses shall be to the clauses contained in this Framework Agreement, references to Schedules shall be to the schedules in Annex A or B as the context so requires and references to paragraphs shall be to the relevant paragraph of the Schedule in which the reference occurs;

11.1.3 headings are inserted for convenience only and shall not affect its interpretation or construction; and

11.1.4 capitalised terms shall have the meanings assigned to them in clause 1 of the Route Agreement terms and conditions.

11.1.5 except as otherwise expressly provided in any Route Agreement if there is any inconsistency between this Framework Agreement, the Schedules hereto , any Route Agreement or any other document referred to in or incorporated into this Framework Agreement or any Route Agreement the order of priority for the purposes of construction is:

11.1.5.1 each Route Agreement;

11.1.5.2 this Framework Agreement;

11.1.5.3 the Schedules to this Framework Agreement;

11.1.5.4 any other document referred to in or incorporated by reference into this Framework Agreement or any Route Agreement.

12. PARENT COMPANY GUARANTEE

12.1 Subject to clause 12.2, the Operator shall within 14 days of any request by the Corporation at any time during the continuance of this Framework Agreement provide to the Corporation a parent company guarantee acceptable to the Corporation and if also requested, a legal opinion both substantially in the form set out in Schedule XV.

12.2 The Operator shall not be required to provide a parent company guarantee in accordance with clause 12.1 until the Operator has entered into (or is about to enter into) a Route Agreement pursuant to this Framework Agreement.

13. ENTIRE AGREEMENT

13.1 Subject to clause 13.2:

13.1.1 this Framework Agreement (and any Route Agreements to which the Operator is a Party) and all documents referred to in the same, contain all of the terms which the Parties have agreed relating to the subject matter of this Framework Agreement and any Route Agreement and supersede and extinguish any prior drafts agreements undertakings representations

warranties and arrangements of any nature whatsoever whether or not in writing relating to the provision of the Services under Route Agreements. Neither Party has been induced to enter into this Agreement by a statement which it does not contain; and

13.1.2 (without prejudice to the Operator's obligations under this Framework Agreement and the Route Agreement) the Operator is responsible for and shall make no claim against the Corporation in respect of any misunderstanding affecting the basis of the Operator's tender in respect of this Framework Agreement and/or Route Agreement and any incorrect or incomplete information howsoever obtained.

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If any of the provisions of this Framework Agreement (in whole or in part) is or becomes invalid, illegal or unenforceable, the validity, legality or enforceability of the remaining provisions shall not in any way be affected or impaired provided always that if in the Corporation's reasonable opinion such a provision is so fundamental as to prevent the accomplishment of the purpose of this Framework Agreement, the Corporation and the Operator shall immediately commence good faith negotiations to remedy such invalidity.

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15.1 Any notice or other communication affecting the Framework Agreement or which is required to be given under the Framework Agreement shall in the case of:

15.1.1 the Corporation be addressed to the Performance Director Palestra, 10th Floor, 197 Blackfriars Road, London SE1 8NJ or such other person or address as the Corporation may from time to time specify in writing to the Operator; and

15.1.2 the Operator be addressed to The Managing Director at the address set out at the front of this Framework Agreement or such other person or address as the Operator may from time to time specify in writing to the Corporation.

15.2 Any notice or other communication to be given under this Framework Agreement shall be in writing and shall be deemed to have been duly given if delivered by hand or by pre-paid first class post or by facsimile (or by electronic mail where expressly provided for in this Framework Agreement) to a Party at the address set out in clause 15.1 for such Party.

15.3 In the event of any postal or other strike or industrial action affecting post or communications in the United Kingdom, notices shall be given personally or by facsimile (or by electronic mail where expressly provided for in this Framework Agreement).

15.4 Any Notices or other communications shall be deemed to have been received by the addressee two Working Days following the date of despatch if the notice or other document is sent by pre-paid first class post, or the next Working Day after delivery is sent by hand or facsimile (or the next Working Day after being opened by the addressee if sent by electronic mail).

15.5 Notices and communications not governed by this clause 15 may be given in such manner as the Parties may from time to time agree.

16. PUBLICATION OF TENDER RESULTS

The Operator acknowledges and agrees that the results of any tender process (including without limitation any information relating to tender prices submitted by the Operator) in which it participates for the award of any Route Agreement pursuant to this Framework Agreement may be made publicly available by the Corporation and/or disclosed to any third party who may request such information, whether or not the Operator is awarded such, or any other, Route Agreement.

17. STAFF PASS AGREEMENT

17.1 Subject to clause 17.2, the Operator shall upon request by the Corporation, become a party to a staff pass agreement (the form of which will be provided by the Corporation and will be substantially in accordance with the principles contained in "Bus Operator Passes and Identity Cards" from time to time in force (current version set out at Annex C) between any member of the TfL Group and certain other parties and the Operator shall comply with the obligations contained in such an agreement.

17.2 As at the date of this Framework Agreement if the Operator is not already a party to a staff pass agreement (by virtue of providing bus services under agreement with the Corporation which are not subject to this Framework Agreement), the Operator shall not be required to become a party to any staff pass agreement until the Operator enters into a Route Agreement with the Corporation.

18. CONTRACTS (RIGHTS OF THIRD PARTIES) ACT 1999

Any third party who is not a Party to this Framework Agreement shall have no right under the Contracts (Rights of Third Parties) Act 1999 ("the Third Party Act") to enforce any term of this Framework Agreement notwithstanding that any such term may purport to confer or may be construed as conferring a benefit on such third party. This does not affect any right or remedy of such third party which exists or is available apart from the Third Party Act.

19. NON-EXCLUSIVITY

This Framework Agreement shall not be an exclusive arrangement between the Parties either as to the contracts that the Parties shall enter into between

themselves or as to the Corporation being bound to offer Route Agreements to the Operator in preference to any other contractor or operator or at all.

20. BEST VALUE

The Operator acknowledges that TfL is a best value authority for the purposes of Section 1 of the Local Government Act 1999 and as such TfL must make arrangements to secure continuous improvement in the way its functions are exercised, having regard to a combination of economy, efficiency and effectiveness. The Operator agrees where requested by the Corporation to participate in any related reviews and negotiate in good faith (acting reasonably) any changes to this Framework Agreement and any Route Agreement entered into pursuant to this Framework Agreement in order for TfL and/or the Corporation to achieve best value.

21. CHANGE OF CONTROL OR OWNERSHIP OF THE OPERATOR

21.1 Without prejudice to clause 21.2, the Operator shall immediately inform the Corporation of any event that may give rise to a Change of Ownership and or a future Change of Ownership and provide such information as the Corporation reasonably requires in relation to such a Change of Ownership.

21.2 The Operator shall obtain the Corporation's written approval prior to any Change of Control of the Operator during the duration of the Framework Agreement and such approval may at the Corporation's discretion be:

21.2.1 given with or without any conditions being attached; or

21.2.2 denied on any grounds.

21.3 The Operator shall notify the Corporation as soon as it becomes aware of a proposed Change of Control and shall provide the Corporation with all information (within its possession) relating to the proposed transferee.

21.4 For the avoidance of doubt if the Corporation gives its approval under clause 21.2.1 subject to conditions being attached and any condition is not satisfied in full the Corporation shall be entitled to withdraw its approval and approval shall be deemed to have been denied.

22. SURVIVAL

22.1 Clause 12 shall survive the expiry of this Framework Agreement until the later of the following:

22.1.1 expiry or termination of the last Route Agreement entered into pursuant to this Framework Agreement; or

22.1.2 the expiry or termination of any route agreement (substantially on the same terms and conditions as contained in Annex B) assigned or novated to the Operator.

22.2 Any other provisions which are intended expressly or impliedly to survive the termination or expiry of this Framework Agreement, including the provisions necessary to give effect to clause 22.1 shall survive the termination or expiry of his Framework Agreement.

IN WITNESS whereof the Parties hereto have caused this document to be executed and delivered as a Deed the day and year first above written.

Executed as a deed by)
LONDON BUS SERVICES LIMITED)
acting by a Director and the)
Secretary or two Directors .....
Director
)
)
)
Director/Secretary

Executed as a deed by)
[**company name**])
acting by a Director and the)
Secretary or two Directors .....
Director
)
)
)
Director/Secretary

OR

The common seal of)
[**company name**])
was affixed to this deed in the) [seal to be affixed]
presence of:)

.....
Director

.....
Director/Secretary

ANNEX A

ROUTE AGREEMENT

FRAMEWORK AGREEMENT NO. ……..	ROUTE AGREEMENT NO. ……	ROUTE NO. .....

ROUTE AGREEMENT

FORM OF CONTRACT

THIS ROUTE AGREEMENT is dated the _____day of _____20___

BETWEEN

(1) LONDON BUS SERVICES LIMITED (and its successors in title) whose registered office is at Windsor House, 42 – 50 Victoria Street, London, SW1H 0TL (the "Corporation"); and

(2) ---------- of company number [ ] and whose registered office is at ---------- (the "Operator").

RECITALS:

The Parties have entered into a Framework Agreement by which they have agreed that whenever the Parties enter into a Route Agreement for the provision of bus services by the Operator which is expressed to be pursuant to the Framework Agreement, Annex B and Annex C of the Framework Agreement shall apply to the Route Agreement as if they were incorporated into the Route Agreement.

IT IS AGREED AS FOLLOWS:

1. This is an agreement entered into pursuant to the Framework Agreement for the provision of bus services by the Operator on the terms and conditions set out herein.

2. This Route Agreement includes this Agreement together with the Schedules hereto (and any documents referred to therein) and the terms, conditions and Schedules set out in Annex B and Annex C of the Framework Agreement, except in so far as they may be varied by Schedule IC to this Route Agreement, provided that only Part 1 of Annex C shall be legally binding and all other documents contained in Annex C are for guidance and information only.

3. The Corporation reserves the right at any time to make any changes to all or any part of Annex C provided that in relation to Part 1 only, the Corporation shall comply with any express conditions which may be set out in the Route Agreement relating to such changes.

4. Wherever Annex B of the Framework Agreement indicates that a Schedule is completed individually in respect of each Route Agreement such Schedules are attached hereto.

5. This Route Agreement commenced on [_____ 20__] and the Services shall commence on [_____ 20__] (the "Commencement Date"). This Route Agreement shall continue in force until [_____ 20__] (the "Initial Expiry Date") unless it is extended in accordance with the provisions of clause 2 of the Route Agreement to [_____ 20__] (the "Extended Expiry Date") or unless earlier terminated in accordance with the provisions of the Framework Agreement or this Route Agreement.

Signed on behalf of the Corporation by	Signed on behalf of the Operator by:
Signature: _____	Signature: _____
Name: _____	Name: _____
Position: _____	Position: _____

SCHEDULE I

SERVICE SPECIFICATION

This Schedule comprises the following:

Schedule IA - Route Requirements and Route Description

Schedule IB - Working Timetable, Peak Vehicle Requirements and Scheduled In Service Mileage

Schedule IC - Special Conditions and Variations form Annex B Terms and Conditions

Schedule ID - Minimum Performance Standards and QSI Threshold

FRAMEWORK AGREEMENT NO. ……..	ROUTE AGREEMENT NO. ……	ROUTE NO. .....

SCHEDULE IA

ROUTE REQUIREMENTS AND ROUTE DESCRIPTION

Part 1 Route Requirements

Terminal Points
Stopping Arrangements
Garage Address
Layovers
Route Control

Part 2 Route Description comprising:

Route Record
Public Timetable : Due to the widespread use of Stop Specific Timetables (SSTT), Public Timetables are no longer being issued.

* Registration

* *Only to be included if a section of the route operates outside London*

FRAMEWORK AGREEMENT NO. ……..	ROUTE AGREEMENT NO. ……..	ROUTE NO. .....

SCHEDULE IB
WORKING TABLE, PEAK VEHICLE REQUIREMENTS, AND SCHEDULED IN SERVICE MILEAGE

The following quantities of vehicles shall be used to operate the Services and constitute the "Peak Vehicle Requirement" (PVR) by day type and time of day in respect of the Services

	Working Timetable			**Number of Vehicles In Service**				**Daily/Nightly Scheduled In Service Miles**		**Number of Days/Nights[1]**		**Scheduled in Service Mileage**	
	Reference No.	Effective Date	**Vehicle Type**	AM PVR	Midday PVR	PM PVR	Evening PVR	Per Day	Per Night	Days	Nights	Days	Nights
Mondays to Fridays										253	259		
Saturdays				N/A		N/A				52	52		
Sundays				N/A		N/A				52	52		
Public Holidays				N/A		N/A				6			
Boxing Day				N/A		N/A				1			
								Totals		**364**	**363**		
								Total Scheduled in Service Mileage					

The AM PVR is the maximum quantity of vehicles in service between 07.00 hours and 09.30 hours on Mondays to Fridays.
The PM PVR is the maximum quantity of vehicles in service between 16.00 hours and 18.30 hours on Mondays to Fridays.
[1] The breakdown of number of days and nights shown above are for illustrative purposes only, actual numbers shall be determined on a Route Agreement by Route Agreement basis.

FRAMEWORK AGREEMENT NO. ……..	ROUTE AGREEMENT NO. ……	ROUTE NO. .....

SCHEDULE IC

SPECIAL CONDITIONS AND VARIATIONS FROM ANNEX B TERMS AND CONDITIONS

Early Termination Date (clause 27.8)	.....20_
Sponsored Route (clause 27.9)	Yes/No
Multiple Termination clause 27.10 to apply (*If yes* ***the following agreements will be subject to multiple termination***)	Yes/No …… ……
Is the Operator permitted to accept advertising on the vehicles? (clause 20 of Annex B)	Yes/No
Incentive Provisions – Do the provisions of clause 46 apply?	Yes/No

FRAMEWORK AGREEMENT NO. ……..	ROUTE AGREEMENT NO. ……	ROUTE NO. .....

SCHEDULE ID
MINIMUM PERFORMANCE STANDARD AND QSI THRESHOLD

Minimum Operated Mileage Standard	……..
Route Categorisation	High Frequency Route Or Low Frequency Route
Minimum Performance Standard	..... minutes Excess Wait Time or ..... % "On-Time"
Initial Minimum Performance Standard	..... minutes Excess Wait Time or ..... % "On-Time"
Method of monitoring QSI Perform nce	Manual QSI Surveys
QSI Coverage	Locations Direction A Direction B …… …… …….... …… ....
	Number of Manual QSI Surveys scheduled per Quarter ……
QSI Threshold	..... minutes Excess Wait Time or ..... % "On-Time"
Primary Assessment Period	Quarter …. Of Financial Year …../…… To Quarter …. Of Financial Year …../……
Secondary Assessment Period	Quarter …. Of Financial Year …../…… To Quarter …. Of Financial Year …../……
24 – Hour Services Will QSI Performance for the day-service only be used for calculating Performance Payments and assessing Contract Extension Criteria.	Yes/No

FRAMEWORK AGREEMENT NO. ……..	ROUTE AGREEMENT NO. ……	ROUTE NO. .....

SCHEDULE IIA

VEHICLE SPECIFICATION

This Schedule comprises the following:

Part 1 Vehicle Description

Part 2 Not used

Part 3* Vehicle Livery Specification

* Only to be included if the Vehicle Livery Specification is different from that set out in Schedule II, Appendix A of Annex B.

SCHEDULE IIA

PART 1 - VEHICLE DESCRIPTION

The vehicles approved for use in the Services shall be

	Vehicle Type A	Vehicle Type B
Chassis Manufacturer and Type		
Body Manufacturer and Type		
Single /Double Deck or Articulated		
Upper Deck Air Cooling system		
Minimum Seating Capacity		
Maximum Standing Capacity		
-		
Maximum Length		
Maximum Width		
Number of Doors		
Year of Manufacture		
Engine Type (Including Euro Rating)		

Notes:

Where appropriate the utilisation of the respective Vehicle Types is shown in Schedule IB.

FRAMEWORK AGREEMENT NO. ……..	ROUTE AGREEMENT NO. ……	ROUTE NO. .....

SCHEDULE IIIA

FARE CHART

The Fare chart relating to this Route Agreement will be provided by the Corporation prior to the Commencement Date and in updated form from time to time during the life of the Route Agreement.

In accordance with Schedule II of the Route Agreement, a current fare chart shall be available for inspection by members of the public on each vehicle used to operate the Services.

The Operator's obligations in respect of fare collection arrangements, ticket checking and inspection remain unchanged.

FRAMEWORK AGREEMENT NO. ……..	ROUTE AGREEMENT NO. ……	ROUTE NO. .....
VERSION NO….....	EFFECTIVE DATE ……	

SCHEDULE IVA

CONTRACT PRICE AND OTHER FINANCIAL DETAILS

1. Contract Price £ ..... p.a.

   For 24 hour Services, the Contract Price shall be subdivided into a day and night price as follows;

   A. Contract Price – Day-service £ ..... p.a.

   B. Contract Price – Night-service £ ..... p.a.

2. Period Contract Payment £ .....

3. Scheduled In Service Mileage .....miles p.a.

4. Deduction Figure £ ..... per mile

5. Date of Tender .....

6. Contract Price Adjustment – The basis upon which the Contract Price shall be adjusted is Option [1 or 2] (i.e. reference paragraph [9.2 or 9.3] of Schedule IVB).

7. The Payment Year commences on the first day of Payment Period ....., and ends on the last day of Payment Period ..... , save where the Initial Payment Year applies.

8. Initial Payment Year from . . . . . to . . . . . .

ANNEX B

TERMS AND CONDITIONS

1. Definitions
2. Contract Extensions
3. The Services
4. The Vehicles and Equipment
5. Safety Requirements
6. Operator's Licence
7. Compliance with the General Law and Environmental Requirements
8. Fares, Tickets and Passes
9. Contract Price, Deductions for Lost Mileage and Performance Payments
10. Financial Provisions
11. Ticketing Equipment and Emergency Ticket Packs
12. Information from Ticketing Equipment
13. Fare Collection Arrangements, Ticket Checking and Inspection
14. The Operator's Employees
15. Rights of Access and Audit
16. Bus Stands, Stations and Emergency Procedures
17. Security Alerts, Carriage of Animals and Correspondence with the Public
18. Indemnity and Insurance
19. Advertising the Services
20. Commercial Advertising
21. Lost Property
22. Assignment, Novation and Disposal
23. Confidentiality

24. Variations

25. Bus Priority and other traffic measures

26. Penalty Fares

27. Termination

28. Force Majeure

29. Arbitration

30. Intellectual Property

31. Conflict and Sufficiency of Tender

32. TUPE

33. Sums Recoverable from or Payable by the Operator

34. Changes in Personnel

35. Statutory Provisions

36. Waiver

37. Jurisdiction

38. Construction

39. Entire Agreement

40. Validity, Legality, Enforceability

41. Notices

42. Survival

43. Change of Law

44. Failure to monitor the Services

45. Contracts (Rights of Third Parties) Act 1999

46. Incentive Provisions

47. Change of Control or Ownership of the Operator

48. Discrimination Acts

49. Data Protection

50. Freedom of Information and Transparency

ANNEX B

ROUTE AGREEMENT - TERMS AND CONDITIONS

1. DEFINITIONS

In this Route Agreement, unless the context otherwise requires:

1.1 Not used

1.2 "Bus Mystery Traveller Survey" or "MTS" means the survey named as such and more particularly described in Schedule V

1.3 "Change of Control" means any event where any single person or group of persons acting in concert (within the meaning of The City Code on Take-overs and Mergers (the "Take-over Code"):

1.3.1 acquires control (as defined in Section 450 of the Corporation Tax Act 2010) of the Operator; or

1.3.2 increases its or their interest in the relevant share capital (as defined in Section 792 of the Companies Act 2006) of the Operator which is subject to the Take-over Code such that that person or group of persons would be obliged to make an offer for the Operator under Rule 9 of the Take-over Code or would be so obliged, but for any "whitewash" carried out pursuant to the Notes on Dispensations from Rule 9 of the Take-over Code.

For the purposes of this definition, the "Operator" includes the Operator and each body corporate which is from time to time directly or indirectly its holding company (as defined in Section 1159 of the Companies Act 2006).

1.4 "Change of Ownership" means any:

1.4.1 material change in the ownership of any shareholding in the Operator (that carries the right to vote in general meetings of the shareholders of the Operator): and/or

1.4.2 the Holding Company where such change relates to 50% or more of the issued share capital of the Holding Company;

and a change in the ownership is material for the purposes of clause 1.4.1 if it is a change of 10% or more of the Operator's issued share capital during the duration of the Route Agreement.

1.5 "Commencement Date" means the date set out in the Route Agreement Form of Contract, being the date on which the Services commence or such other date as may be notified by the Corporation to the Operator.

1.6 "Contract Price" means the amount set out in Schedule IVA being the total annual price in respect of the provision of the Services as calculated and adjusted in

accordance with Schedule IV, or as otherwise advised or varied in accordance with the Route Agreement.

1.7 "Contract Price Adjustment" means the annual adjustment to the Contract Price in respect of inflation or deflation as calculated in accordance with Schedule IVB and based on the option set out in Schedule IVA.

1.8 “Contract Extension Criterion” means the criterion applicable for an extension of the term of the Route Agreement as set out in Schedule IX.”.

1.9 "Contract Extension Notice" means a notice substantially in the form set out in Appendix A to Schedule IX.

1.10 "Contract Sum" means the sum payable to the Operator by the Corporation each Payment Year calculated on the basis of the Contract Price less Deductions for Lost Mileage.

1.11 "Contractual QSI Performance" means the QSI Performance adjusted after taking into account any Data Suspension agreed by the Corporation in accordance with Schedule VII.

1.12 "Corporation" means London Bus Services Limited and its successors in title.

1.13 "Data Suspension" means the suspension of unrepresentative data as a result of factors outside the Operator's control and as described in Schedule VII.

1.14 "Date of Tender" means the date set out in Schedule IVA, from which date price movements shall be measured for the purposes of Contract Price Adjustment. The Date of Tender shall normally be the date upon which the Operator was required to submit its tender in respect of the Services.

1.15 "Deductible Lost Mileage" means the total number of Scheduled In Service Miles determined in the reasonable opinion of the Corporation or estimated by the Corporation in accordance with Schedule IVB not to have been operated in any Payment Period other than Non-Deductible Lost Mileage.

1.16 “Deductions for Lost Mileage” means Deductible Lost Mileage multiplied by the Deduction Figure and shall be payable by the Operator to the Corporation.

1.17 "Deduction Figure" means the rate per mile set out in Schedule IVA.

1.18 "Early Termination Date" means the date set out in Schedule IC.

1.19 "Emergency Ticket Pack" means a sealed pack of serially numbered fully pre printed tickets, issued to the Operator, for use when the Ticketing Equipment supplied by the Corporation or the Corporation’s contractor or agent is not available for use in the operation of the Services.

1.20 "Extended Expiry Date" means the date set out in the Route Agreement Form of Contract, being the date on which the Route Agreement expires if extended

in accordance with the Route Agreement.

1.21 “Extension Assessment Period” means the Primary Assessment Period described in Schedule X.”

1.22 "Fares Payment Irregularity" means the issue of any ticket or acceptance of any pass which is not in accordance with the provisions of clause 16.1.3 or Schedule III.

1.23 "Financial Year" means the Corporation’s annual accounting year, which shall commence on 01 April and end on 31 March each year and shall consist of thirteen Payment Periods as set out in the Payment Calendar.

1.24 “Framework Agreement” means the agreement between the Corporation and Operator to govern the terms upon which the Operator provides or will provide certain bus passenger services for the Corporation the particulars of which are contained in the Route Agreement.

1.25 “GLA Act” means the Greater London Authority Act 1999.

1.26 "High Frequency Route" means those routes, which generally have weekday daytime frequencies of 5 buses per hour or more.

1.27 “Holding Company” means a company as defined in Section 1159 of the Companies Act 2006.

1.28 “iBus” means the Corporation’s automatic vehicle location and communications system which is comprised of the iBus Equipment and other items operated by the Corporation designed to deliver reliable, consistent bus services while providing audio and visual information to passengers on board.

1.29 “iBus Equipment” means equipment details of which are included in Annex B at Schedule XVI of the Route Agreement.

1.30 "Initial Expiry Date" means the date set out in the Route Agreement Form of Contract, being the date on which the Route Agreement expires unless extended (or terminated earlier) in accordance with the Route Agreement.

1.31 "Initial Minimum Performance Standard" means the Minimum Performance Standard (seasonally adjusted in accordance with paragraph 8 of Schedule VII if applicable) which shall apply to the Services during the Initial Payment Year and as set out in Schedule ID.

1.32 "Initial Payment Year" means the period set out in Schedule IVA as determined by the Corporation in accordance with Schedule IVD.

1.33 "Interim Statement" means a claim showing in relation to the Payment Period to which the Interim Statement relates the Period Contract Payment or other payment in respect of the Payment Period calculated in accordance with Schedule IV and the sum due on the Intermediate Payment Date being 75% of that Period Contract Payment or other payment.

1.34 "London Buses" means the trading name of the Corporation.

1.35 "Low Frequency Route" means those routes, which generally have weekday daytime frequencies of 4 buses per hour or less.

1.36 "Manual QSI Surveys" means the surveys conducted or procured by the Corporation using plain-clothes observers standing by the roadside and/or by reviewing C.C.T.V footage in order to monitor QSI Performance.

1.37 "Minimum Operated Mileage Standard" means the standard set out in Schedule ID, or as amended in accordance with the Route Agreement and being the minimum acceptable standard of mileage to be operated by the Operator in any one Payment Period or such other period as may be determined by the Corporation. The Minimum Operated Mileage Standard shall be expressed as a percentage of the Scheduled In Service Mileage and will be inclusive of Deductible Lost Mileage and Non–Deductible Lost Mileage.

1.38 “Minimum Performance Standard” means the minimum acceptable standard of performance for the Services as set out in Schedule ID (or as amended or adjusted in accordance with the Route Agreement) and expressed:

1.38.1 for Low Frequency Routes, as a percentage of buses departing “on-time” (which means departure from an advertised timing point in accordance with the Working Timetable not more than two and a half minutes early or five minutes late); or

1.38.2 for High Frequency Routes, as a number of minutes excess wait (that is the average time that an intending passenger waits longer than the average scheduled wait time in accordance with the Working Timetable)

and the term Minimum Performance Standard shall include the Initial Minimum Performance Standard where the context requires it.

1.39 "Non-Deductible Lost Mileage" means the total number of Scheduled In Service Miles not operated by the Operator in any Payment Period the loss of which is determined in the reasonable opinion of the Corporation as being beyond the Operator's reasonable control in accordance with the provisions of Schedule VI.

1.40 "Official" means an employee, agent or contractor engaged by the Corporation for the purpose of revenue protection and/or other operational matters.

1.41 "Operator" means the company or person named as the Operator in the Framework Agreement and this Route Agreement.

1.42 “Operator Personnel” means all such employees, officers, suppliers, sub-contractors and agents of the Operator as are engaged in the performance of any of the Services. Not used.

1.43 "Party" means each company or person who is a party to this Route Agreement and any permitted assignees.

1.44 "Payments Calendar" means the payments calendar referred to in Schedule IVB.

1.45 "Payment Date" means each of the Intermediate Payment Date and Final Payment Date specified as such in the Payments Calendar.

1.46 "Payment Documents" means in relation to each Payment Period:

1.46.1 a claim submitted by the Operator to the Corporation setting out the Period Contract Payment or other payment due in respect of the Payment Period less any sums previously paid in respect of the Route Agreement in relation to that Payment Period whether on the Intermediate Payment Date or otherwise and the Operator's calculation of Deductions for Lost Mileage; and

1.46.2 a report in respect of each Payment Period by the Operator to the Corporation relating to mileage and lost mileage in the form set out in Schedule IVB.

1.47 "Payment Period" means each of the periods identified as such in the Payments Calendar.

1.48 “Payment Statement” means the statements issued by the Corporation to the Operator before each Final Payment Date (as set out in the Payments Calendar) and as further described in Schedule IVB.

1.49 "Payment Year" means the periods set out in Schedule IVA as determined by the Corporation in accordance with paragraph 2 of Schedule IVD. The Payment Year includes, as the context requires the "Initial Payment Year".

1.50 "Penalty Fares" means the penalty fares imposed on any bus passenger pursuant to the provisions of the GLA Act.

1.51 “Penalty Fares Revenue” means the amount of revenue attributable to Penalty Fares.

1.52 "Performance Payment" means the payment to or from the Operator calculated in accordance with Schedule IVD.

1.53 "Performance Payment Statement" means the statement issued by the Corporation to the Operator in respect of a Payment Year, setting out the Performance Payments to be made in respect of that Payment Year (if any) such statement shall be substantially in the form set out in Appendix A to Schedule IVD.

1.54 “Period Contract Payment” means the sum due to the Operator from the Corporation in respect of each Payment Period as set out in or calculated in accordance with Schedule IV.

1.55 “Primary Assessment Period” means the ninth last to the sixth last full Quarters prior to the Initial Expiry Date and as set out in Schedule ID.

1.56 “Primary Extension Criterion” means the criterion described in Schedule IX.

1.57 “Public Timetable” means the information provided to the public, which summarises all individual scheduled journeys on the Services and/or summarises the scheduled intervals between journeys and as set out in Schedule IA and which may be produced on a stop specific basis.

1.58 “QSI” means the Quality of Service Indicators.

1.59 “QSI Coverage” means the coverage requirements in respect of the Manual QSI Surveys to be conducted in respect of the Services and as set out in Schedule ID.

1.60 “QSI Performance” means the Operator’s actual performance of the Services expressed in the same manner as for the Minimum Performance Standard and as calculated by the Corporation in accordance with Schedule VII from time to time.

1.61 “QSI Threshold” means the threshold performance standard as set out in Schedule ID (or as amended or adjusted in accordance with the Route Agreement) and expressed in the same manner as for the Minimum Performance Standard.

1.62 “Quarter” means each quarter shown on the Payments Calendar.

1.63 “Quarterly QSI Performance Report” means the report issued by the Corporation to the Operator at the end of each Quarter, in accordance with Schedule VII.

1.64 "Reliable" or "Reliability" means to be relied on; in which reliance or confidence may be put; trustworthy, sure and

1.64.1 for a High Frequency Route shall also mean regularity, or

1.64.2 for a Low Frequency Route shall also mean punctuality.

1.65 “Route Agreement” means the Route Agreement Form of Contract together with the terms and conditions, Schedules set out in Annex B and the documents contained in Annex C of the Framework Agreement as amended from time to time.

1.66 “Route Agreement Information” means:

1.66.1 the Route Agreement in its entirety (including from time to time agreed changes to the Route Agreement); and

1.66.2 data extracted from claims and invoices submitted pursuant to Clause 9 and Schedule IV which shall consist of the Operator’s name, the

expenditure account code, the expenditure account code description, the document number, the clearing date and the invoice amount.

1.67 "Scheduled In Service Mileage" means the annual mileage to be operated under this Route Agreement in order to meet the requirements of the Working Timetable as set out in Schedule IB and for any Payment Period the Scheduled In Service Mileage shall be the total of the daily mileages derived from the Working Timetable for all days in that Payment Period and "Scheduled In Service Miles" shall be interpreted accordingly.

1.68 "Services" means the bus services to be provided under this Route Agreement.

1.69 "Sponsored Route" means the Services or any part thereof which is declared to be a Sponsored Route in Schedule IC.

1.70 "TfL" means Transport for London and its successors in title.

1.71 "TfL Group" means Transport for London and any subsidiary (as defined in Section 1159 of the Companies Act 2006) thereof from time to time, including as the context so admits the Corporation.

1.72 "Ticketing Equipment" means any equipment and/or software and/or associated cabling, wiring housing or connections supplied to the Operator in accordance with the provisions of this Route Agreement for use in the provision of the Services primarily for the purposes of issuing tickets and recording of the same, recording on bus revenue receipts, validating Smartcards, recording the use of passes and all forms of pre-paid travel, recording passenger journeys and for the provision of information to the Operator and to the Corporation or its agents or contractors relating to the same.

1.73 "Transparency Commitment" means the transparency commitment stipulated by the UK government in May 2010 (including any subsequent legislation) in accordance with which the Corporation is committed to publishing its contracts, tender documents and data from claims and/or invoices received.

1.74 "Working Day" means any day Monday to Friday inclusive except public holidays in England.

1.75 "Working Timetable" means the agreed document set out in Schedule IB which includes details of all scheduled in service journeys together with all positioning journeys showing timing of all scheduled in service journeys, timed at the intermediate timing points specified by the Corporation, and which includes all vehicle workings that identify the journey to be operated by individual vehicles and scheduled stand time at each terminus on the route.

2. CONTRACT EXTENSIONS

2.1 The Corporation shall be responsible for monitoring the Operator's performance of the Services and shall compare the QSI Performance (or if applicable the

Contractual QSI Performance) against the Contract Extension Criteria in accordance with the provisions of Schedule IX.

2.2 If the Operator meets or exceeds the Contract Extension Criteria during the Extension Assessment Period then the Operator shall be entitled to an automatic extension of the term of the Route Agreement from the Initial Expiry Date to the Extended Expiry Date.

2.3 If the Operator has met or exceeded the Contract Extension Criteria the Corporation shall send to the Operator a Contract Extension Notice informing the Operator that it is entitled to an automatic extension to the term of the Route Agreement on the same terms and conditions.

2.4 The Operator shall complete and return the Contract Extension Notice within 28 days of the date of the Contract Extension Notice indicating whether it wishes to accept or reject an extension to the term of the Route Agreement.

2.5 If the Operator accepts an extension to the term of the Route Agreement then with effect from the date of receipt by the Corporation of the completed Contract Extension Notice the duration of the Route Agreement shall be extended so as to expire on the Extended Expiry Date unless earlier terminated in accordance with the provisions of the Route Agreement.

2.6 If the Operator rejects an extension to the term of the Route Agreement, or fails to return the Contract Extension Notice within the time period specified in clause 2.4 (which shall be deemed to be a rejection by the Operator), then the Route Agreement shall continue in force until the Initial Expiry Date. For the avoidance of doubt the Operator shall continue to perform the Services in accordance with all the terms and conditions of the Route Agreement until the Initial Expiry Date.

2.7 If the Operator fails to meet the Contract Extension Criteria the Operator shall not be entitled to an extension of the term of the Route Agreement.

2.8 The Corporation shall not be liable to the Operator for any loss of profit, loss of contract or any other losses and/or expenses of whatsoever nature arising out of or in connection with any failure of the Operator to be offered an automatic extension of the term of the Route Agreement pursuant to this clause 2.

3. THE SERVICES

3.1 The Operator shall provide the Services exercising all skill and diligence and in accordance with the terms and conditions of this Route Agreement and so as to ensure that the Working Timetable is met at all times.

3.2 The Operator:

3.2.1 acknowledges that it has sufficient information about the Corporation and this Route Agreement and that it has made all appropriate and necessary

enquiries to enable it to perform the Services in accordance with the Route Agreement;

3.2.2 shall neither be entitled to any additional payment nor excused from any obligation or liability under the Route Agreement due to any misinterpretation or misunderstanding by the Operator of any fact relating to the Route Agreement; and

3.2.3 shall comply with all lawful and reasonable directions of the Corporation relating to its performance of the Services.

3.3 The Operator is authorised to enter into contracts of carriage with passengers on the Services on the terms and conditions of carriage applicable to bus services in Greater London as amended from time to time and in accordance with the terms and conditions of this Route Agreement as the Corporation's agent. The Operator shall issue tickets and/or passes and carry out such other ticket checking and/or validation tasks as may be required by the Corporation from time to time, and shall collect fares and pass the same to the Corporation as agent for the Corporation in accordance with this Route Agreement. Otherwise, the activities of the Operator pursuant to this Route Agreement shall be conducted by it as principal and the Operator shall not hold itself out or describe itself to any person as an agent or representative of the Corporation, except as expressly authorised herein.

3.4 Save as otherwise provided, the Operator shall provide the Services in accordance with the provisions as set out in Schedule I of this Route Agreement and shall not make any change of any kind to the Services without obtaining the prior written approval of the Corporation except in cases of temporary emergency, whereupon the Operator shall without prejudice to the Operator's obligations under clause 19.4, notify the Corporation's Performance Director or such other person nominated by the Corporation from time to time of the nature of the emergency, its likely duration and proposals for arrangements to deal with the same as soon as is practical in the circumstances.

3.5 By giving notice not later than 1 November in any year, and subject to clause 3.6 the Corporation may require, and if so required, the Operator shall adopt Saturday, Sunday or some other special time schedules on any days from 23 December up to and including 3 January.

3.6 The Operator shall not operate the Services on 25 December each year, unless otherwise agreed with the Corporation.

3.7 The Services shall be operated from the location set out in Schedule I and the Operator shall not operate the Services from any other location without the prior written consent of the Corporation, such consent not to be unreasonably withheld.

4. THE VEHICLES AND EQUIPMENT

4.1 The Operator shall provide the Services using only vehicles described in Schedule IIA which comply with the requirements set out in Schedule II. The livery of the vehicles shall be as set out in Schedule IIA.

4.2 Where the Corporation considers that the operation of a vehicle provided by the Operator could affect the safety of passengers or the general public the Corporation may instruct the Operator not to operate that vehicle. In such circumstances the Operator shall provide at its own expense an alternative vehicle for the performance of the Services.

4.3 The Operator shall ensure at all times that all vehicles used in providing the Services are in a clean and serviceable condition (both internally and externally) and fit for the purpose.

4.4 The Operator shall comply with the Corporation's *"Engineering Quality Monitoring"* system (as set out in Annex C).

4.5 The Corporation its employees agents and contractors shall have the right at any time to enter the Operator's premises for the purposes of inspecting the vehicles used in the provision of the Services, the Operator's maintenance facilities and/or the maintenance records kept for the said vehicles and for the purpose of conducting emission checks.

4.6 The Corporation (or its agents and contractors) shall have the right (without the requirement for written consent) at its own expense (subject to clauses 4.6A and 4.11) to install or require the Operator to install in accordance with any instructions issued by the Corporation any equipment on vehicles and at garages, depots or other premises of the Operator used in operating the Services provided that the Corporation, after consultation with the Operator, gives the Operator reasonable written notice of when such equipment is to be installed and at such times which do not prejudice the ability of the Operator to provide the Services. The Operator shall bear all costs of making the vehicles or premises available to the Corporation at such times as are agreed between the Corporation and the Operator.

4.6A Without prejudice to clause 4.6, the Operator shall, at its expense, be responsible for ensuring that all new vehicles entering into service after 1 January 2005 conform with the requirements for physical space, power, cabling and other equipment ("the cabling equipment") as set out in "Communication and Data Requirements for London Buses" in Annex C (which may be updated and provided to the Operator from time to time). If, for any reason, a vehicle does not conform with such requirements by the date that has been notified to the Corporation in accordance with "Notification of Lead Times on Vehicle Movements" (as set out in Annex C), the Corporation shall be entitled, without prejudice to any of its other rights or remedies, to:

4.6A.1 require the Operator, at the Operator's expense, to install, re-install or repair (whichever is appropriate) the cabling equipment by the date specified by the Corporation; or

4.6A.2 install, re-install or repair (whichever is appropriate) the cabling equipment (either itself or through a contractor or agent) and the Operator shall be liable for all costs and expenses associated with doing so; and/or

4.6A.3 provide or require the Operator to provide at the Operator's expense an alternative vehicle approved by the Corporation for the provision of the Services.

4.6B The Corporation may deduct all reasonable costs and expenses that it incurs under clauses 4.6A.2 and 4.6A.3 from the Contract Price which is due or which may become due to the Operator under this Route Agreement (or any other contract with the Corporation) or the Corporation may recover such costs as a debt.

4.7 In the event that equipment is provided pursuant to this clause 4 for the purposes of:

4.7.1 providing vehicle location reports such as that provided by iBus;

4.7.2 enhancing the quality of passenger information such as the Corporation's real time bus passenger information system ("Countdown")

the Operator shall comply with the requirements in Schedule XVI

4.7A In the event that equipment provided pursuant to this Clause 4 is equipment comprised in or used for the iBus bus communication and information system ("iBus") then the provisions of Schedule XVI shall apply and the Corporation and the Operator shall comply with the requirements of Schedule XVI.

4.8 The Operator acknowledges and agrees that the failure of any equipment installed on the vehicles or supplied to the Operator under this clause 4 shall not entitle the Operator to make any claim in respect of any delays or interruptions in the Services in reliance on any such equipment failure.

4.9 In the event that equipment of any type is provided pursuant to this clause 4 or Schedule X, the Corporation may issue a Code of Practice in relation to such equipment and the Operator shall comply with any such Code of Practice as amended by the Corporation from time to time.

4.10 Without prejudice to clause 18 the Operator shall pay to the Corporation on demand:

4.10.1 all reasonable costs incurred by the Corporation its agents or contractors associated with the inspection, removal and reinstallation of any equipment where such work is necessary as a result of the actions of the Operator rather than any instruction or request of the Corporation; and

4.10.2 all reasonable costs incurred by the Corporation, its agents or contractors as a result of failure by the Operator to comply with its

obligations under this Route Agreement in relation to the equipment including without prejudice to the generality of the foregoing any costs wasted as a result of failure by the Operator to allow access to vehicles or premises at the locations or times agreed.

4.11 Title and property in any equipment provided pursuant to this clause 4 or Schedule X shall at all times remain with the Corporation (or, where the Corporation has procured that any third party provide the equipment, with that third party if so agreed between the Corporation and the third party). The Operator shall be responsible for all such equipment and shall use its best endeavours to preserve and protect the equipment in proper working order or condition. All equipment shall be at the Operator's risk from time of delivery to the Operator to the time of return to or collection by the Corporation its agents or contractors whether or not fitted to any vehicle or installed at the Operator's premises and the Operator shall without prejudice to clause 18 indemnify the Corporation from and against any loss or damage to such equipment which without limitation to the generality of the foregoing shall include any damage caused by vandalism or misuse.

4.12 The Operator shall not use any equipment provided by the Corporation under this clause 4 or Schedule X on any vehicles except those used in providing the Services without the prior written consent of the Corporation, which consent may be granted subject to such conditions (including as to payment to the Corporation by the Operator) as the Corporation thinks fit.

4.13 The Operator shall allow the Corporation or its agents or contractors on site access to any vehicle, garage or other location fitted with equipment provided pursuant to this clause 4 or Schedule X or indicated in the Corporation's or the Operator's records as fitted with such equipment at the garage or other location at which a vehicle is usually based or at the garage or other location (as appropriate) for the purposes of inspecting, testing and maintaining the said equipment.

4.14 In the event that any vehicle fitted with any equipment provided pursuant to this clause 4 or Schedule X is withdrawn from use in the provision of the Services the Operator shall immediately notify the Corporation in accordance with *"Notification of Lead Times on Vehicle Movements*" (as set out in Annex C and as amended by the Corporation from time to time) and the Corporation shall make arrangements for the removal of the equipment from the vehicle either by means of an instruction to the Operator or through the Corporation's agents or contractors before permitting the vehicle to be used on any other route or for any other services or disposal of the vehicle in any other way.

4.15 On expiry or earlier termination of this Route Agreement, the Operator shall immediately return all equipment provided by the Corporation under this clause 4 or Schedule X or shall allow the Corporation its agents or contractors to remove all such equipment. Failure to comply with this provision shall without prejudice to clause 18 render the Operator liable to pay the Corporation a sum equal to the full replacement value of any such equipment not returned to or recovered by the Corporation.

4.16 The Corporation or its contractors or agents shall, whilst on the Operator's vehicles or premises pursuant to clauses 4.5, 4.6, 4.6A.2, 4.13 or 4.14, comply with the Operator's reasonable instructions.

4.17 In addition to and without prejudice to clause 7, the Operator shall comply with Regulation 10(1), 10A, 10B and 10C of The Road Vehicles (Construction and Use) Regulations 1986 and, for the purposes of this Route Agreement, the exceptions to Regulation10 (1) and 10A (1) mentioned therein shall not apply.

4.18 Nothing in clauses 4.1 to 4.17 shall relieve the Operator from its obligation to ensure that a vehicle is ready to enter into service on the date that such vehicle is due to enter into service.

4.19 For the avoidance of doubt, references to "equipment" in this Route Agreement shall include (without limitation) cabling equipment required to be installed under clause 4.6A and Ticketing Equipment unless the context indicates otherwise.

5. SAFETY REQUIREMENTS

5.1 In providing the Services the Operator shall take all steps necessary to ensure the safety and wellbeing of all persons including:

5.1.1 members of the public;

5.1.2 passengers boarding, travelling on and alighting from the vehicles used in operating the Services;

5.1.3 all employees, agents and contractors of the Corporation whilst on or visiting any of the Operator's vehicles or premises used in the provision of the Services for any purpose in connection with this Route Agreement; and

5.1.4 other road users.

5.2 The Operator shall:

5.2.1 comply with the requirements to produce information on health and safety and other issues set out in Schedule V; and

5.2.2 comply with and produce for inspection by the Corporation when required to do so the Operator's health and safety policy statement and supporting documentation; and

5.2.3 comply with all other requirements set out in Schedule V.

5.3 Without prejudice to clause 27.1.11, the Parties agree and acknowledge that where persistent minor breaches or a material breach of the safety requirements under this Route Agreement arise, such breaches may not be capable of remedy if the Corporation forms the view that as a result of such breach or breaches there is

a significant risk that the Operator has or will compromise the Corporation's performance of its statutory functions, or any statutory duties to which the Corporation may become subject from time to time, or, if the Services were to continue, would be likely to compromise such performance in the future.

6. OPERATOR'S LICENCE

6.1 The Operator shall have and keep in force a Public Service Vehicles Operator's licence granted under Section 12 of the Public Passenger Vehicles Act 1981which permits the lawful operation of the Services and shall produce the licence at any time upon request for inspection by the Corporation.

6.2 If at any time the Operator's licence referred to in clause 6.1 is removed, revoked, restricted or suspended, the Corporation, without prejudice to any of its other rights or remedies under this Route Agreement including without prejudice to the generality of the foregoing the right pursuant to clause 18 to recover any losses, costs or expenses incurred by the Corporation as a result of the Operator's breach of clause 6.1 (including without limitation the cost of engaging a temporary or replacement operator at short notice), may at its sole discretion notify the Operator in writing that the Services are to be suspended but that the Route Agreement is to continue in force and effect. If the Operator's licence is restored, the Corporation may by written notice require the Operator to recommence provision of the Services and the Operator shall recommence such provision immediately upon receipt of such written notice. If the Corporation gives such notice of suspension of the Services to the Operator, the Corporation may at any time thereafter whilst the Operator's licence continues to be removed, revoked, restricted or suspended notify the Operator that the Route Agreement is terminated in accordance with clause 27.1.2.

6.3 The removal, revocation, restriction or suspension of the Operator's licence referred to in clause 6.1 shall be deemed to be a matter entirely within the control of the Operator.

6.4 The Operator shall notify the Corporation immediately of any circumstances relating to the Operator's licence being (or about to be) removed, revoked, restricted, suspended or any other issues relevant to the Operator's licence including without limitation notifying the Corporation in advance of any hearing or formal enquiry with the Traffic Commissioner.

6.5 The Operator shall copy to the Corporation all correspondence with /from the Traffic Commissioner relating to the Operator's licence being (or about to be) removed, revoked, restricted or suspended and any other correspondence relevant to any circumstances arising under clause 6.4.

7. COMPLIANCE WITH THE GENERAL LAW AND ENVIRONMENTAL REQUIREMENTS

7.1 The Operator shall carry out all of its obligations so as to comply with all relevant laws having force of law which are binding on the Operator, including without limitation ensuring that the Services are operated in all respects in accordance with all requirements of all relevant health and safety legislation codes and guidelines (whether such are mandatory or permissible) and with the requirements of the common law, all acts of Parliament, statutory instruments, regulations, and orders from time to time in force.

7.2 Without prejudice to clause 7.1, the Operator shall maintain the vehicles used for the operation of the Services in all respects and comply with all laws, regulations, and orders which are or may become applicable to Public Service Vehicles (as defined in Section 1 of the Public Passenger Vehicles Act 1981).

7.3 The Operator shall promptly notify the Corporation of any notice, order, direction, licence, prohibition, or charge relating to the performance by the Operator of the Services or which relates to or may in any way adversely affect the Operator's performance of the Services and/or the operation by the Operator of Public Service Vehicles.

7.4 Without prejudice to the generality of clause 7.1, 7.2 and 7.3 the Operator shall:

7.4.1 have regard to the need to preserve and protect the environment and the need to mitigate any adverse effects on the environment and shall, so far as possible, ensure that all materials and consumables (including without limitation all bus consumables, tyres, batteries, fuel, oil, anti-freeze and solvents) used in the performance of its obligations under this Route Agreement are environmentally friendly and minimise pollution to the environment, any property and members of the public and are kept and/or disposed of in a safe and lawful manner so as not to interfere unnecessarily or improperly with the environment, any property or any member of the public;

7.4.2 take all steps necessary to ensure the protection of the environment in accordance with legislation and TfL environmental objectives, targets and best practice;

7.4.3 reasonably pursue opportunities to reduce any negative environmental impact of its provision of the Services in accordance with the Mayor of London's Air Quality, Biodiversity, Ambient Noise, Climate Change Mitigation and Energy, Climate Change Adaptation, Business Waste and Municipal Waste strategies as published by the Greater London Authority from time to time and TfL environmental objectives, targets and Health Safety and Environmental Policy in force from time to time.

7.4.4 have regard to reducing environmental impacts across all aspects of its operations including (without limitation) taking all reasonable steps to reduce:

7.4.4.1 Carbon Dioxide emissions arising from fuel use including the: Operator's adoption of measures to reduce vehicle fuel consumption such as the introduction of fuel efficient driver training programmes, installation of fuel monitoring systems and the procurement of vehicles with good fuel consumption and low Carbon Dioxide emissions;

7.4.4.2 Emissions of local pollutants Oxides of Nitrogen (NOx) and Particulates including: ensuring that any exhaust after treatment systems are operated, maintained and serviced as per manufacturer requirements to ensure efficiency, and taking account of NOx and particulate emissions performance of vehicles when selecting new vehicles for operation under this Route Agreement; and

7.4.4.3 noise including: ensuring that all components that may give rise to excessive noise are serviced regularly and silencers are checked and replaced where necessary and taking account of the noise performance of vehicles when selecting new vehicles for operation under this Route Agreement.

7.5 The Operator shall on request by the Corporation demonstrate to the Corporation's satisfaction that it has appropriate environmental management systems in place to ensure compliance with clause 7.4.

8. FARES, TICKETS AND PASSES

8.1 The Operator shall charge passenger fares at the rates set out on the fares chart in Schedule IIIA save that the Operator shall not be required to charge fares if so instructed in writing by the Corporation from time to time.

8.2 The Corporation shall be entitled to vary the fares set out in Schedule IIIA by giving the Operator (except in exceptional circumstances) not less than four weeks notice of any such variation and issuing a revised fares chart to the Operator.

8.3 The Operator shall accept the passes and special tickets referred to and in accordance with Schedule IIIB as amended from time to time, and any other passes or tickets required under the provisions of clause 16.1.3, and shall take such other actions as necessary to validate any passes and tickets, as may be required by the Corporation from time to time.

8.4 The Operator shall pay: -

8.4.1 all fares revenue receipts in respect of fares charged and tickets issued on the Services; and

8.4.2 all sums due in respect of Fares Payment Irregularities and misallocation of revenue

to the Corporation in accordance with Schedule IVC as amended by the Corporation from time to time.

9. CONTRACT PRICE, DEDUCTIONS FOR LOST MILEAGE AND PERFORMANCE PAYMENTS

9.1 In consideration of the provision by the Operator of the Services:

9.1.1 the Corporation shall pay the Operator the Contract Sum; and

9.1.2 the Corporation shall pay the Operator or the Operator shall pay the Corporation as the case may be the Performance Payments (if any)

in the manner and at the times set out or calculated in accordance with Schedule IV.

9.2 The Contract Price shall be fixed save where varied or adjusted in accordance with this Route Agreement. For the avoidance of doubt, except where provided in the Contract Price Adjustment Formula, no adjustment shall be made to the Contract Price in the event of the abolition or material change of fuel duty rebate or its relationship with fuel duty or any increases in fuel duty.

9.3 In the event that following a final determination by the Corporation under the provisions set out in Schedule IVB the Operator is found to have failed to declare or has inaccurately declared Deductible Lost Mileage in any Payment Period, the Corporation shall be entitled to make Deductions for all the Deductible Lost Mileage undeclared or wrongly declared (as measured against any final determination in respect of Deductible Lost Mileage made under Schedule IVB) in the Payment Period in question. The Corporation shall also be entitled to deduct a sum equivalent to the same percentage of Scheduled In Service Mileage as the Deductible Lost Mileage undeclared or wrongly declared in the Payment Period in question for every Payment Period prior to the Payment Period in question up to (but excluding) the last Payment Period in which the Corporation last verified by means of audit, inspection or other investigation the Operator's declarations in relation to Deductible Lost Mileage, or to the commencement of this Route Agreement to a maximum of 12 prior Payment Periods. The Corporation may elect not to make such deductions for all or any of the earlier Payment Periods where the Operator demonstrates to the satisfaction of the Corporation that Deductible Lost Mileage in those earlier Periods was correctly reported. The Corporation may either invoice the Operator for all such Deductions for Lost Mileage or set off those sums against the Period Contract Payment for the next Payment Period following the calculation of all such Deductions for Lost Mileage or recover such sums in accordance with clause 33. In determining the above, the Corporation reserves the right to instruct the Operator to carry out its own audit of lost mileage and provide the results of such audit to the Corporation.

9.4 All claims submitted by the Operator to the Corporation pursuant to this Route Agreement shall be addressed to London Bus Services Limited, Contracts Manager, Palestra, 10th Floor, 197 Blackfriars Road, London SE1 8NJ or such other address as the Corporation may notify in writing from time to time.

9.5 The Corporation shall be entitled to retain any part of the Contract Sum due to the Operator in the final Payment Period under this Route Agreement if it knows or has reasonable grounds to believe that the Operator owes any sum of money to the Corporation under this Route Agreement or any other contract with the Corporation provided that (and without prejudice to clause 33) such retention shall be for a maximum period of 3 months following the Initial Expiry Date or the Extended Expiry Date as the case may be.

9.6 Any payments made by the Corporation under this Route Agreement including final payment under the Route Agreement shall not prevent the Corporation from recovering any amount overpaid or wrongfully paid however such payments have arisen including but not limited to those paid to the Operator by mistake of law or of fact. The Corporation shall be entitled to withhold from any sums due or which become due to the Operator from the Corporation any amount which on the basis of the Corporation's bona fide estimate the Corporation considers due to it from the Operator. Such estimate shall be binding on the Operator unless and until varied by agreement between the Parties or any award, order or judgement.

10. FINANCIAL PROVISIONS

10.1 All payments and receipts referred to in this Route Agreement are exclusive of Value Added Tax (VAT).

10.2 In the event that VAT is or becomes chargeable on any supplies made by any of the Parties under this Route Agreement then (subject to any concessions from HM Revenue and Customs in force from time to time and applicable to the Parties during the continuance of such supply agreements) the Party making the taxable supply shall be issued (by the recipient of the taxable supply) a paid tax invoice for the gross value of the supply made. The tax invoice shall be issued to the Party concerned on or after the relevant Payment Date, in accordance with the "self-billing" procedure set out in paragraph 3.4, Schedule IVB.

10.3 If by reason of any default by the Operator the Corporation is unable to recover from HM Revenue and Customs any payment of VAT it has made in respect of supplies made under this Route Agreement or becomes liable to interest or penalties on payments of VAT due in respect of supplies under the said agreements the Operator shall indemnify the Corporation in respect of any such non-recovery, interest, penalty or any other payment or loss associated therewith and the Corporation shall be entitled to set off any such sum in accordance with clause 33.

11. TICKETING EQUIPMENT AND EMERGENCY TICKET PACKS

11.1 The arrangements for Ticketing Equipment and Emergency Ticket Packs to be used on the Services shall be as set out in Schedule XB as varied from time to time by the Corporation.

11.2 The provisions of clauses 4.6, and 4.8 to 4.16 inclusive shall apply to all Ticketing Equipment and Emergency Ticket Packs provided pursuant to Schedule X.

11.3 The Operator shall comply with the *"London Buses Ticketing Equipment- An Operator's Guide"*(as set out in Annex C).

12. INFORMATION FROM TICKETING EQUIPMENT

The Operator shall provide to the Corporation or to such other persons as the Corporation may from time to time notify to the Operator in writing the data and information from the Ticketing Equipment set out in Schedule X in the manner and at the times set out in Schedule X.

13. FARE COLLECTION ARRANGEMENTS, TICKET CHECKING AND INSPECTION

13.1 In operating the Services the Operator shall ensure that its employees, agents and contractors shall:

13.1.1 charge and collect fares from passengers which are correct in accordance with the fare table in Schedule IIIA as amended from time to time by the Corporation and issue passengers with the correct tickets for their journey; and

13.1.2 check that passengers' passes are valid for the journey being taken, use the appropriate Ticketing Equipment to record pass usage, validate or ensure proper validation (as appropriate) of tickets and passes or follow such other ticket/pass checking as may be instructed by the Corporation from time to time.

13.2 When carrying out its duties the Operator shall use its best endeavours to ensure that its employees, agents and contractors comply with the procedures on fare collection arrangements, ticket checking and inspection set out in Schedule XI as amended by the Corporation from time to time and shall ensure that such staff comply with the requirements of *"Revenue Rules for Operating Staff on London Buses Contracted Services*" (as set out in Annex C).

13.3 The Operator hereby authorises the Officials to operate on any vehicle providing the Services and to fulfil the role of Inspector as defined in Section 24(4) of the Public Passenger Vehicles Act 1981.

13.4 Without prejudice to clause 13.3 the Officials shall be permitted to board vehicles providing the Services at any time for the purpose of checking that the Operator and its employees, agents and contractors are complying with the provisions of this Route Agreement, are complying with the Public Service Vehicle (Conduct of Drivers, Inspectors, Conductors and Passengers) Regulations 1990 (and any other relevant legislation and regulations) and for the purpose of checking records and Ticketing Equipment used by the Operator its employees, agents and contractors.

13.5 The Operator shall use its best endeavours to ensure that its employees, agents and contractors comply with any reasonable instructions given to them by the Officials pursuant to this Route Agreement.

14. THE OPERATOR'S EMPLOYEES, AGENTS AND CONTRACTORS

14.1 The Operator shall employ or engage drivers and conductors (as appropriate) suitably qualified in all respects in accordance with the requirements of all acts of Parliament, statutory instruments and regulations from time to time in force which are applicable thereto and all such drivers and conductors shall comply with all traffic regulation orders made from time to time and any conditions of any licences appertaining thereto.

14.2 Without prejudice to the generality of clause 14.1, the Operator shall use its best endeavours to ensure that:

14.2.1 all staff dealing or likely to deal with the public are at all times helpful, polite and smartly and suitably dressed;

14.2.2 its employees, agents and contractors do not smoke in any circumstances whilst on any vehicle;

14.2.3 its employees, agents and contractors do not report for duty or carry out their duties whilst under the influence of alcohol or any illegal drug and that they do not consume alcohol or any illegal drug while on duty (including during meal and other breaks);

14.2.4 each driver carries details of his duty roster showing vehicle trip number relative to timetable which shall be made available to representatives of the Corporation on request;

14.2.5 each driver and conductor is competent in the use of the Ticketing Equipment and any other equipment provided pursuant to clause 4 for use on the vehicles used in the operation of the Services;

14.2.6 all staff at the Operator's garages or such other locations who are required to use the Ticketing Equipment or any other equipment provided pursuant to clause 4 for use on the Operator's premises are competent in the use of the Ticketing Equipment or other equipment as appropriate;

14.2.7 its drivers take account of the needs of all passengers (in particular older and disabled passengers) by displaying a high standard of driving skill including without limitation ensuring that its drivers avoid unnecessarily rapid acceleration, do not drive at inappropriate speeds or apply harsh braking unnecessarily, where appropriate pull-in at stops parallel with and close to the kerb and give sufficient time for passengers to board, become seated or stand securely (using handrails and/or other assistive fittings) and/or alight in safety and comfort before moving off;

14.2.8 No longer used

14.2.9 all staff who have dealings with the public (or support such staff) are provided with disability awareness training to a standard prescribed by the Corporation and which ensures compliance with the Equality Act 2006 and if requested by the Corporation, the Operator shall provide the Corporation with details of training provided pursuant to this clause 14.2.9.

14.3 The Operator shall keep updated and supply to the Corporation on request. full particulars of all persons who are or may be at any time employed on the Route Agreement in including without limitation a list of drivers' and conductors' names and identity numbers.

14.4 The Operator shall, and shall use its reasonable endeavours to ensure that its employees, contractors and agents shall, comply with the provisions of the Big Red Book published and updated by the Corporation from time to time (current version 2nd Edition) ("Big Red Book")

14.5 If in the Corporation's reasonable opinion the Operator fails to achieve standards set out in or compatible with the objectives of the Big Red Book the Corporation may request the Operator to develop and implement an action plan to improve performance and the Operator shall use its best endeavours to produce, implement and comply with such a plan, keeping the Corporation fully informed of progress.

14.6 Subject to clause 14.8, the Operator shall, at its expense, ensure that all drivers, conductors service controllers and garage support staff employed by the Operator achieve the relevant BTEC qualification as set out in the BTEC Guidance Material (or equivalent qualification as approved by the Corporation) within one year of the start date of their employment in the such role with the Operator.

14.7 The reference in clause 14.6 to "BTEC Guidance Material" means the Guidance Material on BTEC Intermediate Award in Professional London Bus Service Delivery Supporting the Delivery of Bus Services in London and the Guidance Material on BTEC Advanced Award in Controlling Bus Services in London which has been provided by the Corporation to the Operator and which may be updated by the Corporation from time to time after consultation with the Operator.

14.8 For the purposes of clause 14.9 the term London Living Wage means the basic hourly wage of £7.85 (before tax, other deductions and any increase for overtime) as may be updated from time to time.

14.9 Without prejudice to any other provision of this Route Agreement, the Operator shall:

14.9.1 ensure that no person employed and/or engaged in or about the provision of the Services is paid an hourly wage (or equivalent of an hourly wage) less than the London Living Wage;

14.9.2 ensure that employed and/or engaged in or about the provision of the Services is paid less than the amount to which they are entitled in their respective contracts of employment;

14.9.3 provide to the Corporation such information concerning the London Living Wage and as the Corporation or its nominees may reasonably require from time to time;

14.9.4 disseminate on behalf of the Corporation to employed and/or engaged in or about the provision of the Services such perception questionnaires as the Corporation may reasonably require from time to time and promptly collate and return to the Corporation responses to such questionnaires; and

14.9.5 co-operate and provide all reasonable assistance in monitoring the effect of the London Living Wage.

14.10 Any breach by the Operator of the provisions of clause 14.9 shall be treated as a material breach capable of remedy.

15. RIGHTS TO INFORMATION, RIGHTS TO ACCESS TO THE OPERATOR'S PREMISES AND RIGHTS OF AUDIT

15.1 The Operator shall supply the Corporation with the information specified in Schedule V.

15.2 The Corporation (and its agents or contractors) shall have the rights of access and the rights of audit and/or inspection set out in this Route Agreement.

15.3 The Corporation shall provide the Operator with reasonable notice (which shall normally be a minimum of one Working Day) of its intention to exercise any rights under clause 15.2 and shall so far as practicable exercise such rights so as not to prejudice the ability of the Operator to provide the Services provided that the Corporation may exercise such rights without notice where the Corporation considers it reasonably necessary to achieve the purpose of any audit or inspection.

15.4 The Operator shall provide or make available to the Corporation its employees agents and contractors:

15.4.1 all assistance as may reasonably be required;

15.4.2 all records, data and other information as may reasonably be required;

15.4.3 the use of a telephone, photocopier and such other office equipment as may be reasonably required;

15.4.4 reasonable access to persons employed and/or engaged in or about the provision of the Services; and

15.4.5 a suitable work area

during the exercise by the Corporation of its rights under clause 15.2 at any premises of the Operator.

15.5 The Operator agrees (and shall procure that its subcontractors agree), to retain all records (which shall mean all records relating to or in connection with the Route Agreement and any other information reasonably required by the Corporation or specified in the Route Agreement) for a period of not less than six years (or such other period as may be expressly stated in the Route Agreement or as required by law whichever is longer) after expiry or termination of this Route Agreement (the "Retention Period"). The Operator shall (and shall procure that its subcontractors shall) maintain a true and accurate set of records which shall be stored in a safe and secure manner appropriate to preserve the condition of the records during the Retention Period and to prevent loss or unauthorised disclosure of such records. The Corporation (and its contractors and agents) shall have the rights of access and the rights of audit and/or inspection of any or all such records in accordance with the provisions set out in this Route Agreement and such rights shall continue to apply during the Retention Period.

16. BUS STANDS, STATIONS, AND EMERGENCY PROCEDURES

16.1 The Operator shall use its best endeavours to ensure that its employees, agents and contractors shall comply with *"London Buses Officials Attending and Dealing with On The Road Accidents and Incidents Involving Contracted Service Buses, Passengers and/or Staff"* (as set out in Annex C) and with all instructions given to them from time to time by the Corporation's authorised officials in respect of:

16.1.1 the use of bus stands, bus stations, bus stops and other infrastructure owned, occupied or managed by the Corporation (or its agents or contractors) and used by the Operator;

16.1.2 emergency situations and/or diversions from the normal route;

16.1.3 the acceptance of passengers in an emergency with tickets which are not normally valid on the Services; and

16.1.4 any other safety or security related matters.

16.2 The Operator shall, and shall ensure that its employees agents and contractor's shall, comply with the *"General Conditions Relating to the use of London Buses Bus Stations and Stands"* (as set out in Annex C) and as amended by the Corporation from time to time. In particular, the Operator shall ensure that when at a bus station or stand (off or on highway) its employee's switch off engines at all times when parked.

17. SECURITY ALERTS CARRIAGE OF ANIMALS AND CORRESPONDENCE WITH THE PUBLIC

17.1 The Operator shall use its best endeavours to comply and ensure that its employees, agents and contractors comply with the procedures as amended from time to time by the Corporation and set out in Schedule XIII in relation to suspicious packages, the carriage of animals and particular driving requirements.

17.2 The Operator shall comply with the requirements set out in Schedule V and *"Dealing with Customer Contacts: Standards and Monitoring,* (as set out in Annex C) in relation to public correspondence.

18. INDEMNITY AND INSURANCE

18.1 The Operator shall be responsible for and shall release and indemnify the Corporation its employees, agents and contractors from and against all liability for: death or personal injury, loss of or damage to property (including property belonging to the Corporation or for which it is responsible and including property provided to the Operator pursuant to clause 4 or Schedule X); and any other loss, damage, cost and/or expense which may arise out of or in the course of or by reason of the performance or non-performance of this Route Agreement by the Operator, its employees or agents whether such injury, loss, damage, cost and/or expense be caused by negligence or otherwise and/or any termination, avoidance or disclaimer of this Route Agreement at common law or in accordance with the Insolvency Act 1986 by any insolvency practioner acting in relation to the Operator; provided always that the Operator shall not be liable to indemnify the Corporation for any injury, loss, damage, cost and expense caused solely by the negligence of the Corporation, its employees, agents or contractors is shown to have contributed to the said injury, loss, damage, cost and/or expense.

18.2 Without prejudice to its liability to indemnify the Corporation under clause 18.1 the Operator shall, at its own expense, arrange and maintain throughout the duration of this Route Agreement the following insurances (the Insurances):

18.2.1 public liability in the sum of not less than £10,000,000 (ten million pounds) per incident;

18.2.2 employers' liability in the sum of not less than £5,000,000 (five million pounds) per incident or such other sum as may be required from time to time under the provisions of the Employers Liability (Compulsory Insurance) Act 1969; and

18.2.3 motor vehicles (as required under the Road Traffic Act 1988 or any subsequent legislation or statutory requirements) and in the sum appropriate to reflect their use as public carriage vehicle transporting passengers

with an insurer (or insurers) authorised to underwrite such risks in the United Kingdom and if required by the Corporation on terms approved by the Corporation.

18.3 The Operator shall ensure that the Insurances cover the Operator's legal liability (including liability assumed under this Route Agreement) which may arise out of or in the course of or by reason of the performance or non-performance of this Route Agreement and extend to indemnify the Corporation as principal.

18.4 At any time during the continuance of this Route Agreement the Operator shall on being requested to do so by the Corporation provide proof to the reasonable satisfaction of the Corporation that the Insurances have been effected and are in force.

18.5 The Operator shall with all due diligence comply with the terms and conditions of the Insurances and all reasonable requirements of the insurers, including without limitation, in connection with the prosecution, defence and settlement of claims, the recovery of losses and the prevention of accidents. The Operator shall bear the cost of all exclusions, limitations and excesses under the policies of insurance.

18.6 In relation to all the Insurances except that required under clause 18.2.2 the Operator agrees that the Corporation shall have the right to control and to supervise all dealings with the press and any other media in relation to any incident, event, claim or action.

19. ADVERTISING THE SERVICES

19.1 The Corporation shall advertise and provide passenger information about the Services from time to time as the Corporation sees fit including any notices and/or such other items of publicity as it considers are reasonably required to advertise any short term changes to the Services such as temporary diversions and changes to stopping arrangements.

19.2 The Operator shall not advertise the Services without the prior written approval of the Corporation.

19.3 The Operator shall make available to the TfL's Travel Information Service (and/or such other parts of the Corporation and/or the TfL Group notified by the Corporation to the Operator from time to time) all information relating to the Working Timetable, Public Timetable and route to which the Services are operated

and such other information relating to the Services in such a form as the Corporation may reasonably require.

19.4 The Operator shall give the TfL's Travel Information Service (and/or such other parts of the Corporation and/or the TfL Group notified by the Corporation to the Operator from time to time) two weeks notice of any amendments to the above information pursuant to changes to this Route Agreement save where this is not possible by reason of the Operator being given shorter notice of such amendments by the Corporation.

19.5 The Operator shall notify the Corporation's Bus Communication Centre ("Centrecomm") or such other parts of the Corporation and/or the TfL Group notified to the Operator by the Corporation from time to time immediately by telephone or facsimile or by any other suitable means of communication of any known or anticipated disruptions to the Services.

19.6 The Operator hereby authorises the Corporation and/or the TfL Group to provide details of any information supplied by the Operator under this clause 19, including the Public Timetable but excluding that solely in respect of the Working Timetable, to the general public and to the media, (including for the avoidance of doubt radio, television, teletext, newspapers and the like) in print, by electronic means of communication or in any other form which the Corporation and/or the TfL Group considers appropriate.

19.7 If an operator provides any other service on any route which is within five miles of any point in the route of any Service provided under the terms of this Route Agreement then the Operator shall at its own expense comply with such reasonable direction as the Corporation may give from time to time to ensure that the Services are clearly identified in such manner as to avoid them being mistaken for any other services operated by any other operator.

20. COMMERCIAL ADVERTISING

20.1 Where Schedule IC indicates that the Operator is permitted to accept advertising on the vehicles, the Operator will be free subject to the provisions of this clause 20 to accept advertising on the vehicles used on the Services and to retain any revenues received from such advertising. The Operator shall not otherwise be permitted to accept advertising on any vehicles used on the Services.

20.2 All costs relating to the fitting and maintenance of advertisements shall be borne by the Operator.

20.3 Advertisements affixed to the outside of the vehicle shall only be permitted in accordance with and on those areas of the vehicle identified in Schedule IIB.

20.4 Advertisements affixed to the interior of the vehicle will only be permitted on those areas of the vehicle above the windows and excluding the vehicle ceiling.

20.5 The Operator's right to advertise is subject to any modification the Corporation may require to meet the Corporation's requirements for the display of any service or other information.

20.6 Advertisements will not be acceptable if in the opinion of the Corporation's Operations Director and/or Director of Group Marketing each from time to time in post and/or such other person that the Corporation may from time to time specify they:

20.6.1 do not comply with the law or incite anyone to break the law;

20.6.2 conflict with the British Code of Advertising, Sales Promotion and Direct Marketing;

20.6.3 are likely to cause widespread or serious offence to members of the public, on account of the nature of the product or service being advertised the wording or design of the advertisement or inference contained in the advertisement or are open to the possibility of its defacement;

20.6.4 depict men, women or children in a sexual manner or displays nude or semi-nude figures in an overtly sexual context ;

20.6.5 depict direct and immediate violence to anyone shown in the poster or to anyone looking at the poster;

20.6.6 advertise films which have not been granted permission for public exhibition or which do not show the certificate;

20.6.7 are of a political nature calling for the support of a particular viewpoint, policy or action or attacking a member or policies of any legislative, central or local government authority. (Provided that advertisements are acceptable which simply announce the time, date and place of social activities or of meetings together with the names of the speakers and the subjects to be discussed);

20.6.8 contain illustrations which depict or might reasonably be assumed to depict quotations from or references to a living person unless the written consent of that person is obtained and is produced to the Corporation;

20.6.9 are intended to or do undermine or impugn any other operator providing services under contract to or by agreement with the Corporation; and/or

20.6.10 might adversely affect in any way the interest of any member of the TfL Group or are in any way considered inappropriate or do not comply with any advertising policy of the Corporation or TfL from time to time (which shall not be unreasonably imposed).

20.6.11 depict or refer to indecency or obscenity or use obscene or distasteful language;

20.6.12 relate to lap-dancing, “gentlemen’s clubs”, escort agencies or massage parlours;

20.6.13 condone or provoke anti-social behaviour;

20.6.14 contain images or messages which relate to matters of public controversy and sensitivity;

20.6.15 use handwriting or illustrations that would suggest the advertisement has been damaged, defaced, fly posted or subject to graffiti, after it has been posted;

20.6.16 I(in the case of digital media), the advertisement must not pose a health and safety risks a result of flickering or other visual imagery.

20.7 If in the opinion of the Corporation's Operations Director and/or Director of Group Marketing each from time to time in post and/or such other person as the Corporation may from time to time specify any advertisement is not acceptable by reason of any reason set out in clause 20.6 such advertisement shall on the written request of the Operations Director and/or Director of Group Marketing each from time to time in post and/or such other person that the Corporation may from time to time specify be removed immediately at the cost of the Operator.

20.8 The Operator shall indemnify and keep indemnified the Corporation against all claims, demands, proceedings, costs, charges and/or expenses arising out of the display of advertisements on vehicles used on the Services.

21. LOST PROPERTY

The Operator shall comply with the arrangements for dealing with lost property as set out in Schedule XIV as varied from time to time in writing by the Corporation.

22. ASSIGNMENT, NOVATIONS AND DISPOSALS

22.1 This Route Agreement is personal to the Operator who shall not without the prior written consent of the Corporation assign, novate or otherwise dispose in whole or in part of its rights hereunder nor assign sub-contract or otherwise delegate in whole or in part any of its obligations hereunder (except in cases of temporary emergency where the Corporation shall be informed as soon as is practical in the circumstances).

22.2 Approval by the Corporation of any subcontract shall not relieve the Operator of any of its obligations hereunder and where the Operator subcontracts all or any part of the Services the Operator shall:

22.2.1 ensure that such person is obliged to comply with all of the obligations and duties of the Operator under this Route Agreement insofar as they

relate to the Services or part of them (as the case may be) which that subcontractor is required to provide;

22.2.2 be responsible for payments to that person; and

22.2.3 remain solely responsible and liable to the Corporation for any breach of the Route Agreement or any performance, non-performance, part-performance or delay in performance of any of the Services by any subcontractor to the same extent as if such breach, performance, non-performance, part-performance or delay in performance had been carried out by the Operator.

22.3 For the avoidance of doubt a disposal shall be deemed to include but not be limited to any re-organisation of the Operator which materially would affect the Operator's ability to perform its obligations under this Route Agreement including without limitation any re-organisation which affects the resources, technical competence and/or financial standing (or the technical and/or financial resources available) to enable the Operator to perform its obligations.

22.4 In the event that the Operator wishes to assign or novate this Route Agreement, or any part of it, the Operator shall comply with the following procedure:

22.4.1 at least 6 weeks prior to the date that the Operator intends for the assignee or novatee (as appropriate) ("the New Operator") to commence provision of the Services, the Operator shall send a request to assign or novate (as appropriate) to the Corporation in the form as set out in Schedule XVA; and

22.4.2 the Operator shall complete, execute and procure that the New Operator executes an assignment or novation agreement (as appropriate) in the form as set out in Schedule XV. The Operator shall send the assignment or novation agreement (as appropriate) duly completed and executed to the Corporation with the request to assign or novate.

22.5 The Corporation may at its sole discretion consent to the assignment or novation (as appropriate) by executing the assignment or novation agreement and sending copies to the Operator and the New Operator.

22.6 The Corporation may amend any terms of or attach further conditions to the assignment or novation agreement (as appropriate) as it sees fit by sending a schedule in the form as set out in Schedule XVD setting out such amendments/further conditions to the Operator. The Operator shall, within 14 days of receipt of such notice, notify the Corporation of its and the New Operator's acceptance or non-acceptance of such amendments/further conditions. If the Operator and the New Operator accept the schedule:

22.6.1 the Operator shall sign and procure that the New Operator signs the schedule, and the Operator shall send the duly signed schedule to the Corporation; and

22.6.2 the Corporation shall sign the schedule and the assignment or novation agreement (as appropriate) attach the said documents and send copies to the Operator and the New Operator.

22.7 The Corporation's consent to the assignment or novation (as appropriate) shall be conditional upon acceptance of such amendments/further conditions as required by the Corporation under clause 22.6.

22.8 Any purported assignment or novation which is not made in accordance with this clause 22 shall be invalid, and without prejudice to clause 18 the Operator shall indemnify the Corporation in respect of any claims, liabilities, costs, losses and/or expenses incurred by the Corporation in connection with or in consequence of such invalid assignment or novation.

23. CONFIDENTIALITY

23.1 Subject to clauses 23.2, and 50 each Party hereby undertakes with the other that it shall keep confidential (and will ensure that its officers, employees, agents and professional and other advisers keep confidential) any information which is supplied, received or obtained pursuant to this Route Agreement in relation to the passengers, business, assets or affairs of any Party or which the disclosing Party indicates is confidential, and shall not disclose to any third party any such information without the consent of the Party concerned (such consent not to be unreasonably withheld or delayed).

23.2 The obligation of confidentiality under this clause 23 shall not apply to the disclosure of information to the extent that such disclosure is:

23.2.1 of publicly available information or information which becomes publicly available otherwise than as a result of a breach of this clause 23;

23.2.2 of information which is lawfully in the possession of the receiving Party prior to its disclosure by the disclosing Party;

23.2.3 of information which is received in good faith by the receiving Party from a third party and is not knowingly used or disclosed in breach of this clause 23;

23.2.4 required by any law (including without limitation any order of a court of competent jurisdiction) or the rules of any stock exchange or governmental or other regulatory authority whether or not having the force of law (but, if not having the force of law compliance with which is in accordance with the general practice of persons subject thereto);

23.2.5 required to ensure compliance by the Corporation or any member of the TfL Group with any of its statutory functions under the GLA Act or other relevant legislation;

23.2.6 by the Corporation to the Secretary of State for Transport (or the government department responsible for public transport in London for the

time being) or any person or body who has statutory responsibilities in relation to transport in London or any other government department with an interest in the Services or the method of provision of the Services other than the persons or bodies specifically referred to in clause 23.2.7 below;

23.2.7 to any local authority, commissioner of police, the London Transport Users Committee (and any successor body) or any other person or body that is consulted by the Corporation pursuant to the Transport Act 1985 or the GLA Act or other relevant legislation, provided that it shall obtain the written consent of the Operator, such consent not to be unreasonably withheld, before any financial information in relation to the Operator is disclosed pursuant to this clause 23.2.7;

23.2.8 of such information as the Corporation may reasonably require to publish at or around the expiry or termination of the Route Agreement in order to secure continuity of the provision of the Services;

23.2.9 required of the Operator or the Corporation by an auditor pursuant to clause 15 or Schedules V and X;

23.2.10 pursuant to clause 16 of the Framework Agreement;

23.2.11 to any local authority in relation to the Operator's performance under this Route Agreement and/or the level of customer patronage of the Services;

23.2.12 by the Corporation to any member of the TfL Group, to the Greater London Authority (including the Mayor of London), to a Minister of the Crown or any department of H.M. Government of the United Kingdom;

23.2.13 to the relevant traffic commissioner in respect of any apparent breaches of drivers hours;

23.2.14 of information and data obtained from the monitoring undertaken to assess the Operator's overall performance of the Services which the Corporation may use in such manner as the Corporation deems appropriate; or

23.2.15 to any sponsor (which expressions means any person, body or company who makes or has made a financial contribution towards the running of the Services) where the Services or any part thereof are noted in Schedule IC as being a Sponsored Route.

24. VARIATIONS

24.1 The Corporation may vary this Route Agreement with the written consent of the Operator save where this Route Agreement provides that variations or

adjustments may be made by the Corporation and the consent of the Operator is not expressly required.

24.2 Where a variation may not take effect without the Parties' agreement to that variation and the Parties fail to reach agreement as to all the terms of the variation this Route Agreement shall (subject to the provisions in this Route Agreement) continue to have full force and effect until the variation has been agreed in all respects.

24.3 A variation shall take effect:

24.3.1 from the date specified by the Corporation in the written notice to the Operator where the Operator's written consent to the variation is not required; or

24.3.2 from the date agreed by the Corporation and the Operator where the Operator's written consent is required; or

24.3.3 forthwith where no date is specified.

25. BUS PRIORITY AND OTHER TRAFFIC MEASURES

25.1 The Operator shall permit and facilitate the installation and operation of cameras and other related equipment by TfL (or such other persons as the Corporation may specify) on the Operator's vehicles in order to assist in the enforcement of traffic regulations intended to ensure proper use of bus lanes and other bus priority or traffic measures.

25.2 The Parties shall negotiate in good faith any changes required to this Route Agreement as a result of the introduction of bus priority measures and/or other traffic initiatives which impact on or affect the Services, and in particular shall agree any changes required to Schedule I and or IVA in relation to the level of resources required for the Services as a result of the introduction of such bus priority measures and/or other traffic initiatives.

25.3 Without prejudice to clause 25.2, the Operator shall co-operate with the Corporation and any third party and act reasonably and in good faith in relation to the introduction or potential introduction of any public passenger transport initiatives relevant to the provision of bus services.

26. PENALTY FARES

26.1 The provisions of Section 245 of the GLA Act shall apply to the Services. The Officials shall be responsible for imposing Penalty Fares and collecting Penalty Fares Revenue on the Services. If the vehicle is equipped with suitable Ticketing Equipment, the Officials shall hand over all Penalty Fares Revenue collected on any service to the Operator's driver or other staff on the vehicle on which the Penalty Fare was collected, and the Operator's driver or other staff shall issue to

the Officials an excess fare ticket for the amount of each Penalty Fare collected and handed over.

26.2 All Penalty Fares Revenue handed over by the Officials to the Operator's driver or other staff shall be at the Operator's risk until paid to the Corporation in accordance with the provisions of Schedule IVC.

27. TERMINATION

27.1 The Corporation shall have the right to terminate this Route Agreement upon written notice at any time if:

27.1.1 the Operator commits any persistent or material breach of any provisions of this Route Agreement (which shall include but not be limited to any breach of clauses 3, 4, 5, 6, 7, 8.4, 11, 12, 13, 14, 15, 16.2, 22, 23 or 30) and in the case of such a breach which is capable of remedy fails to remedy the same within 14 days of notification of the breach by the Corporation (and in which the Corporation expresses its intention to exercise its rights under this sub-clause);

27.1.2 the Operator fails to comply with clause 6;

27.1.3 in the reasonable opinion of the Corporation, the Operator's overall performance in respect of its obligations under this Route Agreement is not to the standards required by the Corporation, as set out in this Route Agreement;

27.1.4 an order is made by a court of competent jurisdiction, or a resolution is passed, for the dissolution or administration of the Operator or its Holding Company (otherwise than in the course of a reorganisation or restructuring previously approved in writing by the Corporation);

27.1.5 any step is taken to appoint a manager, receiver, administrator, trustee or other similar officer in respect of any assets of the Operator or its Holding Company;

27.1.6 the Operator or its Holding Company convenes a meeting of its creditors or makes or proposes any arrangement or composition with, or any assignment for the benefit of, its creditors;

27.1.7 the Operator or its Holding Company ceases or threatens to cease to carry on trading or any part of its operation;

27.1.8 the Operator, its Holding Company, employees, agents or contractors make, offer or promise any improper loan, fee, reward or advantage of any kind to any employee, agent or contractor of the Corporation;

27.1.9 any similar event to those set out at clauses 27.1.3 to 27.1.8 above occurring in relation to the Operator and/or its Holding Company under the law of any applicable jurisdiction for those purposes;

27.1.10 the Operator commits any of the money laundering related offences listed in the Public Contract Regulations 2006;

27.1.11 the Operator or any of its officers, employees or agents commits any act of bribery described in the Bribery Act 2010

27.1.13 the Operator fails to obtain the Corporation's prior written approval to a Change of Control in accordance with clause 47;

27.1.14 the circumstances in clause 5.3 of the Framework Agreement apply;

27.1.15 the Operator fails to comply with clause 5; or

27.1.16 the Operator fails to obtain the Corporation's written consent prior to an assignment, novation or any other disposal in accordance with clause 22.

27.2 Without prejudice and in addition to its other obligations under this Route Agreement in the event that this Route Agreement is terminated under clause 27.1.3, 27.1.4, 27.1.5, 27.1.6, 27.1.7, 27.1.8 or 27.1.9 the Operator shall:

27.2.1 provide all reasonable assistance to the Corporation or such third parties as the Corporation may request, to the extent necessary to effect the efficient transfer of Services to any replacement operator;

27.2.2 provide the Corporation with copies of all information requested in this regard; and

27.2.3 at the request of the Corporation return to the Corporation and/or provide to any replacement operator specified by the Corporation with all Corporation property and/or materials in the Operator's possession or control.

27.3 For the purposes of clause 27.1.3, (but without limiting the generality of that clause), in considering whether or not the Operator's overall performance in respect of its obligations under this Route Agreement is to the standards required by the Corporation as set out in this Route Agreement, the Corporation shall have regard (inter alia) to the matters specified in Schedule XII. For the avoidance of doubt, the Corporation may terminate this Route Agreement under any sub-clause of clause 27.1 above notwithstanding that the circumstances in Schedule XII have not arisen.

27.4 For the avoidance of doubt, in the event of the Operator being in breach of clause 6.1 because the total number of vehicles operated by the Operator is in excess of those permitted by the licence referred to therein, the Corporation may terminate

this Route Agreement, but before serving notice upon the Operator, it shall have regard to any other notices of termination issued or to be issued by the Corporation under other Route Agreements and other agreements for bus services between the Parties and it shall only issue a notice under this Route Agreement if the Operator would, in the reasonable opinion of the Corporation, still be in breach of clause 6.1 once such other notices have taken effect.

27.5 The termination of this Route Agreement under clause 27.1 above shall be with such notice as the Corporation considers appropriate in the circumstances and during such notice period the Operator shall continue to perform all of its obligations set out in this Route Agreement including without limitation continuing to provide the Services so as to meet or exceed the Minimum Performance Standard and the Minimum Operated Mileage Standard and during such notice period the Operator shall co-operate with the Corporation to avoid or minimise any disruption to the Services.

27.6 This Route Agreement shall terminate automatically if for any reason the Framework Agreement is terminated, but not if the Framework Agreement expires, in which case this Route Agreement shall continue in full force and effect in accordance with its terms, notwithstanding the expiry of the Framework Agreement.

27.7 The termination of this Route Agreement under this clause 27 shall be without prejudice to any rights of either Party in respect of any antecedent breach of contract by the other Party.

27.8 Without prejudice to clause 27.7 and clause 18, in the event that this Route Agreement is terminated under this clause 27, the Operator shall fully indemnify the Corporation for all reasonable costs losses and/or expenses incurred by the Corporation in connection with or as a consequence of the termination, including without limitation the cost of engaging a replacement or temporary operator at short notice.

27.9 Subject to clause 27.11, either Party may terminate this Route Agreement upon giving not less than 10 months prior written notice expiring on the Early Termination Date.

27.10 Where it is noted in Schedule IC that the Services or any part thereof are Sponsored Routes, the Corporation may at any time following the withdrawal of funding or the confirmation that funding will be withdrawn (in whole or in part) for the Sponsored Routes upon giving not less than 3 months prior written notice to the Operator terminate this Route Agreement.

27.11 Where it is indicated in Schedule IC that this clause 27.11 applies to this Route Agreement, without prejudice to any other provision of this Route Agreement, the Corporation shall not exercise its rights to terminate this Route Agreement under clause 27.9 unless it simultaneously exercises its rights to terminate all other agreements with the Operator listed in Schedule IC.

27.12 On termination of this Route Agreement, the Corporation shall not be liable to the Operator for any loss of profit, loss of contract or any other losses and/or expenses of whatsoever nature arising out of or in connection with such termination.

27A DECLARATIONS OF INEFFECTIVENESS

27A.1 In the event that a court makes a Declaration of Ineffectiveness, the Corporation shall promptly notify the Operator. The Parties agree that the provisions of this clause 27A shall apply as from the date of receipt by the Operator of the notification of the Declaration of Ineffectiveness.

27A.2 The Declaration of Ineffectiveness shall not prejudice or affect any right, liability or remedy which has accrued or shall accrue to either Party prior to or after such Declaration of Ineffectiveness.

27A.3 As from the date of receipt by the Corporation of the notification of the Declaration of Ineffectiveness, the Parties (acting reasonably and in good faith) shall agree or, in the absence of such agreement, the Corporation shall reasonably determine an appropriate Cessation Plan with the object of achieving:

27A.3.1 an orderly and efficient cessation of the Services or (at the Corporation's request) a transition of the Services to the Corporation or such other entity as the Corporation may specify; and

27A.3.2 minimal disruption or inconvenience to the Corporation or to public passenger transport services or facilities,

in accordance with the provisions of this Clause 27A and to give effect to the terms of the Declaration of Ineffectiveness.

27A.4 Upon agreement, or determination by the Corporation, of the Cessation Plan the Parties will comply with their respective obligations under the Cessation Plan.

27A.5 The Corporation shall pay the Operator's reasonable costs in assisting the Corporation in preparing, agreeing and complying with the Cessation Plan. Such costs shall be based on any comparable costs or Contract Price agreed as part of this Route Agreement or as otherwise reasonably determined by the Corporation. Provided that the Corporation shall not be liable to the Operator for any loss of profit, revenue, goodwill or loss of opportunity as a result of the early termination of this Route Agreement pursuant to this Clause 27A.

28. FORCE MAJEURE

28.1 Neither Party shall be liable for any breach of its obligations hereunder resulting from causes beyond its reasonable control including but not limited to acts of God, insurrection or civil disorder, war or military operations, national or local emergency, fire, lightning, explosion, flood, subsidence or unusually adverse weather conditions provided that lack of funds shall not be interpreted as a cause

beyond the reasonable control of any Party and any non performance shall not for so long as such event continues constitute a default in relation to the affected obligation under this Route Agreement or subject to clause 28.2 entitle the other Party to terminate this Route Agreement by virtue of any non performance arising from such event PROVIDED THAT:

28.1.1 the Party shall have taken all reasonable steps to have overcome avoided or minimised the effects of any such occurrence; and

28.1.2 the Party shall have notified the other Party as soon as is reasonably practicable.

28.2 If an event referred to in clause 28.1 shall continue for a period of one calendar month the other Party may thereafter terminate this Route Agreement upon giving 21 days written notice.

28.3 The Parties shall negotiate in good faith with a view to agreeing a variation (if appropriate) to mitigate the effects of any interruption to the Services arising from an event referred to in clause 28.1.

29. ARBITRATION

If any claim, question, dispute or difference whatsoever shall arise between the Parties out of or in relation to or in connection with this Route Agreement either Party shall as soon as reasonably practicable give notice to the other in writing of the existence of such claim, question, dispute or difference specifying its nature and the point at issue and if the same shall not be resolved within a period of ninety (90) days from the date of the notice it may be referred in writing by either Party to be determined by a sole arbitrator (the "Arbitrator") who shall be appointed by mutual agreement or failing agreement by the President of The Chartered Institute of Arbitrators of England and Wales on the application of either Party. This submission shall be deemed to be a submission to arbitration within the meaning of the Arbitration Act 1996 or any statutory modification or amendment thereof and the award of the Arbitrator shall be final and binding on the Parties. The law governing this arbitration agreement, the curial law and every reference to arbitration hereunder shall be English Law. For the purposes of limitation of action the arbitral proceedings shall be deemed to have commenced on the service of the written reference to arbitration referred to in this clause 29.

30. INTELLECTUAL PROPERTY AND LONDON 2012

30.1 Save as provided in clause 30.2, the Operator shall not use TfL's registered trade mark known as the roundel and/or the "bar and circle" device nor any other intellectual property owned by any other member of the TfL Group. The Operator shall not do or permit to be done any act which may impair or diminish the rights of any member of the TfL Group in the roundel or any other intellectual property or cause material harm to the goodwill attached to the roundel or other intellectual property.

30.2 Subject always to the provisions of clause 30.1, the Operator shall be permitted to use the roundel in such manner as is required by the provisions of Schedule II, and to use the roundel and any other intellectual property of any member of the TfL Group only as expressly provided by this Route Agreement in writing.

30.3 The Operator shall use its best endeavours to assist in the Corporation and/or any other member of the TfL Group protecting all other intellectual property rights (which shall include any patent application know how registered and unregistered trade marks or service marks trade name logo get-up design right registered design copyright or similar industrial or commercial right) owned by any member of the TfL Group and shall not knowingly do or cause or permit anything to be done which may endanger the intellectual property rights or the like thereto of any member of the TfL Group.

30.4 The Operator shall not (without the prior written approval of the London Organising Committee of the Olympic Games Limited ("LOCOG") in each case) represent that the Services or any goods provided under the Route Agreement have been endorsed or approved by the Corporation, the British Olympic Association, the British Paralympic Association, LOCOG or any other official Olympic or Paralympic body, or that the Operator (including any of its products or services) are in any way associated with those organisations, the Olympic Games and/or Paralympic Games, or London 2012, including by publishing or issuing any statement (factual or otherwise) about the Operator's provision of the Services and/or any goods to the Corporation.

31. CONFLICT AND SUFFICIENCY OF TENDER

31.1 Without prejudice and in addition to the Operator's obligations under this Route Agreement, the Operator:

31.1.1 acknowledges that it has sufficient information about the Corporation and the content of this Route Agreement and that its has made all appropriate and necessary enquiries to enable it to provide the Services in accordance with this Route Agreement;

31.1.2 shall not be excused from any obligation or liability under this Route Agreement and shall make no claim against the Corporation in respect of

any misunderstanding affecting the basis of the Operator's tender in respect of this Route Agreement or any incorrect or incomplete information howsoever obtained provided that nothing in this clause shall exclude any liability of either Party for fraudulent misrepresentation.

31.2 In the event of any conflict or inconsistency in any of the terms or provisions of this Route Agreement, the Parties shall give such meaning, construction or interpretation to the relevant terms or provisions as would be most likely in all the circumstances of the Route Agreement and the Framework Agreement to give effect to the intention of the Parties.

32. TUPE

32.1 The Operator acknowledges and agrees that prior to expiry or termination of this Route Agreement it shall use all reasonable endeavours to identify and comply with any obligations which may arise out of a transfer to another operator under the Transfer of Undertakings (Protection of Employment) Regulations 1981 as amended ("TUPE") and it shall comply with the requirements of Regulation 10 of TUPE prior to such expiry or, if the period of any notice permits, termination.

32.2 At any time during the 52 week period before the expiry of or during any period of notice terminating this Route Agreement or at any time after expiry or termination of this Route Agreement the Corporation may require the Operator to provide to the Corporation (or to any other operator or operators notified by the Corporation) such information as is reasonably required by the Corporation or such other operators relevant to the potential liabilities of any new operator arising under TUPE including but not limited to information on the following:-

32.2.1 the names of employees operating the Services, their salaries and other conditions of employment, ages and length of service;

32.2.2 the method of organisation of the employees operating the Services and documentary evidence relating to such organisation;

32.2.3 the proposals for consultation with affected employees; and

32.2.4 details of collective agreements and union recognition agreements

and shall in addition provide copies to the Corporation upon request of any communication with any potential or intended new operator or the Operator's employees or their representatives relating to the effect on such employees of the expiry or termination of this Route Agreement.

32.3 The Operator shall provide the Corporation with the name and address of a person within its organisation to whom all queries and requests for information under this clause 32 shall be addressed in the first instance during the period referred to in clause 32.2.

32.4 The Operator undertakes and agrees that it shall not in the 10 months prior to

expiry or termination of this Route Agreement (or, where notice of termination is given of less than 10 months, during any such period of notice):-

32.4.1 reorganise or substantially alter the numbers or method of organisation of the employees operating the Services, except to the extent that any such change is the result of a bona fide business reorganisation of the Operator which is not related or confined to the employees operating the Services or the expected expiry or termination of this Route Agreement; or

32.4.2 make any increase to the salaries or any significant change to the terms and conditions of employment of the employees operating the Services, except to the extent that such increases or changes are applied to all of the Operator's employees, whether or not operating the Services, or are the result of a bona fide business reorganisation of the Operator which is not related or confined to the employees operating the Services or termination of this Route Agreement.

33. SUMS RECOVERABLE FROM OR PAYABLE BY THE OPERATOR

33.1 All damages, costs, charges, expenses, debts, sums or other amounts owing (contingently or otherwise) to or incurred by the Corporation arising out of or attributable to this Route Agreement or any other contract between the Corporation and the Operator may be deducted by the Corporation from monies due or which may become due to the Operator under this Route Agreement or under any other Route Agreement or contract with the Corporation as a debt.

33.2 Exercise by the Corporation of its rights under this clause 33 shall be without prejudice to any other rights or remedies available to the Corporation under this Route Agreement or at common law.

34. CHANGES IN PERSONNEL

The Operator shall notify the Corporation's Performance Director within 14 days of any changes to the Operator's senior management or senior personnel involved in the Services, including without limitation changes to any of the directors and key personnel engaged in the performance of the Services.

35. STATUTORY PROVISIONS

Except where the context requires otherwise, references to any statute , enactment, order, regulation or other similar instrument shall be construed as references to such statute , enactment, order, regulation or other similar instrument as amended or re-enacted or as their application is modified by other provisions (whether before or after the date hereof) from time to time.

36. WAIVER

36.1 No failure or delay on the part of either Party to exercise any right or remedy under this Route Agreement shall be construed or operate as a waiver thereof, nor shall any single or partial exercise of any right or remedy preclude or in any way restrict the further exercise of such right or remedy as the case may be.

36.2 No waiver by either Party of a failure or failures by the other Party to perform any provision of this Route Agreement shall operate or be construed as a waiver in respect of any other or further failure whether of a like or different character.

37. JURISDICTION

The Route Agreement shall be governed by and construed in accordance with the law of England and Wales. Without prejudice to clause 29, the courts of England will have exclusive jurisdiction to settle any dispute which may arise out of or in connection with the Route Agreement provided that the Corporation has the right in its absolute discretion to enforce a judgment and/or to take proceedings in any other jurisdiction in which the Operator is incorporated or in which any assets of the Operator may be situated. The Parties agree irrevocably to submit to that jurisdiction.

38. CONSTRUCTION

38.1 In this Route Agreement unless the context otherwise requires: -

38.1.1 references to the singular shall include the plural and vice versa and references to the masculine shall include the feminine and vice versa;

38.1.2 references to clauses shall be to the clauses in this Route Agreement, references to Schedules shall be to the schedules in Annex A or B as the context so requires and references to paragraphs shall be to the relevant paragraph of the Schedule in which the reference occurs; and

38.1.3 headings are inserted for convenience only and shall not affect its construction.

39. ENTIRE AGREEMENT

39.1 Subject to Clause 39.2:

39.1.1 this Route Agreement (together with the Framework Agreement) and all documents referred to in this Route Agreement (together with the Framework Agreement) contains all of the terms which the Parties have agreed relating to the subject matter of the Route Agreement and such documents and supersedes and extinguishes any prior drafts, agreements, undertakings, representations, warranties and arrangements of any nature whatsoever, whether or not in writing

relating to the provision of the Services. Neither Party has been induced to enter into the Route Agreement or Framework Agreement by a statement which this Route Agreement (together with the Framework Agreement) does not contain; and

39.1.2 without prejudice to the Operator's obligations under the Route Agreement, the Operator is responsible for and shall make no claim against the Corporation in respect of any misunderstanding affecting the basis of the Operator's tender in respect of the Route Agreement or any incorrect or incomplete information howsoever obtained.

39.2 Nothing in this clause 39 excludes any liability which one Party would otherwise have in respect of any statement it has made fraudulently to the other Party.

40. VALIDITY, LEGALITY, ENFORCEABILITY

If any provision of this Route Agreement (in whole or in part) is held invalid, illegal or unenforceable for any reason by any court of competent jurisdiction, such provision shall be severed from the Route Agreement and the remaining provisions shall continue in full force and effect as if the Route Agreement had been executed without the invalid, illegal, or unenforceable provision. In the event that in the Corporation's reasonable opinion such a provision is so fundamental as to prevent the accomplishment of the purpose of the Route Agreement, the Corporation and the Operator shall immediately commence good faith negotiations to remedy such invalidity.

41. NOTICES

41.1 Any notice or other communication affecting this Route Agreement or which is required to be given under the Route Agreement shall in the case of:

41.1.1 the Corporation be addressed to the Performance Director, London Bus Services Limited, Palestra, 10th Floor, 197 Blackfriars Road, London SE1 8NJ or such other person or address as the Corporation may from time to time specify in writing to the Operator; and

41.1.2 the Operator be addressed to The Managing Director at the address set out in the Route Agreement Form of Contract or such other person or address as the Operator may from time to time specify in writing to the Corporation.

41.2 Any notice or other communication to be given under this Route Agreement shall be in writing and shall be deemed to have been duly given if delivered by hand or by pre-paid first class post or by facsimile (or by electronic mail where expressly provided for in this Route Agreement) to a Party at the address set out in clause 41 for such Party.

41.3 In the event of any postal or other strike or industrial action affecting post or communications in the United Kingdom, notices shall be given personally or by

facsimile (or by electronic mail where expressly provided for in this Route Agreement).

41.4 Any notices or other communications shall be deemed to have been received by the addressee two Working Days following the date of dispatch if the notice or other document is sent by pre-paid first class post, or the next Working Day after delivery if sent by hand or facsimile (or the next Working Day after being opened by the addressee if sent by electronic mail).

41.5 Notices or communications not governed by this clause 41 may be given in such manner as the Parties may from time to time agree.

42. SURVIVAL

42.1 Termination or expiry of this Route Agreement shall be without prejudice to any rights accruing to the Parties under this Route Agreement. In particular, but without prejudice to the generality of the foregoing: -

42.1.1 the provisions of clauses 1, 9.5, 9.6, 10.3, 15, 18.1, 23, 27.7, 27A, 29, 30, 32, 33, 37.1, 45.2, 49 and 50 shall survive the termination or expiry of this Route Agreement and continue in full force and effect, along with any Schedules and/or other documents and/or other provisions referred to in such clauses;

42.1.2 any sums owing to either Party in accordance with this Route Agreement shall remain payable notwithstanding the termination or expiry of this Route Agreement; and

42.1.3 any other provision which is intended, expressly or impliedly, to survive the termination or expiry of this Route Agreement, including those provisions necessary to give effect to clauses surviving under clause 42.1.1, shall survive the termination or expiry of this Route Agreement.

43. CHANGE OF LAW

43.1 For the avoidance of doubt the Operator shall bear all costs in relation to any training of its employees arising out of any change in the law or acceptance of any new currency in the United Kingdom.

43.2 Without prejudice to clause 43.1, if at any time the Bank of England or other competent monetary authority in the United Kingdom or competent organ of H.M. Government of the United Kingdom recognises the Euro as lawful currency and tender of the United Kingdom the Corporation may by reasonable notice to the Operator elect that all payment obligations arising under this Route Agreement shall be denominated and/or constituted in Euros on the basis that all outstanding amounts and obligations previously denominated and/or constituted in pounds sterling shall be translated into Euros at the exchange rate applied or recognised by the United Kingdom authority organ which granted recognition of

the Euro for the purpose of such translation on the date on which it granted recognition of the Euro.

44. FAILURE TO MONITOR THE SERVICES

44.1 Subject to clauses 44.2 and 44.3 in the event that the Corporation or its agents or contractors are unable to monitor all or any part of the Operator's performance of the Services in accordance with the provisions set out in this Route Agreement the Parties shall negotiate in good faith any changes that may be required to this Route Agreement provided that the Corporation shall:

44.1.1 take all reasonable steps to overcome, avoid or minimise the effect of not being able to monitor all or part the Services; and

44.1.2 notify the Operator as soon as reasonably practicable of the reasons why all or part of the Services cannot be monitored.

44.2 Not used

44.3 If the Corporation or its agents or contractors are unable to monitor the QSI Performance during a Quarter, and as a consequence the Corporation does not satisfy the QSI Coverage requirements for that Quarter, then the Operator's QSI Performance for that Quarter shall be deemed to be the better of:

44.3.1 the Minimum Performance Standard adjusted by the Corporation to reflect seasonal factors; or

44.3.2 the Operator's QSI Performance for the equivalent Quarter of the previous Payment Year.

44.4 For the avoidance of doubt the Corporation shall comply with clauses 44.1.1 and 44.1.2 in the event that clause 44.2 applies.

45. CONTRACTS (RIGHTS OF THIRD PARTIES) ACT 1999

45.1 Subject to clause 45.2, any third party who is not a Party to this Route Agreement shall have no right under the Contracts (Rights of Third Parties) Act 1999 ("the Third Party Act") to enforce any term of this Route Agreement notwithstanding that any such term may purport to confer or may be construed as conferring a benefit on such third party. This does not affect any right or remedy of such third party which exists or is available apart from the Third Party Act.

45.2 The Third Party Act applies to the Route Agreement to the effect that:

45.2.1 any member of the TfL Group shall have the right to enforce any provision contained in the Route Agreement against the Operator to the extent that such provision confers a benefit or purports to confer a benefit on that

member of the TfL Group (including without limitation benefits conferred under clauses 18, 19, 20, 21, 23, and 30); and

45.2.2 any member of the TfL Group shall be treated as a party to clause 29 of the Route Agreement in respect of any claim, question, dispute or difference whatsoever which shall arise between that member of the TfL Group and the Operator relating to the matters in respect of which it has a right of enforcement under clause 45.2.1.

45.3 Notwithstanding clause 45.2, the Parties to the Route Agreement shall be entitled to:

45.3.1 rescind the Route Agreement (if applicable), or
45.3.2 vary any term of the Route Agreement in accordance with clause 24
without the consent of any member of the TfL Group.

46. INCENTIVE PROVISIONS

46.1 The provisions contained in this Route Agreement in relation to Performance Payments and the Contract Extension Criteria (and as specified in clause 46.3), shall for the purposes of this clause 46 be collectively referred to as the "Incentive Provisions".

46.2 The Corporation shall in its absolute discretion determine whether the Incentive Provisions shall apply to the Route Agreement. Without prejudice to the generality of the foregoing, the type of situations where Corporation may exercise its discretion under this clause 46 are where the Services are in respect of school routes or mobility routes.

46.3 Where at the commencement of this Route Agreement it is noted in Schedule IC that the Incentive Provisions do not apply the following provisions shall not apply to this Route Agreement:

46.3.1 clause 2, clause 9.1.2 and clause 44; and
46.3.2 Schedule IVD and Schedule IX in their entirety.

all other provisions of the Route Agreement shall continue to apply provided that where any other part of the Route Agreement relates to or can reasonably be inferred as relating to the Incentive Provisions or any part thereof, such parts shall apply mutatis mutandis.

46.4 For the avoidance of doubt if the Incentive Provisions do not apply to the Route Agreement, the Operator shall not be relieved of any of its obligations in respect of the Services including without limitation the obligation to achieve the Minimum Operated Mileage Standard and the Minimum Performance Standard.

47. CHANGE OF CONTROL OR OWNERSHIP OF THE OPERATOR

47.1 Without prejudice to clause 47.2, the Operator shall immediately inform the Corporation of any event that may give rise to a Change of Ownership or a future Change of Ownership and provide such information as the Corporation reasonably requires in relation to such a Change of Ownership.

47.2 The Operator shall obtain the Corporation's written approval prior to any Change of Control of the Operator during the duration of the Route Agreement and such approval may at the Corporation's discretion be:

47.2.1 given with or without any conditions being attached; or

47.2.2 denied on any grounds including without limitation where such Change of Control would in the opinion of the Corporation have a material adverse effect on the ability of the Operator to continue to perform its obligations under the Route Agreement.

47.3 The Operator shall notify the Corporation as soon as it becomes aware of a proposed Change of Control and shall provide the Corporation with all information (within its possession) relating to the proposed transferee.

47.4 For the avoidance of doubt if the Corporation gives its approval under clause 47.2.1 subject to conditions being attached and any condition is not satisfied in full the Corporation shall be entitled to withdraw its approval and approval shall be deemed to have been denied.

48. DISCRIMINATION ACTS

48.1 The Operator shall not throughout the duration of the Route Agreement unlawfully discriminate within the meaning and the scope of the Equality Act 2010 and any other relevant enactments in force from time to time relating to discrimination in employment (together the "Discrimination Acts") or any statutory modifications or re-enactments thereof relating to discrimination and employment.

48.2 The Operator shall take all reasonable steps to ensure the observance of the provisions of clause 48 by all officers, employees, agents and consultants of the Operator and all sub-contractors.

48.3 The Operator acknowledges that the Corporation is under a duty 76A of the Sex Discrimination Act 1975, Section 71 of the Race Relations Act 1976 and under section 49A of the Disability Discrimination Act 1995 to have due regard to the need to eliminate unlawful discrimination on the grounds of sex or marital status, race or disability (as the case may be) and to promote equality of opportunity and good relations between persons of different racial groups and between disabled people and other people (as the case may be). The Operator shall assist and cooperate with the Corporation where possible in satisfying this duty. The Operator agrees that performance of the Services is dependent on attracting and

retaining a suitably skilled and motivated workforce throughout the duration of the Route Agreement. The Operator agrees where possible to enable the Corporation to satisfy its duty to assist and co-operate with the Corporation where possible with the Corporation's compliance with its duties under section 1 and section 149 of the Equality Act 2010 as and when section 1 and/or section 149 come into force, including any amendment or re-enactment of section 1 or section 149, and any guidance, enactment, order, regulation or instrument made pursuant to these sections, promote (and shall encourage its officers, employees, agents and consultants and sub-contractors to promote) the principle of equal treatment at all times and shall co-operate fully with the Corporation to exchange experiences and good practices.

48.4 The Operator shall put in place and maintain adequate practices and procedures throughout the duration of the Route Agreement to ensure compliance with clause 48.
The Operator shall upon request submit to the Corporation evidence of its compliance with clause 48 such information as the Corporation may reasonably require from time to time including without limitation information relating to staff management, promotion opportunities, grievance and disciplinary issues, training, general employment practices and the composition of the workforce.

48.5 If in the reasonable opinion of the Corporation the Operator fails to comply with any of the Discrimination Acts and such non-compliance adversely affects (or is likely to adversely affect) the performance of the Route Agreement the Operator shall co-operate fully with the Corporation to remedy such non-compliance provided that the Corporation reserves the right to report any non-compliance that it considers serious to the relevant commission established under such legislation.

48.6 In the event of a finding of any unlawful discrimination being made against the Operator by any court or industrial tribunal, or an adverse finding following any formal investigation by any commission established under any of the Discrimination Acts the Operator shall take all appropriate remedial steps to eliminate such unlawful discrimination in the future (including complying with any recommendations issued by the relevant commission). The Operator shall on request provide the Corporation with details of such recommendations and any remedial steps taken.

48.7 The Corporation shall (subject to any legal limitations) be entitled at any time to audit and/or inspect any information in the custody, control or possession of the Operator for the purposes of ensuring compliance with this clause 48. The Operator shall provide all reasonable co-operation in relation to such audit and/or inspection including granting access to any premises containing such information or where such premises are not the Operator's own using reasonable endeavours to procure such access.

48.8 Without limiting any of the foregoing provisions, the Operator shall implement, maintain and promote policies in relation to Harassment, Bullying and Discrimination and Equal Opportunities in Employment, consistent with the Corporation's policies as set out in Annex C, or as developed by the Operator and

approved by the Corporation. The Operator shall take all reasonable steps to monitor and ensure compliance with such policies by its employees, agents and sub-contractors.

49. DATA PROTECTION

49.1 The Operator shall comply with all of its obligations under the Data Protection Act 1998 ("the DPA") and all regulations made under the DPA. When processing personal data (as defined in the DPA) on behalf of the Corporation ("Corporation personal data"), the Operator shall only act in accordance with instructions from the Corporation.

49.2 The Operator shall take appropriate technical and organisational security measures, that are satisfactory to the Corporation, against unauthorised or unlawful processing of the Corporation's personal data and against accidental loss, destruction of or damage to such personal data. The Operator shall take reasonable steps to ensure the reliability of its staff having access to Corporation personal data and to ensure that such staff are fully aware of the measures to be taken when processing Corporation personal data.

49.3 When the Operator receives a written request from the Corporation for information about, or a copy of, the Corporation's personal data, the Operator shall supply such information or data to the Corporation within such time, and in such form, as specified by the Corporation.

49.4 If the Operator sub-contracts any Services under this Route Agreement in accordance with clause 22.1 the Operator shall ensure that the sub-contractor complies with the same data protection requirements that the Operator is required to comply with.

50. FREEDOM OF INFORMATION AND TRANSPARENCY

50.1 For the purposes of this clause 50:

50.1.1 **"FOI Legislation"** means the Freedom of Information Act 2000 ("FOI Act"), any subordinate legislation made under the FOI Act, the Environmental Information Regulations 1992, regulations under section 74 of the FOI Act, and any guidance issued by the Information Commissioner, the Ministry of Justice, or the Department for Environment Food and Rural Affairs (including in each case its successors or assigns) in relation to such legislation;

50.1.2 **"Information"** means information recorded in any form held by the Corporation or held by the Operator on behalf of the Corporation; and

50.1.3 **"Information Request"** means a request for Information under the FOI Legislation.

50.2 The Operator acknowledges that the Corporation:

50.2.1 is subject to the FOI Legislation and agrees to assist and cooperate with the Corporation to enable the Corporation to comply with its obligations under the FOI Legislation; and

50.2.2 may be obliged under the FOI Legislation to disclose Information without consulting or obtaining consent from the Operator.

50.3 Without prejudice to the generality of clause 50.2, the Operator shall and shall procure that its sub-contractors shall:

50.3.1 transfer to the Corporation each Information Request relevant to the Framework Agreement, Route Agreement, services or any member of the TfL Group that it or they (as the case may be) receive as soon as practicable and in any event within 2 Working Days of receiving such Information Request; and

50.3.2 in relation to Information held by the Operator on behalf of the Corporation, provide the Corporation with details about or a copy of all such Information that the Corporation requests and such Information shall be provided within 5 Working Days of a request from the Corporation (or such other period as the Corporation may reasonably specify), and in such form as the Corporation may reasonably specify.

50.4 The Corporation shall be responsible for determining whether Information is exempt information under the FOI Legislation and for determining what Information will be disclosed in response to an Information Request in accordance with the FOI Legislation. The Operator shall not respond directly to an Information Request unless expressly authorised to do so by the Corporation.

50.5 The Operator acknowledges that the Corporation is subject to the Transparency Commitment. Accordingly, notwithstanding clause 23.1 the Operator hereby gives its consent for the Corporation to publish the Route Agreement Information to the general public.

50.6 The Corporation may in its absolute discretion redact all or part of the Route Agreement Information prior to its publication. In so doing and in its absolute discretion the Corporation may take account of the exemptions/exceptions that would be available in relation to information requested under the FOI Legislation (as defined in clause 50.1 above). The Corporation may in its absolute discretion consult with the Operator regarding any redactions to the Corporation Information to be published pursuant to clause 50.5. The Corporation shall make the final decision regarding publication and/or redaction of the Corporation Information.

50.7 For the avoidance of doubt, nothing in this clause 50 shall prevent the Operator from providing the Services under this Route Agreement or providing information

directly to the public in response to a request that is not a request under the FOI Legislation.

SCHEDULE I

SERVICE SPECIFICATION

Schedule I is completed individually in respect of each Route Agreement, comprising the following:

Schedule IA - Route Requirements and Route Description

Schedule IB - Working Timetable and Peak Vehicle Requirements

Schedule IC - Special Conditions and Variations from Terms and Conditions

Schedule ID – Minimum Performance Standards and QSI Threshold

SCHEDULE II

VEHICLE SPECIFICATION

This Schedule refers to the Vehicle Specification requirements. The full technical Vehicle Operational Specification contained within the Master ITT document issued from Tranche 365 onwards, also forms part this Schedule.

A. VEHICLE SPECIFICATION

Schedule IIA is completed individually in respect of each Route Agreement comprising the following parts:

1. Vehicle Description

2. Not used

B. VEHICLE REQUIREMENTS

1.1 This Schedule specifies the vehicles to be used by the Operator in the provision of the Services and the provisions to apply to all such vehicles. The Operator shall not use vehicles which are not specified in or do not comply with the provisions of Schedule II except in circumstances where alternative TfL specification vehicles are used on a short term basis as emergency replacements, in which event the Corporation must be advised in writing immediately. The Corporation reserves the right to specify the use of other vehicles at the Operator's expense should the emergency replacements fail in the Corporation's absolute discretion to meet the operational requirements of the Services.

1.2 All vehicles used in the provision of the Services shall be in standard red livery (ICI London Bus Red P498 FPF3) with white roof top. Logo positions and any other proposals other than the standard red livery shall be as approved by LBSL. No alteration may take place until the Corporation has given its written consent.

1.3 All vehicles used to operate the Services shall;

1.3.1 be equipped with the Ticketing Equipment and any other equipment or items provided pursuant to clause 4 of the Route Agreement ;

1.3.2 be equipped with iBus as defined in “iBus London Equipment for New Buses Installation Manual”. See also Schedule XVI.

1.3.3 be capable of operating a 24 (twenty-four) volts electrical supply to enable the use of Ticketing Equipment supplied by the Corporation;

1.3.4 satisfy the prevailing Exhaust Emissions Standards which may be set from time to time by the prevailing competent authority;

1.3.5 Not Used.

1.3.6 Not Used.

1.3.7 be fitted with CCTV in accordance with “CCTV Requirements” (as set out in the Vehicle Operational Specification documents, and as may be updated by the Corporation from time to time).

1.4 TfL’s roundel which is a registered trademark known as the "bar and circle device"(or such other corporate symbol as shall be notified to the Operator from time to time) shall be clearly displayed on the front and near side of each vehicle when used in the provision of the Services in accordance with the Corporation's guidelines for such display position issued from time to time. This requirement may be satisfied by the inclusion of the roundel as part of the notices displayed in accordance with paragraph 1.5, if so directed by the Corporation.

1.5 The Operator shall affix to the vehicles and display such other notices as the Corporation may reasonably require from time to time, including without prejudice to the generality of the foregoing, information relating to conditions of carriage and conduct of passengers. All the relevant notices to be displayed on the vehicles shall be supplied to the Operator, free of charge, by the Corporation. A booklet entitled “London Buses Passenger Information Notices” details all the passenger information notices and this can be obtained by the Operator at: http://www.stewartsigns.co.uk/client-area.php using the login username and password supplied separately by the Corporation. The Operator shall only use the items and notices supplied by the Corporation.

1.6 A current faretable shall be available for inspection by members of the public on each vehicle.

1.7 Destination blinds and route numbers shall be displayed in accordance with the Vehicle Operational Specification documents. The Operator shall be notified of route blind information and any changes by the Corporation to the said names and/or numbers shall be implemented upon a timescale as agreed between the Parties.

1.8 The Operator shall have regard to the guidelines issued by the Corporation from time to time when complying with its obligations in paragraphs 1.4 to 1.7 inclusive.

1.9 The Operator shall comply with the requirements set out in Appendix C in relation to the wiring and ancillary requirements for new vehicles.

1.10 The Operator shall comply with *" Notification of Lead Times on Vehicle Movements"* (as set out in Annex C).

1.11 The Operator shall comply with the *"Guidelines for the Carriage of Buggies on Buses"* (as set out in Annex C) when permitting passengers accompanied by children in pushchairs and wheelchair users to travel.

2. Support Fleet Vehicles

All support fleet vehicles (pool cars, ferry vehicles, engineering support etc) utilised under the contract must be selected on the basis of the least environmental impact with regards to carbon dioxide, local air pollutant emissions and noise. The Corporation's objective is to ensure that all operators' vehicles achieve a consistent environmental standard. Operators should work towards the following standards:

2.1. Euro Standards:

- All vehicles to achieve a minimum of Euro II emissions by March 2011
- All vehicles to achieve a minimum of Euro III emissions by March 2012
- All vehicles to achieve a minimum of Euro IV by March 2014
- From March 2011, all vehicles due for a replacement must be replaced with vehicles that meet Euro IV emission standards as a minimum
- From March 2012, all vehicles due for a replacement must be replaced with vehicles that meet Euro V emission standards as a minimum

2.2 Carbon Dioxide Limits

- Cars (category M1): Fleet average CO2 emissions for new cars purchased in 2011/12 should not exceed 110g/km CO2, reducing by 5g/km each year for the duration of the Contract.
- Vans and Minibuses) category N1 and M2): Fleet average CO2 emissions for new vans or minibuses purchased in 2011/12 should not exceed 240g/km CO2, reducing by 5g/km each year for the duration of the contract.

In line with mayoral environmental strategies and TfL commitments to reduce carbon dioxide emissions, Operators are also encouraged to include zero or ultra low carbon vehicles in their support fleet such as electric or plug-in hybrid vehicles.

3. <u>Advertisements</u>

3.1 Advertisements, including those relating to the Operator's own staff vacancies, shall not be affixed to the outside of vehicles including the window glass, except:

3.1.1 within the shaded areas shown on the attached diagrams in Appendix A;

3.1.2 for all vehicles except Routemasters, as supa-rears except that the design of such advertisements shall be subject to the Corporation's prior written approval;

3.1.3 to the sides of single deck subject to the Corporation's prior written approval in respect of the exact location and size of such advertisements;

3.1.4 to other areas with the prior written consent of the Corporation; and

3.1.5 for Routemasters the advertising positions are the same as for double deck vehicles except the off side of the vehicle where the 'T' shape is replaced by an 'L' shape.

3.2 Advertisements shall not be affixed to the interior of the vehicles except as set out in clause 20 of Annex B.

4. Risk Assessments

4.1 All vehicle types used in the operation of the Services shall be subject to a documented risk assessment by the Operator which demonstrates that the risks of operating that vehicle type have been adequately mitigated taking account of any specific operational issues arising from the use of the vehicles in the London traffic and passenger environment. All such risk assessments shall be undertaken in accordance with any relevant legislation, including without prejudice to the generality of the foregoing, the Management of Health and Safety at Work Regulations 1999. These assessments should include the identification of risk and compared to existing vehicles where appropriate and of any new hazards. A structured approach should be followed in making judgements on the change in risk associated with the vehicle type, assessing both the likelihood and consequences of the identified hazards and actions to ensure risks are reduced to "as low as is reasonably practicable". Risk assessments should be reviewed following a significant incident or change to vehicle or operating procedures.

4.2 In the event that the Operator wishes to use a vehicle in the operation of the Services that has features not previously covered by a risk assessment for that vehicle type, the Operator shall submit a risk assessment for that vehicle type, which shall include such new features, to the Corporation for its prior written approval.

4.3 The Operator shall not use any vehicles in the operation of the Services without the Corporation's written approval of the risk assessments required pursuant to this Schedule.

APPENDIX A

Advertisement positions on exterior of vehicles.

Note:

"Offside" means the right hand side of the vehicle when facing forward.
"Nearside" means the left-hand side of the vehicle when facing forward.

APPENDIX B

Wiring and ancillary requirements for new vehicles

APPENDIX B

Wiring and ancillary requirements for new vehicles

Electronic Ticket Machine (ETM), and iBus.

This information sets out the Corporation and the TfL Group's overall requirements; detailed specifications for individual vehicle types will be agreed between the Corporation, the Operator and vehicle manufacturers. The final instruction to fit is the sole responsibility of the Operator.

Item	Materials to be fitted	Spec/material supplier	Contact
Electronic Ticket machine (ETM)	Electrical supply 24V: permanent or switch feed from battery Space for fitting ETM and Smartcard Reader (including appropriate allowances in design of Assault Screen if fitted) as per specifications issued by Cubic on behalf of the Corporation. A "Space Model" can be made available to the body builder on application to the Corporation. ETM and Reader trays will be fitted by Cubic by arrangement with the Corporation	London Buses Ticket Technology	Ticket Technology Tel: 020 7918 4759 Fax: 020 79184882
iBus	The wiring and equipment for iBus Radio, Selective Vehicle Detection, Automatic Vehicle Location (AVL) and on board passenger information requirements are detailed in *"iBus London Equipment for New Buses Installation Manual"* and the equipment is made available as 'Free Issue' by the Corporation	TfL iBus Change Management	TSG Chamge Management tsgchangement@tfl.gov.uk
	-		

SCHEDULE III

FARES, TICKET AND PASS ACCEPTANCE

A. FARE CHART

Schedule IIIA is completed individually in respect of each Route Agreement.

B. TICKET AND PASS ACCEPTANCE

The Operator shall accept and/or validate the tickets and passes detailed on the fare chart set out in Schedule IIIA and any additional tickets and passes as notified by the Corporation from time to time, and take any other actions as instructed by the Corporation from time to time in relation to ticket and pass checking, validation and acceptance.

SCHEDULE IV

CONTRACT PRICE AND CONTRACT SPECIFIC DETAILS

Part A - Contract Price and Other Financial Details

Part B - Contract Payments

1. Payments Calendar
2. Contract Price and Period Contract Payments
3. Payment Period Information
4. Payment Method
5. Submission by Corporation of Payment Statement
6. Sums due to Corporation from Operator
7. Deductions for Lost Mileage
8. Fare Payment Irregularities
9. Contract Price Adjustment
10. British Summer Time / Greenwich Mean Time
11. New Year's Eve

Appendix A – Sample Interim Statement and Payment Document

Part C - Handover of Fares Revenue

1. Introduction
2. Calculation of Fares Revenue to be Handed Over
3. Adjustments for Tickets Issued in Error, Etc.
4. Misallocation of Fares Revenue.

Appendix A – Revenue Returns

Part D - Performance Payments

1. Introduction
2. The Payment Year
3. Performance Payments during the Initial Payment Year (if applicable)
4. Performance Payments during the Final Payment Year
5. Calculations of Performance Payments
6. Data Suspensions
7. Changing Standards
8. Day/Night Services
9. Termination
10. Invoicing/Payment

Appendix A – Sample Performance Payment Statement

SCHEDULE IV

CONTRACT PRICE AND CONTRACT SPECIFIC DETAILS

A. CONTRACT PRICE AND OTHER FINANCIAL DETAILS

(Schedule IVA is completed individually in respect of each Route Agreement)

B. CONTRACT PAYMENTS

1. Payments Calendar

The Corporation shall distribute to the Operator a Payments Calendar showing the Quarters, Payment Periods and Payment Dates in relation thereto. Each Payments Calendar shall cover a period of one year commencing on 1 April in every year, and shall be in similar form to the Payments Calendar for the year ending 31 March 2012, as set out below.

PAYMENTS CALENDAR 2011/2012

Quarter	Payment Period	Period		Lost Mileage Information Date (Thursday)	Interim Submission Date (Friday)	Intermediate Payment Date (Friday)	Final Submission Date (Wednesday)	Final Payment Date (Friday)
		From (Date)	To (Date)					
	1	01-Apr-11	29-Apr-11	05-May-11	01-Apr-11	15-Apr-11	18-May-11	27-May-11
1	2	30-Apr-11	27-May-11	02-Jun-11	29-Apr-11	13-May-11	15-Jun-11	24-Jun-11
	3	28-May-11	24-Jun-11	30-Jun-11	27-May-11	10-Jun-11	13-Jul-11	22-Jul-11
	4	25-Jun-11	22-Jul-11	28-Jul-11	24-Jun-11	08-Jul-11	10-Aug-11	19-Aug-11
2	5	23-Jul-11	19-Aug-11	25-Aug-11	22-Jul-11	05-Aug-11	07-Sep-11	16-Sep-11
	6	20-Aug-11	16-Sep-11	22-Sep-11	19-Aug-11	02-Sep-11	05-Oct-11	14-Oct-11
	7	17-Sep-11	14-Oct-11	20-Oct-11	16-Sep-11	30-Sep-11	02-Nov-11	11-Nov-11
	8	15-Oct-11	11-Nov-11	17-Nov-11	14-Oct-11	28-Oct-11	30-Nov-11	09-Dec-11
3	9	12-Nov-11	09-Dec-11	15-Dec-11	11-Nov-11	25-Nov-11	28-Dec-11	06-Jan-12
	10	10-Dec-11	06-Jan-12	12-Jan-12	09-Dec-11	23-Dec-11	25-Jan-12	03-Feb-12
	11	07-Jan-12	03-Feb-12	09-Feb-12	06-Jan-12	20-Jan-12	22-Feb-12	02-Mar-12
4	12	04-Feb-12	02-Mar-12	08-Mar-12	03-Feb-12	17-Feb-12	21-Mar-12	30-Mar-12
	13	03-Mar-12	31-Mar-12	05-Apr-12	02-Mar-12	16-Mar-12	18-Apr-12	27-Apr-12

Easter Weekend in 2011 is 22 April – 25 April.
Easter Weekend in 2012 is 6 April – 9 April

NOTES:

1. Payment Periods 1 - 13 cover the Financial Year (i.e. 1 April to 31 March inclusive). Payment Periods may vary in length and in some cases may be up to five weeks duration.

2. In each Financial Year, the Quarters shall be in respect of Payment Periods 1-3, 4-6, 7-10 and 11-13.

3. The dates set out in the Payments Calendar are without prejudice to the Operator's obligations under paragraph 3.4 of Schedule VI.

2. Contract Price and Period Contract Payments

2.1 The Period Contract Payments shall (unless adjusted in accordance with the provisions of this Route Agreement) be equal to one thirteenth of the Contract Price. There shall be no adjustment to the Period Contract Payment except as provided in this Route Agreement, and in particular and for the avoidance of doubt there shall be no adjustment to the Period Contract Payment in respect of the length of any Payment Period.

2.2 In relation to each Payment Period the Period Contract Payment shall be paid by the Corporation to the Operator on the Payment Dates as follows:-

2.2.1 on each Intermediate Payment Date (as set out in the Payments Calendar), 75 (seventy five) per cent of the Period Contract Payment for the Payment Period to which that Intermediate Payment Date relates; and

2.2.2 on each Final Payment Date (as set out in the Payments Calendar), the remainder of the Period Contract Payment (if any) following adjustment for any other provision of this Route Agreement including in particular any Deductions for Lost Mileage in accordance with paragraph 7 of this Schedule IVB

provided that in respect of any Payment Period during which the Route Agreement does not subsist for the whole of the Payment Period, the Period Contract Payment shall be pro-rated and shall be calculated by reference to the number of days in that Payment Period for which the Route Agreement subsisted.

2.3 In the event that the Contract Price is adjusted, in accordance with the provisions of this Route Agreement, effective from any day other than the first day of a Payment Period, then the Period Contract Payment for the Payment Period in question shall be pro-rated and calculated by reference to the number of days in that Payment Period and the number of days prior to and after the adjustment.

2.4 The Operator shall submit: -

2.4.1 an Interim Statement on or before each Interim Submission Date (as set out in the Payment Calendar); and

2.4.2 the Payment Documents on or before each Final Submission Date, (as set out in the Payment Calendar)

and payment by the Corporation of sums claimed either on the Interim Submission Date and/or Final Submission Dates shall be conditional upon (i) the Operator submitting to the Corporation the Interim Statement by the Interim Submission Date and the Payment Documents by the Final Submission Date and (ii) the Operator providing information and

data from the Ticketing Equipment and about mileage operated in accordance with Schedules V and VI.

2.5 The total Period Contract Payments for a Payment Year shall be equivalent to the Contract Sum for such Payment Year.

3. Payment Period Information

3.1 The Operator shall submit the Interim Statements and Payment Documents in the formats set out in Appendix A to this Schedule IVB.

3.2 The Operator shall ensure that its Interim Statements and Payment Documents are complete and are certified by a Director of the Operator as being correct.

3.3 The Interim Statements and Payment Documents shall be sent from the Operator to the Corporation in such electronic or other form and layout as shall be specified in Appendix A, or as otherwise notified by the Corporation from time to time.

3.4 The Corporation has adopted a “self billing” process with effect from 13 October 2003, removing the need for the Operator to submit an invoice for all Intermediate, Final Contract Payments and Performance Payments. This self-billing process has been introduced with H M Revenue and Customs approval. In the event of approval being withdrawn by H M Revenue and Customs the Corporation shall revert to the previous procedure which will require the Operator to submit invoices.

4. Payment Method

Payment by the Corporation of the Period Contract Payment in accordance with paragraph 2 above shall be by Bankers' Automated Clearing Services (BACS) to a bank account the details of which have been notified by the Operator to the Corporation from time to time, or by such other method determined by the Corporation.

5. Submission by Corporation of Payment Statement.

5.1 The Corporation shall submit to the Operator a Payment Statement showing as a minimum the following information in relation to the Payment Period to which that Final Payment Date relates:

5.1.1 the Period Contract Payment or other payment in respect of the Payment Period calculated under paragraph 2.2;

5.1.2 Deductions for Lost Mileage (i) as calculated by the Corporation or (ii) as estimated by the Corporation;

5.1.3 amounts payable in relation to Deductions for Lost Mileage following a final determination in accordance with paragraph 7 below in relation to any previous Payment Period;

5.1.4 amounts to be withheld or paid over pursuant to paragraph 4.4 of Schedule IVC;

5.1.5 amounts paid on the Intermediate Payment Date; and

5.1.6 the net payment due.

6. Sums due to Corporation from Operator

Where any sum is due to the Corporation from the Operator in respect of any Final Payment Date, the Corporation may set off such sums in accordance with clause 33 or may invoice the Operator for such sums, and the Operator shall pay such invoiced amounts within 14 days of receipt of such invoice.

7. Deductions for Lost Mileage

7.1 In relation to each Payment Period the Operator shall declare and calculate Deductible Lost Mileage and Deductions for Lost Mileage in submission of the Payment Documents. If the Corporation reasonably believes after consultation with the Operator that the Operator's calculations of Deductible Lost Mileage or Deductions for Lost Mileage contained therein are incorrect and/or they exclude lost mileage which is not determined by the Corporation to be Non-Deductible Lost Mileage, the Corporation may make a reasonable estimate of Deductible Lost Mileage and Deductions for Lost Mileage in the Payment Period concerned which shall be included in the Payment Statement and shall be payable by the Operator until such time as the Operator has provided a satisfactory explanation or the Corporation has made enquiries to its satisfaction when a final determination shall be made.

7.2 The Corporation shall notify the Operator of the reason why the Corporation's figures have been used under paragraph 7.1 and the Operator shall co-operate with the Corporation in providing information required to assist the Corporation in making a final determination of Deductions for Lost Mileage. The Corporation shall consider any representations made by the Operator.

7.3 Provided that the Operator has given to the Corporation any information required under paragraph 7.2 in time to allow it to do so, the Corporation shall make a final determination at least two Working Days before the next Final Payment Date of Deductions for Lost Mileage and the difference between the estimate and the final determination shall be included in the Payment Statement and taken account of in the net payment on the next Final Payment Date.

7.4 Where the Operator fails to submit the Payment Documents the Corporation may make a reasonable estimate of Deductible Lost Mileage and Deductions for Lost Mileage in the Payment Period concerned which shall be included in the Payment Statement and payable by the Operator until such time as the Payment Documents have been submitted. When such documents or information have been submitted a final determination shall be made and the difference between the estimate and the final determination shall be included in the Payment Statement and taken account of in the net

payment on the first Final Payment Date which is at least 9 Working Days following submission of the Payment Documents.

8. Fares Payment Irregularities

8.1 For the purposes of this paragraph 8:

R = total number of passengers recorded by the Corporation's Officials as checked on the Services over the period P

T = total number of passenger journeys made on the Services over the period P as determined by the ticket machine data supplied by the Operator to the Corporation in accordance with Schedule X or, in the absence of any or all such data, such number as can be identified and supported by such other information and documentation as the Corporation may reasonably require

P = any consecutive period of 4 weeks determined by the Corporation

U = Amount (in pounds sterling) recorded as underpaid by all passengers recorded as checked in R, being calculated as the total value of excess fare receipts and tickets issued to those passengers by the Corporation's Officials (excluding any receipts and tickets for Penalty Fares and/or extended fares)

E = Estimated percentage of passenger journeys on the Services checked over the period P

I = total amount (in pounds sterling) of Fares Payment Irregularities for which the Corporation will invoice the Operator.

And

$$E = \frac{100 \times R}{T}$$

$$I = \frac{100 \times U}{E}$$

8.2 The Corporation's Officials may make on-vehicle spot checks of the tickets and/or other documents giving authority to travel on the Services held by passengers travelling on the Services.

8.3 For any period P, E is equal to or greater than one half of one per cent (0.5%), the Corporation shall invoice the Operator for the amount of Fares Payment Irregularities, I.

8.4 The Operator shall pay any such invoice within 14 days of receipt.

9. Contract Price Adjustment

9.1 The Contract Price shall be adjusted on each anniversary of the Date of Tender in accordance with paragraph 9.2 below.

9.2 The adjustment to the Contract Price (C2) is given by: -

C2 = C1 (1 + R)

Where: -

C1 = Contract Price as adjusted previously or varied in accordance with the Agreement

R = The percentage price adjustment calculated in accordance with paragraph 9.3.

The percentage price adjustment (R) is given by: -

$$R = \left(\left(\frac{L1 - L2}{L2}\right) \times W1\right) + \left(\left(\frac{P1 - P2}{P2}\right) \times W2\right) + \left(\left(\frac{F1 - F2}{F2}\right) \times W3\right)$$

9.2.1 For Route Agreements prior to Tranche 244:

Where: -

W1 = 0.55 representing the proportion of the Contract Price that is to be adjusted by movement in labour rates.

W2 = 0.25 representing the proportion of the Contract Price that is to be adjusted by movements in the Retail Price Index.

W3 = 0.05 representing the proportion of the Contract Price that is to be adjusted by movements in the retail price of DERV.

L1 =

The Average Weekly Earning index – Whole Economy published for the month that is four months prior to the anniversary of the Date of Tender as set out in Column 1 (KA5H) of Table 7 – Not Seasonally Adjusted Average Weekly Earnings Index Figures, Excluding Bonuses, Including Arrears, published by the Office for National Statistics (ONS).

L2 = The Average Weekly Earnings Index – Whole Economy published for the month that is twelve months prior to the index L1.

P1 = The Retail Prices Index published for the month that is four months prior to the anniversary of the Date of Tender as set out in Table RPO2 published by the Office for National Statistics (ONS).

P2 = The Retail Prices Index published for the month that is twelve months prior to the index P1.

F1 =

The average retail price of DERV published for the month that is four months prior to the anniversary of the Date of Tender as set out in the Monthly Tables/Typical/Average Annual Retail Prices of Petroleum Products and a Crude Oil Price index (QEP4.1.1 and 4.1.2)/Table 4.1.1 Monthly published by the Office for National Statistics (ONS).

F2 = The average retail price of DERV as published by the Department of Trade and Industry for the month which is twelve months prior to that used in F1."

for the avoidance of doubt 15% of the prevailing Contract Price is non-adjustable.

Note:

The source data used above is revised monthly and ceases to be provisional for the third month prior to the current month. For the purpose of annual Contract Price Adjustments, survey data for the fourth month prior will be used. This will reduce the likelihood of the need to calculate arrears payments.

9.2.2 For Route Agreements from Tranche 244:

Where: -

W1 = 0.62 representing the proportion of the Contract Price that is to be adjusted by movement in labour rates.

W2 = 0.16 representing the proportion of the Contract Price that is to be adjusted by movements in the Retail Price Index.

W3 = 0.07 representing the proportion of the Contract Price that is to be adjusted by movements in the retail price of DERV.

L1 =

The Average Weekly Earning index – Whole Economy published for the month that is four months prior to the anniversary of the Date of Tender as set out in Column 1 (KA5H) of Table 7 – Not Seasonally Adjusted Average Weekly Earnings Index Figures, Excluding Bonuses, Including Arrears, published by the Office for National Statistics (ONS).

L2 = The Average Weekly Earnings Index – Whole Economy published for the month that is twelve months prior to the index L1.

P1 = The Retail Prices Index published for the month that is four months prior to the anniversary of the Date of Tender as set out in Table RPO2 published by the Office for National Statistics (ONS).

P2 = The Retail Prices Index published for the month that is twelve months prior to the index P1.

F1 =

The average retail price of DERV published for the month that is four months prior to the anniversary of the Date of Tender as set out in the Monthly Tables/Typical/Average Annual Retail Prices of Petroleum Products and a Crude Oil Price index (QEP4.1.1 and 4.1.2)/Table 4.1.1 Monthly published by the Office for National Statistics (ONS).

F2 = The average retail price of DERV as published by the Department of Trade and Industry for the month which is twelve months prior to that used in F1."

for the avoidance of doubt 15% of the prevailing Contract Price is non-adjustable.

Note:

The source data used above is revised monthly and ceases to be provisional for the third month prior to the current month. For the purpose of annual Contract Price Adjustments, survey data for the fourth month prior will be used. This will reduce the likelihood of the need to calculate arrears payments.

9.3 Not used

9.4 All adjustments to the Contract Price pursuant to this paragraph 9 shall take effect from the Payment Date relating to the Payment Period in which the Date of Tender falls.

10. British Summer Time / Greenwich Mean Time *(Only applies when night services are to be provided under the Route Agreement)*

10.1 In order to maintain the normal 24-hour service coverage, the Operator shall provide additional services at the normal frequency at the end of British Summer Time (usually in October). The cost of such additional services is included in the Contract Price included in Schedule IVA and the Operator shall not make any further claim for costs in relation to the additional services. Such additional services shall be deemed to form part of the Services to be provided under this Route Agreement.

10.2 At the beginning of British Summer Time (usually in March) departures timetabled to depart in the hour lost are not required to be operated and the Corporation shall not make any deduction to the Contract Price included in Schedule IVA to take account of such non-operation.

11. New Year's Eve *(Only applies when night services are to be provided under the Route Agreement)*

11.1 In the event that New Year celebrations in Greater London (and in particular in Trafalgar Square) require that the Services operate a revised routing, the Operator shall comply with such revised routing as advised by the Corporation.

The Operator's costs associated with such revised routing shall be deemed to be included in the Contract Price included in Schedule IVA and the Operator shall make no further claim for costs in relation to the revised routing.

11.2 Assessment of the need to re-route the Services to take account of New Year celebrations and the detail of the routings shall be at the sole discretion of the Corporation.

11.3 In the event that any additional journeys are required to be operated on New Year's Eve the costs, if any, of such additional journeys shall be agreed by the Operator and the Corporation.

SCHEDULE IV B
APPENDIX A

SAMPLE INTERIM STATEMENT

Operator Name: _____

Payment Period No: _____ From_____To_____

Route Agreement Number	Version Number	Route Number	Period Contract Payment (100%)	Intermediate Period Payment (75%)	Amount Due
Totals:					

Signed on behalf of Operator: _____ _____
Director Date

Notes:

1. If there has been or is to be a variation(s) to the Contract Price during the Payment Period, the Operator shall show all version numbers.
2. As calculated in accordance with paragraphs 2.1, 2.2, and 2.3, as appropriate.

Sample Payment Document

Operator Name: _____

Payment Period No: _____ From_____To_____

Route Agreement Number	Version Number	Route Number	Period Contract Payment (100%)	Intermediate Period Payment (75%)	Final Period Payment (25%)	Deduction Figure	Deductible Lost Miles	Deductions for Lost Mileage	Amount Due
Totals:									

Signed on behalf of Operator: _____ _____
Director Date

Notes:

1. If there has been or is to be a variation(s) to the Contract Price during the Payment Period, the Operator shall show all version numbers.
2. As calculated in accordance with paragraphs 2.1, 2.2, and 2.3, as appropriate.

C. HANDOVER OF FARES REVENUE

1. Introduction

1.1 All monies received or collected from passengers in respect of travel on the Services and all Penalty Fares Revenue handed over by the Corporation's Official shall belong to the Corporation and shall be at the Operator's risk until it is paid to the Corporation in accordance with this Schedule IVC.

1.2 The Operator shall pay all monies by cheque or BACS (as the Corporation notifies the Operator from time to time) each week on the Friday following the end of the operating week to which the sums refer. An operating week shall run from Saturday to the following Friday and shall cover all the days on which the Services are provided during that time.

2. Calculation Of Fares Revenue To Be Handed Over

2.1 The monies due to the Corporation pursuant to paragraph 1 above shall be calculated as:

2.1.1 the amount of revenue receipts identified by the data provided by the Ticketing Equipment, including Penalty Fares Revenue or, in the absence of any or all of this data, the amount of revenue receipts accruing to the Services as can be identified and supported by such other information and documentation as the Corporation shall reasonably require;

2.1.2 plus the amount of revenue resulting from the use of Emergency Ticket Packs as set out in Schedule XI, paragraph 2;

2.1.3 less any adjustments to the amount of revenue receipts at 2.1.1 above in respect of the issue of tickets in the circumstances set out in Schedule XI, paragraphs 5 and 6, subject to the provisions of paragraph 3 below; and

2.1.4 plus any adjustments to the amount of revenue receipts at 2.1.1 above in respect of invalid ticket annulments as set out in Schedule XI, paragraph 3.

2.2 All payments pursuant to paragraph 1.2 above shall be supported by such documentation including identification of the Operator, the route, the day or days of operation to which the receipts refer, as the Corporation may from time to time require. This requirement shall be without prejudice to the requirements of Schedule X in relation to transmission of ticket issued and revenue receipts data and the requirements of Schedule XI. Revenue information must be recorded by the Operator and reported to the Corporation using Forms 1A and 1B as set out in Appendix A to this Schedule IVC. This information shall be provided to the Corporation by the Thursday following the end of the operating week or at such other intervals in respect of such periods as the Corporation may require.

2.A Adjustments for Ticket Annulments

2.1A Adjustments to the amount of revenue receipts pursuant to paragraph 2.1.3 must be made for unsupported ticket annulments in accordance with the provisions set out in Schedule XI paragraph 3.

2.2A In the event that the Operator is found to have failed to make the appropriate adjustments in any Payment Period, the Corporation shall be entitled to claim payment for all unsupported ticket annulments in the Payment Period in question. The Corporation shall also be entitled to deduct a sum equivalent to the value of the unsupported ticket annulments in the Payment Period in question for every Payment Period prior to the Payment Period in question up to (but excluding) the last Payment Period in which the Corporation last verified by means of audit, inspection or other investigation the Operator's declarations in relation to unsupported ticket annulments, or to the commencement of this Route Agreement to a maximum of 12 prior Payment Periods. The Corporation may elect not to make such deductions for all or any of the earlier Payment Periods where the Operator demonstrates to the satisfaction of the Corporation that unsupported ticket annulments in those earlier Periods were correctly reported. The Corporation may either invoice the Operator for all such unsupported ticket annulments or set off those sums against the Period Contract Payment for the next Payment Period following the calculation of all such unsupported ticket annulments or recover such sums in accordance with clause 33.

3. Adjustments to Ticket Machine Data

3.1 Any adjustment to the amount of revenue receipts pursuant to paragraph 2.1.3 must be made only in accordance with the provisions set out in Schedule XI paragraphs 5 and 6, and the Operator shall provide all supporting information and forms referred to therein.

3.2 In the event that it is discovered, or the Corporation reasonably has grounds to believe, that the Operator has made adjustments pursuant to paragraph 2.1.3 which the Operator was not properly entitled to make, (an “Invalid Adjustment”) the Operator shall:

3.2.1 pay to the Corporation immediately (whether demanded or not) all sums deducted from revenue receipts in respect of such Invalid Adjustments; and

3.2.2 not make any adjustments to revenue receipts in respect of any matter under paragraph 2.1.3 above for three consecutive Payment Periods following the Payment Period in which the Invalid Adjustment was identified.

3.3 The Corporation may permit the Operator to make adjustments pursuant to paragraph 2.1.3 before the expiry of the three Payment Periods if the Operator demonstrates to the satisfaction of the Corporation that all previous adjustments were validly made by the Operator.

3.4 For the avoidance of doubt, the Operator shall be responsible for any mistakes, errors, invalid or ineligible claims by its drivers, operators or other staff which lead to Invalid Adjustments pursuant to paragraph 2.1.3 above.

4. Misallocation Of Fares Revenue

4.1 If it is discovered, or the Corporation has reasonable grounds to believe, that any fares revenue which should have been paid to the Corporation in respect of the Services pursuant to this Schedule IVC together with all supporting documentation or information which would have identified the fares revenue as received or collected in respect of the Services has not been paid or
provided to the Corporation pursuant to this Route Agreement, then subject to paragraph 4.2 the Operator shall:

4.1.1 pay forthwith to the Corporation all fares revenue (calculated in accordance with paragraph 2) which should have been handed over in respect of the Services together with interest on the total amount of such delayed payment at the rate of 3% above the then current base rate of HSBC Bank plc from the date when payment should have been made in accordance with paragraph 1.2 to the date when payment is received by the Corporation;

4.1.2 (without prejudice to clause 18) indemnify the Corporation in respect of all costs and expenses incurred by the Corporation in checking all such previous payments, returns and information as the Corporation in its absolute discretion considers necessary to ensure all fares revenue attributable to the Services has been paid over to the Corporation; and

4.1.3 pay forthwith to the Corporation all fares revenue which is identified by the Corporation as a result of any investigation under paragraph 4.1.2 as being attributable to the Services and which has not previously been paid over to the Corporation, together with interest on all such sums for the period and at the rate set out in paragraph 4.1.1.

4.2 The Operator shall not be liable to pay over any sums or interest pursuant to either 4.1.1 or 4.1.3 to the extent that fares revenue properly attributable to the Services has been paid to the Corporation in respect of any other bus passenger services operated by the Operator under contract to or by agreement with the Corporation, but the Operator shall be liable for any costs in respect of paragraph 4.1.2.

4.3 The Operator shall co-operate fully with any investigation carried out by the Corporation pursuant to paragraph 4.1.2, and shall make available all necessary records, documents and information, including any relating to bus services operated by the Operator which are not under contract to or by agreement with the Corporation.

4.4 For such period as the Corporation is conducting any investigation pursuant to paragraph 4.1.2 and until all sums shown to be properly attributable to the Services have been paid to the Corporation, the Corporation may withhold a proportion of the Period Contract Payment for each Payment Period equal to any sum calculated in accordance with paragraph 4.1.1 (whether or not previously paid to the Corporation in accordance with paragraph 4.1.2. All such sums withheld shall be paid by the Corporation to the Operator following payment of all sums due under paragraph 4.1.1 and 4.1.3.

4.5 If, as a result of any investigation under paragraph 4.1.2, it is discovered that the Operator has paid to the Corporation any sums which were not properly attributable to

the Services, such sums shall be set off against any sums due to the Corporation under this paragraph 4 or shall be paid by the Corporation to the Operator.

LONDON BUSES: REVENUE RETURN						FORM 1A		
OPERATOR: _____	**GARAGE CODE: _____**		**ROUTE NO: _____**			**WEEK ENDING: ____/____/____**		
	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	**TOTAL**
Electronic Ticket Machine Total £								
PLUS Emergency Ticket Packs Total £								
Sub Total £								
PLUS Unsupported Ticket Annulments Total £								
PLUS or MINUS Miscellaneous Adjustments Total £								
Final Revenue Total £								

LONDON BUSES: REVENUE RETURN			FORM 1B
OPERATOR: _____	**GARAGE CODE:** _____	**ROUTE NO:** _____	**WEEK ENDING:** ____/____/____

Emergency Ticket Packs				Unsupported Ticket Annulments			Miscellaneous Adjustments			
Date	Duty	Serial No.	Value £	Date	Duty	Value £	Date	Duty	Reason	Value £
			Total			Total				Total

D. PERFORMANCE PAYMENTS

1. Introduction

The Operator's QSI Performance (and where appropriate the Contractual QSI Performance) during each Payment Year shall be assessed by the Corporation, in accordance with the provisions of Schedule VII, to determine the amount of Performance Payments, if any, that are due, either to or from the Operator, in respect of the Route Agreement.

2. The Payment Year

2.1 The first and last days of the Payment Year shall be determined by the Corporation as set out below and as set out in Schedule IVA.

2.2 The Corporation shall determine the first and last days of the Payment Year, by reference to the Initial Expiry Date, which shall normally be determined as follows:

2.2.1 where the Initial Expiry Date is the last day of a Quarter, the final Payment Year shall end on the Initial Expiry Date, and each preceding Payment Year shall end on the last day of the equivalent Quarter, or

2.2.2 where the Initial Expiry Date is not on the last day of a Quarter, the final Payment Year shall normally end on the last day of the last full Quarter prior to the Initial Expiry Date, and each preceding Payment Year shall end on the last day of the equivalent Quarter. (An example is shown in the table below where the * Commencement Date and ** Initial Expiry Date occur part way through Quarters 1A and 6A respectively and the final Payment Year is shaded).

Quarters:	A	B	C	D
Year:				
1	*	1	2	3
2	1	2	3	4
3	1	2	3	4
4	1	2	3	4
5	1	2	3	4
6	**			

Last day of the last full Quarter prior to the Initial Expiry Date.

(Notes on the above table:
1. Is based on an initial contract duration of five years; and
2. Quarter A is the Quarter during which the Commencement Date falls, which could be any of the four Quarters of a Payment Year).

2.3 Having determined the first and last days of the Payment Year in accordance with paragraph 2.2 above (i.e. by reference to the Initial Expiry Date), in the event that the

Payment Year in the first year of operation of the Route Agreement does not consist of four full Quarters, this Payment Year shall be known as the "Initial Payment Year".

2.4 The first and last days of the Initial Payment Year shall be set out in Schedule IVA.

3. Performance Payments during the Initial Payment Year (if applicable)

3.1 During the first year of operation of the Route Agreement:

3.1.1 the QSI Performance for the Quarter during which operation of the Services commences shall be disregarded for Performance Payment purposes; and

3.1.2 Performance Payments shall only apply if the Initial Payment Year consists of at least two full Quarters.

3.2 If Performance Payments apply during the Initial Payment Year then:

3.2.1 the Contract Sum shall be calculated based on the total payments made during the Initial Payment Year;

3.2.2 references to Minimum Performance Standard shall be deemed to be references to Initial Minimum Performance Standard; and

3.2.3 in all other respects the Performance Payments for the Initial Payment Year shall be calculated and paid in accordance with the provisions of this Schedule IVD.

4. Performance Payments during the Final Payment Year

4.1 Subject to paragraph 4.2 below, in the event that the last day of the last full Quarter under this Route Agreement is prior to the Initial Expiry Date then, Performance Payments shall not apply for the period of time after the last full Quarter until the Initial Expiry Date.

4.2 If the Route Agreement is extended in accordance with clause 2 then Performance Payments (if any) shall continue to apply until the Extended Expiry Date. In the event that the last day of the last full Quarter under this Route Agreement is prior to the Extended Expiry Date then Performance Payments shall not apply for the period of time after the last full Quarter until the Extended Expiry Date.

5. Calculation of Performance Payments

5.1 Performance Payments shall be calculated by comparing the QSI Performance achieved by the Operator in the relevant Payment Year against the applicable Minimum Performance Standard seasonally adjusted (if appropriate) by the Corporation in accordance with the Route Agreement.

5.2 If the QSI Performance exceeds the Minimum Performance Standard for a Payment Year, the Corporation shall pay to the Operator a Performance Payment representing 1.5% of the Contract Sum:

5.2.1 for each full 0.10 of a minute "excess wait time" that the QSI Performance exceeds the Minimum Performance Standard, in the case of a High Frequency Route; or

5.2.2 for each full 2% "on-time" that the QSI Performance exceeds the Minimum Performance Standard, in the case of a Low Frequency Route

provided that the Corporation shall not be required to pay to the Operator a Performance Payment in a sum greater than fifteen percent (15%) of the Contract Sum in any one Payment Year.

5.3 If the QSI Performance fails to meet the Minimum Performance Standard for a Payment Year, the Operator shall pay to the Corporation a Performance Payment representing 1% of the Contract Sum:

5.3.1 for each full 0.10 of a minute "excess wait time" that the QSI Performance is below the Minimum Performance Standard, in the case of a High Frequency Route; or

5.3.2 for each full 2% "on-time" that the QSI Performance is below the Minimum Performance Standard, in the case of a Low Frequency Route

provided that the Operator shall not be required to pay to the Corporation a Performance Payment in a sum greater than ten percent (10%) of the Contract Sum in any one Payment Year.

5.4 For the avoidance of doubt, if the QSI Performance either, exceeds or fails to meet, the Minimum Performance Standard by less than:

5.4.1 A full 0.10 of a minute "excess wait time", in the case of a High Frequency Route; or

5.4.2 2% "on-time" in the case of a Low Frequency Route

then no Performance Payments shall be due to either Party for that Payment Year.

5.5 In the event that the final Quarter of the Route Agreement, in which the Initial Expiry Date or the Extended Expiry Date (as appropriate) occurs does not comprise a full Quarter then unless otherwise agreed, the QSI Performance in the last Quarter of the Route Agreement shall be excluded from all calculations of Performance Payments.

5.6 All sums payable by the Operator to the Corporation pursuant to paragraph 5.3 above shall be paid as liquidated damages and not as a penalty and the Parties acknowledge that such sums are a genuine attempt to pre-estimate the loss which shall be suffered by the Corporation in the event of failure by the Operator to meet the Minimum Performance Standard in the performance of the Services.

5.7 The payment by the Operator to the Corporation of any Performance Payments shall not relieve the Operator from its obligations to provide the Services or from any of its other obligations and liabilities under the Route Agreement.

5.8 The provisions of this paragraph 5 shall not prevent the Corporation from exercising any of its other rights under this Route Agreement whether as a result of any breach of contract by the Operator or otherwise and in particular shall be without prejudice to the Corporation's rights under clause 18 or to terminate this Route Agreement.

6. Data Suspensions

6.1 In the event of the Corporation agreeing a Data Suspension, in accordance with the provisions of paragraph 6 of Schedule VII, then the QSI Performance for the Payment Year shall be replaced by the Contractual QSI Performance, for the purposes of calculating the Performance Payment due (if any) in accordance with paragraph 5 above.

6.2 In the event that a Data Suspension agreed by the Corporation persists for more than two Quarters of a particular Payment Year, then Performance Payments shall not apply at all to that Payment Year.

7. Changing Standards

7.1 In the event that the Minimum Performance Standard is adjusted in accordance with the provisions of the Route Agreement and the effective date of such change is other than the first day of a Quarter then for Performance Payments purposes, the adjusted Minimum Performance Standard shall take effect from the first day of the Quarter following the effective date of change.

7.2 If an adjustment to the Minimum Performance Standard (pursuant to paragraph 7.1) is to be effective from the first day of the following payment Year then Performance Payments (if any) for that Payment Year shall be calculated using such adjusted Minimum Performance Standard.

7.3 If an adjustment to the Minimum Performance Standard (pursuant to paragraph 7.1) is to be effective from the first day of a Quarter (and not being the first day of a Payment Year) then Performance Payments (if any) for such Payment Year shall be calculated against a composite Minimum Performance Standard, derived by averaging the Minimum Performance Standards, adjusted to reflect seasonal factors, assigned to each of the Quarters depending on whether it comes before or after the change. The calculations and seasonal factors will be in accordance with the procedure set out in *"QSI Monitoring, Route Categorisation and Minimum Performance Standards*" (as set out in Annex C).

8. Day/Night Services

8.1 The Corporation shall monitor the QSI Performance of the entire Services, in accordance with the provisions of Schedule VII. In the event, that the Services are operated on a 24 hour basis and Schedule ID specifies that only the QSI Performance for that part of the Services specifically identified in Schedule I as being the day-service shall be assessed in terms of the QSI Performance, for the purposes of calculating Performance Payments in accordance with paragraph 5 above.

8.2 In such circumstances the Contract Sum shall be calculated by reference to the Contract Price for the day-service as set out in Schedule IVA. Provided that in calculating the Contract Sum all Deductions for Lost Mileage (including those for the night-service) shall be taken into account.

9. Termination

9.1 In the event that, for any reason, the Route Agreement is terminated prior to the Initial Expiry Date or the Extended Expiry Date (as the case may be) and the effective date of such termination is other than the last day of a Quarter, then the Quarter during which the termination occurs shall be disregarded for the purpose of Performance Payments.

9.2 In calculating Performance Payments due (if any) for the Payment Year during which the termination has occurred, the Corporation shall compare the QSI Performance for the full Quarters of the Payment Year prior to termination with the Minimum Performance Standard (seasonally adjusted as appropriate in accordance with Paragraph 8 of Schedule VII).

10. Invoicing / Payment

10.1 At the end of each Payment Year the Corporation shall calculate the Performance Payment due to or from the Operator in respect of that Payment Year and shall, within a maximum of 56 days of the end of the Payment Year, issue a Performance Payment Statement to the Operator. The format of the Performance Payment Statement shall be substantially in the form set out in Appendix A hereto.

10.2 Following the issue of a Performance Payment Statement, payment shall be made, as follows:

10.2.1 where the Performance Payments are due from the Operator to the Corporation, the Corporation may at its sole discretion set off such sums in accordance with clause 33 or may invoice the Operator for such sums, and the Operator shall pay such invoiced amounts within 14 days of receipt of such and invoice, or

10.2.2 where the Performance Payments are due from the Corporation to the Operator, the Corporation shall pay such amounts as detailed on the Performance Payment Statement within 14 days of issuing this statement.

SAMPLE PERFORMANCE PAYMENT STATEMENT

Operator Name _____

Route Agreement Number _____

Route Number _____

Payment Year	From	To
Payment Period		

Variations effective during the Payment Year

Effective Date of Variation	Contract Price £	Scheduled In Service Mileage	Deduction Figure

Actual Payments made Quality Performance Achieved

Period	Contract Price / 13 £	Scheduled In Service Mileage / 13	Deductible Lost Mileage	Deductions £	Period Contract Payment £
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
Totals					
				Contract Sum	

Quality Performance Achieved

Minimum Performance Standard (seasonally adjusted as necessary). _____

QSI Performance and Contractual QSI Performance (if appropriate). _____

Variance. _____

Performance Payment due. £ _____

SCHEDULE V

MONITORING OF OVERALL PERFORMANCE

1. Objectives
2. Passenger Priorities in respect of the Services
3. Operator's Obligations
4. Monitoring of the Services by the Corporation
5. Information and Data from the Ticketing Machines
6. Review Meetings
7. Audits and Rights of Access
8. Required Action in Respect of any Unsafe Practices

SCHEDULE V

MONITORING OF OVERALL PERFORMANCE

This Schedule provides a summary of the required quality related aspects of the Services and some of the ways in which the Corporation shall monitor the Operator's overall performance in respect of Services and its obligations under this Route Agreement.

1. Objectives

The principle objectives of the Route Agreement are to provide safe, Reliable, attractive, economic, and efficient Services to the passengers.

2. Passenger Priorities in respect of the Services

Research carried out on behalf of the Corporation demonstrates that the importance passengers attach to the various features of bus services are ranked in the following order:

2.1 Time waiting and riding;

2.2 Personal Safety (on board and waiting);

2.3 Comfort in the bus;

2.4 Crowding in the bus;

2.5 Ride quality;

2.6 Driver behaviour;

2.7 Information (before boarding and on board the bus);

2.8 Ease of getting on/off

2.9 Cleanliness; and

2.10 State of repair of the vehicles.

Those attributes wholly or partly in the control of the operator are: time waiting and riding, personal safety (on board the bus), crowding in the bus, comfort in the bus, ride quality, driver behaviour, information (inside the bus), ease of getting on/off, cleanliness and state of repair of the vehicles.

3. Operator's Obligations

Notwithstanding any of its other obligations under the Route Agreement or otherwise at law, the Operator is required at all times to deliver quality Services to meet passengers' priorities outlined in paragraph 2 above or as notified by the Corporation from time to time. In order for this to be achieved the Operator must ensure that:

3.1 all scheduled journeys are operated;

3.2 the Reliability of the Services is maximised;

3.3 all its staff are suitably qualified and trained and that its drivers maintain an acceptable level of driving standards at all times;

3.4 all its staff are polite and helpful to passengers;

3.5 when stopping at bus stops all vehicles are positioned as near to the kerb as possible;

3.6 all vehicles are clean and free from litter, graffiti and etching;

3.7 all vehicles are maintained in a good serviceable condition, in accordance with best engineering practices;

3.8 all required notices are displayed at all times;

3.9 all customer communications are dealt with in accordance with the standards and timescale specified in *"Dealing with Customer Contacts: Standards and Monitoring"* (as set out in Annex C); and

3.10 it provides safe and environmentally acceptable Services at all times and that it shall take any appropriate action to:

3.10.1 minimise the frequency and severity of accidents;

3.10.2 comply with any relevant health and safety legislation, environmental legislation or any other regulation; and

3.10.3 minimise the negative environmental impact of the Services.

4. Monitoring of the Services by the Corporation

4.1 In order to assess the Operator's performance of its obligations in paragraph 3 above, the Corporation (or its agents or contractors) shall monitor the Services as it considers appropriate from time to time, having regard to information from all sources including data available from observations, checks and audits of the Operator. In addition, the Operator shall provide the Corporation with such information as it requires from time to time to support such monitoring.

4.2 As at the date of the Framework Agreement, the Services shall be monitored as detailed below provided that the Corporation reserves the right to vary the means of monitoring or to carry out any additional monitoring as it considers appropriate and such changes shall be notified to the Operator from time to time.

4.2.1 Customer Satisfaction

The Customer Satisfaction Survey (CSS) is designed to capture the *passenger's perception* of the Operator's overall performance of the Services. The CSS comprises approximately 36,000 five minute, face-to-face interviews each year with passengers alighting at representative bus stops throughout Greater London to determine their views on the journey that has just been made.

The sample is representative of the passenger volume carried by the Operator, by time of day and by day of the week. A third party contractor (the CSS Contractor) conducts the CSS on behalf of the Corporation and interviews are carried out by a team of specially trained interviewers appointed by the CSS Contractor throughout the year.

Each passenger rates their satisfaction with 20 different aspects of the journey they have just made, their overall satisfaction with the Services and answer some profiling questions about themselves and their journeys. For each service attribute passengers provide a satisfaction rating on an 11-point scale where 0 is *Extremely Dissatisfied* and 10 is *Extremely Satisfied.*

The Corporation may use the information from CSS to target its other monitoring activities and/or to identify any requirement for additional observations, checks or audits on the Operator's performance in the provision of the Services.

4.2.2 Operated Mileage

The percentage of the scheduled mileage that is actually operated with respect to the Services shall be monitored by the Corporation in accordance with the provisions of Schedule VI.

Deductions for Lost Mileage shall be made from the Period Contract Payments in accordance with the provisions of Schedule IVB.

4.2.3 Reliability of the Services

a) The Operators' overall performance in respect of the Reliability of the Services shall be monitored and assessed by the Corporation primarily using QSIs in accordance with the provisions of Schedule VII.

b) Any Performance Payments due in respect of this Route Agreement, (either to or from the Operator), will be based on the Operator's QSI Performance (or where appropriate Contractual QSI Performance) during each Payment Year and made in accordance with the provisions of Schedule IVD.

4.2.4 Ambience Measures

The Operator's performance in respect of a range of "soft" measures of the quality of the Services shall be monitored and assessed by the Corporation primarily using the Bus Mystery Traveller Survey (MTS) in accordance with the provisions of Schedule VIII.

4.2.5 Public Communications

The Corporation shall monitor all customer communications in respect of the Services in accordance with the provisions of "*Dealing with Customer Contacts: Standards and Monitoring"* (as set out in Annex C).

The Corporation may use the information from public communications to target its other monitoring activities or to identify any requirement for additional observations, checks or audits on the Operator's performance in the provision of the Services. The Corporation shall where appropriate advise the Operator of the results of any monitoring activities arising from a public complaint in respect of the Services.

4.2.6 Driving Standards

The Corporation has established a programme of Driver Quality Monitoring (DQM) to monitor driving standards in respect of the Services. A third party contractor (the DQM Contractor) conducts individual assessments on behalf of the Corporation using qualified assessors in accordance with the provisions of *"Monitoring of Driving Standards"* (as set out in Annex C).

Where a driver is assessed as exhibiting dangerous faults or a serious incident is observed by the DQM Contractor's assessor, the Corporation will notify the Operator *immediately* in accordance with the provisions of *"Monitoring of Driving Standards"* (as set out in Annex C). On receipt of such notification from the Corporation, the Operator is required to *immediately* investigate the incident and take any appropriate action to remedy the situation and to keep the Corporation updated as to what action has been taken.

4.2.7 Drivers' Hours

The Operator shall be responsible for ensuring that all legislation (UK and where applicable, EU) regulations governing drivers' hours are not breached. Without limiting the generality of the foregoing, if the Operator is using agency drivers, the Operator shall take all reasonable steps to ensure that such drivers are not working in excess of the hours set out in such legislation. The Corporation shall have the right to monitor the effectiveness of the Operator's system of regulation and the Operator shall co-operate fully in enabling such monitoring to be carried out. The Corporation shall determine whether the Operator is complying with the procedures and practices advised to the Corporation and shall check for breaches of the legislation in accordance with *"Contract Compliance"* (as set out in Annex C).

In the event of the Operator's procedures and practice being found ineffective or unsatisfactory the Operator shall take such steps as are necessary to introduce an effective system and compliant working practices and keep the Corporation informed as to what remedial action has been taken.

In the event of breaches of the legislation being identified, the Corporation shall send a copy of its Contract Compliance Report together with a copy of the Operator's response to the Traffic Commissioner in accordance with *"Contract Compliance*" (as set out in Annex C).

4.2.8 Incidents

The Operator shall supply to the Corporation information concerning all incidents in accordance with and at the frequency specified in *"Incident Monitoring"* (as set out in Annex C).

In addition, the Operator shall inform the Corporation of any serious incident *immediately* after the event in accordance with the provisions of *"Incident Monitoring"* (as set out in Annex C).

4.2.9 Engineering Standards

The Corporation shall monitor the Operator's engineering standards in respect of the vehicles used on the Services and the effectiveness of Operator's engineering and maintenance regimes. Such monitoring will be in accordance with the Corporation's*"Engineering Quality Monitoring"* system (as set out in Annex C).

4.2.10 Government Vehicle Inspections

The Vehicle Inspection and Monitoring System (VIMS) is part of the mechanism by which the Corporation monitors the safety of operation of the Services. The Operator shall supply to the Corporation information in respect of all annual tests and vehicle spot checks in accordance with the provisions of the Corporation's *"Engineering Quality Monitoring*" system (as set out in Annex C).

In addition, the Operator shall notify the Corporation within *twenty-four hours* of the issue of a PG9 notice (immediate or delayed) marked as indicating neglect or serious failure of the Operator's maintenance regime for any vehicle used in the operation of the Services.

4.2.11 Environmental Performance

The Operator shall supply the Corporation with information and data relating to the Operator's environmental performance, including environmental projects and initiatives, upon request.

Without prejudice to clause 7, the Operator shall supply the Corporation with data pertaining to all tests or assessments relating to the environmental performance of the Operator's vehicles used in the provision of the Services.

Reports shall be submitted in the form specified by the Corporation from time to time using a method of transmission reasonably acceptable to the Corporation.

The Operator shall co-operate with the Corporation in developing and / or implementing initiatives intended to improve environmental performance. In the event that the Corporation is requested to respond at a network level to requests for information from the Greater London Authority, Central or Local Government or any other legitimate body then the Operator shall supply such information as is reasonably necessary for the Corporation to be able to give a full response.

The Operator shall provide environmental performance data covering all aspects of the operation of service including vehicles, associated buildings and infrastructure. Data requirements include energy and fuel use, waste and recycling rates. Data shall be submitted on a template to be issued by the Corporation.

4.2.12 Management of Health and Safety Performance

The Corporation monitors all safety-related aspects of the operation of the Services with a view to discharging its statutory functions in relation to the provision of bus services (including inter alia its duty to provide safe services to, from and within Greater London). Such monitoring is supported by detailed investigation of reported incidents and by consideration of any trends identified. The Operator shall co-operate with the Corporation in carrying out such investigations.

Any information supplied by the Operator in accordance with paragraphs 4.2.8 and 4.2.12 may be analysed by the Corporation and used to compile statistics comparing the relative safety performance of the Services and Operator with other operators providing services to the Corporation, or against other safety criteria.

Without prejudice to clause 6.4, the Operator shall inform the Corporation of any formal inquiry, hearing or disciplinary or enforcement action by the Traffic Commissioner or any other enforcement Agency so far as it relates to the provision of the Services by the Operator. Such notice shall be provided to the Corporation by no later than 1 (one) week of a date being agreed or set for a meeting with the Traffic Commissioner or any other enforcement agency and *immediately* in the case of disciplinary or enforcement action.

4.2.13 Driver Medical Standards

The medical fitness of drivers is essential to ensuring, maintaining and improving the quality and safety of the Services provided by the Operator. Without prejudice to any other obligations under the Route Agreement, the Operator shall take all reasonable steps to ensure the medical fitness of its drivers. To this end, the Operator shall develop, maintain and implement a policy and associated procedures in relation to driver medical standards ("the driver medical standards policy").

The driver medical standards policy shall detail the Operator's arrangements for achieving compliance with DVLA standards for driver medical fitness and address alcohol and drug use and dependency and shall detail the steps that the Operator is taking to comply with the following obligations:

1. Confirm through the request for references that the previous employer is not aware of any medical condition that would prevent the applicant from holding a Public Carriage Vehicle (PCV) licence.

2. Ensure all applicants are medically screened at the pre-employment stage. This shall include a medical review, (addressing medical, drug and alcohol requirements set by the DVLA) by a qualified medical practitioner who is familiar with DVLA requirements.

3. Screen all applicants for intoxicants prior to employment. For cause testing should take place following any incident where the involvement of drugs or alcohol is suspected.

4. The Operator shall ensure that the medical competence of drivers is monitored and maintained through:

   - requiring all drivers to inform their manager if they are unable to drive or hold a PCV licence due to medical reasons;
   - conducting employee interviews following sickness absence; and
   - conducting drug and alcohol testing at a level that satisfies the Operator that DVLA standards are being maintained with no less than 10 per cent of drivers randomly tested for drugs and alcohol annually.

5. Developing and maintaining a procedure for notifying the medical adviser at the DVLA, in writing, if a driver is unable to hold a PCV licence for medical or drug and alcohol reasons.

The Operator shall provide the Corporation with a copy of its driver medical standards policy on request.

5. Information and Data from the Ticketing Equipment

5.1 The Operator shall provide and make available to the Corporation (or its agents or contractors) all passenger journey, revenue receipts, ticket issued and other data extracted from the data modules in agreed electronic formats.

5.2 Where no electronic data is available the Operator shall provide the Corporation with such other information and documentation as the Corporation shall reasonably require in respect of passenger journey, revenue receipts and ticket issue in place of the electronic data. The information referred to shall be delivered or transmitted in such a form and at such intervals as are required by the Corporation (or its agents or contractors).

5.3 The Operator shall provide to the Corporation any such other information in respect of passenger journey, revenue receipts and ticket issue as the Corporation may reasonably require from time to time.

5.4 The Corporation, its employees, agents and contractors shall have the rights to audit revenue data and the rights associated therewith set out in Schedule X.

6. Review Meetings

6.1 The Corporation may request the Operator to attend meetings to review and discuss performance of the Services and any related matters. Such meetings may be at garage level or involve the Managing Director and senior personnel of the Operator.

6.2 The Operator shall (at its own expense) use all reasonable endeavours to enable such meetings to be attended by appropriate personnel and held at a suitable time and venue.

7. Audits and Rights of Access

The Corporation its employees agents and contractors shall have a right of access at reasonable times and upon reasonable notice to the Operator's premises, documentation and vehicles for the purpose of;

7.1 auditing contract compliance by the Operator in accordance with *"Contract Compliance"* (as set out in Annex C);

7.2 auditing all records and information to be provided under this Schedule V;

7.3 auditing responses to public communications;

7.4 carrying out health and safety inspections of vehicles, premises and systems;

7.5 assessing the engineering capability of the Operator as described in paragraph 4.2.9 above;

7.6 investigating and establishing the validity of any public complaint;

7.7 auditing compliance with relevant health and safety requirements;

7.8 auditing the Operator's arrangements for administering Bus Operator and Nominee Passes; and/or

7.9 auditing the Operators' arrangements for the training of staff delivering (and those supporting the delivery of) the Services

7.10 auditing and/or inspecting and/or investigating any other matter in relation to the provision of Services under this Route Agreement.

8. Required Action in Respect of any Unsafe Practices

8.1 Without prejudice to clause 5, if the information produced in accordance with this Schedule V or any other information which comes to the Corporation's attention from time to time indicates that there may be an unsafe practice being undertaken by the Operator the Corporation shall have a right of *immediate* access to the Operator's premises and vehicles to investigate the same. The Operator shall co-operate fully with the Corporation in carrying out such investigations and the Operator shall immediately and at its own expense remedy any unsafe practice found. The Operator shall on request supply the Corporation with details of any internal investigation carried out or commissioned by the Operator and any actions taken by the Operator following any investigation into any unsafe practice.

8.2 Where poor safety and environmental performance by the Operator is identified by the Corporation:

8.2.1 it shall be reported to the Operator who may make representations to the Corporation regarding the causes of the poor performance; and

8.2.2 the Corporation may at its discretion request the Operator to develop an action plan to improve safety and/or environmental performance and the Operator shall use its best endeavours to produce, implement and comply with such action plan.

8.3 Where analysis enables the Corporation to identify locations, vehicles, or other common features which contribute to a high accident rate the Operator shall so far as reasonably practicable co-operate in the development and implementation of improvement plans.

SCHEDULE VI

MILEAGE PERFORMANCE

1. Objective and Monitoring
2. Non – Deductible Lost Mileage
3. iBus Operated and Lost Mileage Information
4. Missing or Incorrect Route Schedule in iBus
5. Unavailability of iBus MTV Application
6. Changes to Reporting Requirements
7. Accuracy of the Data and Audit Requirements
8. Reporting of Service Disruptions

Appendix A – Lost Mileage Return Forms A & B

SCHEDULE VI

MILEAGE PERFORMANCE

This Schedule sets out the requirements of the Route Agreement in respect of the mileage operated on the Services.

1. Objective and Monitoring

1.1 The Operator must ensure that all Scheduled In Service Mileage is operated in accordance with the Working Timetable and the Operator is expected to use its best endeavours to achieve this. The Corporation recognises that operation of the full Scheduled In Service Mileage is not always possible and so in such circumstances is prepared to accept the Minimum Operated Mileage Standard set out in Schedule ID.

1.2 The Corporation reserves the right to amend the Minimum Operated Mileage Standard required during the life of this Route Agreement to reflect as the case may be:

1.2.1 the Corporation's policy of continuous improvement in the quality of bus services provided to passengers;

1.2.2 an increase in the performance of the bus network overall;

1.2.3 any change in the standards required of the Corporation by Local or Central Government, the Greater London Authority or by TfL;

1.2.4 any change to the operational characteristics of the Services;

1.2.5 implementation of new mechanisms for recording and / or reporting mileage performance; and/or

1.2.6 any other relevant changes to the circumstances of the Services.

1.3 The Operator is required to meet the Minimum Operated Mileage Standard throughout the duration of the Route Agreement.

1.4 The Corporation shall monitor cancellations and curtailments of the Scheduled In Service Mileage by the collection and analysis of information regarding the mileage that the Operator has failed to operate. The primary source of data regarding mileage not operated will be the trip record coding undertaken by the Operator and submitted to the Corporation via the iBus MTV application in accordance with the provisions of this Schedule VI.

2. Non-Deductible and Deductible Lost Mileage

2.1 Non-Deductible Lost Mileage as defined means the total number of miles that had been scheduled to operate in service in accordance with the Working Timetable that were not operated by the Operator in any Payment Period the loss of which is determined in the reasonable opinion of the Corporation as being beyond the Operator's reasonable control in accordance with the provisions of this paragraph.

2.2 Lost Mileage that does not fall under the definition of Non-Deductible Lost Mileage within the provisions of paragraph 2.1 shall be defined as Deductible Lost Mileage.

2.3 In determining whether an event is beyond the Operator's reasonable control, the Corporation shall have regard to clause 28.1.

2.4 The Operator acknowledges and agrees that the following are normally within the Operator's reasonable control;

2.4.1 staff absences;

2.4.2 mechanical breakdown and lack of suitable buses; and

2.4.3 late departures from the Operator's garage or depot.

2.5 Severe traffic congestion may be accepted as a reason beyond the Operator's reasonable control. However, the Operator is expected to manage the Services so as to minimise the impact of traffic congestion commonly encountered. The Corporation shall have regard to traffic conditions prevailing at the time the miles that are claimed to be Non-Deductible Lost Mileage were not operated. Further guidance on *"Lost Mileage Classification and Causes"* is set out in Annex C.

2.6 The Corporation may determine to an extent which is reasonable that none or only some of the lost mileage which is claimed to be Non-Deductible Lost Mileage by the Operator is Non-Deductible Lost Mileage. Such determination shall be made on the grounds that the Operator has failed to take all reasonable steps to overcome, avoid or minimise the effects of any events beyond its reasonable control.

2.7 The Corporation in determining Non-Deductible Lost Mileage shall have regard to any representations made by the Operator and received by the Corporation prior to its determination of Deductions for Lost Mileage.

3. iBus Operated and Lost Mileage Information

3.1 The trip level information derived from iBus observations collected from xxxxxxxxxxx is presented to the operator via the iBus Missing Trip Verification (MTV) application.

3.2 Trips or part trips where no observations have been recorded are presented to Operators on the Missing Trip Verification screen. Operators are required to review all missing trip records against garage supporting documentation (see paragraph 7) and assign a cause code and detailed cause code to each record. Depending on the circumstances a missing trip record may be confirmed as lost mileage or as operated mileage and coded accordingly.

3.3 Trips or part trips where observations have been recorded are presented to Operators on the validated Trip Verification screen. Where garage supporting documentation (see

paragraph 7) indicates that validated mileage was not operated, the operator is required to assign the appropriate lost cause code and detailed cause code to the trip record.

3.4 All coding for a calendar week (trips scheduled to end from 00:00 Saturday to 23:59 Friday) shall be completed and submitted to the corporation no later than 21:00 on the Thursday after the end of each week or at such other intervals in respect of such periods as the Corporation may require.

3.5 Full guidance on mileage coding and use of the MTV is detailed in *Lost Mileage Classification and Causes* (as set out in Annex C)

3.6 In addition, the Operator shall notify the Corporation within 1 (one) Working day of the date when the sum of the daily mileages not operated in any Payment Period will result in the actual operated mileage being at least 15% less than the scheduled mileage for such Payment Period (as conclusively determined by the Corporation).

4. Missing or Incorrect Route Schedule in iBus

4.1 In the event that the schedule for a specific route and service day is missing from iBus or the schedule in iBus is incorrect the Operator shall complete the MTV "Mileage Adjustment Screen" with the following information:

4.1.1 reason (missing schedule or wrong schedule);

4.1.2 the service date to which the information relates;

4.1.3 operator, garage and contractual route number;

4.1.4 scheduled in service mileage;

4.1.5 lost mileage, which the Operator accepts is Deductible Lost Mileage categorised as follows:

- Staff (ST);
- Mechanical (MC); and
- Other Deductible (OD)

4.1.6 lost mileage, which the Operator claims is Non-Deductible Lost Mileage categorised as follows:

- Traffic (TR); and
- Other Non-Deductible (ON).

4.1.7 Operated mileage information will be automatically calculated from the data input.

4.2 In addition the Operator shall provide to the Corporation, details of all trips/part trips not operated including:

4.2.1 date and start time of lost trip/part trip;

4.2.2 duty and trip number;

4.2.3 the points between which mileage has been lost;

4.2.4 mileage lost, to one decimal place;

4.2.5 cause code;

4.2.6 the reasons for lost mileage which the Operator has categorised as "Other Deductible" (OD) or "Other Non-Deductible" (ON).

4.3 The Operator shall provide the information referred to in paragraph 4.2 above in hard copy form using the Lost Mileage return Detail (Form B) as set out in Appendix A hereto, and in such electronic or other form and file format, as shall be specified by the Corporation from time to time.

4.4 The information shall be provided to the Corporation no later than 21:00on the Thursday after the end of each week or at such other intervals in respect of such periods as the Corporation may require.

5. Unavailability of iBus MTV Application

5.1 In the event that the iBus MTV application is unavailable for mileage coding within contractual timescales the Operator shall complete a Lost Mileage Return Summary (Form A) as set out in Appendix A hereto with the following information:

5.1.1 operator and garage and contractual route number

5.1.2 the week ending date to which the information relates;

5.1.3 daily scheduled in service mileage;

5.1.4 lost mileage, which the Operator accepts is Deductible Lost Mileage categorised as follows:

a) Staff (ST)
b) Mechanical (MC)
c) Other Deductible (OD)

5.1.5 lost mileage, which the Operator claims is Non-Deductible Lost Mileage categorised as follows:

a) Traffic (TR)
b) Other Non-Deductible (OD)

5.1.6 total lost mileage;

5.1.7 operated mileage (scheduled mileage in paragraph 5.1.3 above less total lost mileage in paragraph 5.1.6);

5.1.8 operated mileage percentage;

5.1.9 operated mileage before non-deductible losses, (scheduled mileage in paragraph 5.1.3 above less total deductible lost mileage in paragraph 5.1.4);

5.1.10 operated mileage before non-deductible losses percentage.

5.2 In addition the Operator shall provide to the Corporation, details of all trips/part trips not operated including:

5.2.1 date and time and start of lost trip/part trip;

5.2.2 duty and trip number;

5.2.3 the points between which mileage has been lost;

5.2.4 mileage lost, to one decimal place;

5.2.5 cause code;

5.2.6 the reasons for lost mileage which the Operator has categorised as "Other Deductible" (OD) or "Other Non-Deductible" (ON)

5.3 The Operator shall provide the information referred to in paragraph 5.2 above in hard copy form using the Lost Mileage Return Detail (Form B) as set out in Appendix A hereto, and in such electronic or other form and file format, as shall be specified by the Corporation from time to time.

5.4 The information shall be provided to the Corporation no later than 21:00 on the Thursday after the end of each week to which it relates or at such other intervals in respect of such periods as the Corporation may require.

6. Changes to Reporting Requirements

6.1 The Corporation reserves the right at any time to change the reporting requirements and procedures outlined in this Schedule VI in order to take advantage of the availability of new technology, such as iBus, in improving the method of monitoring of the Operator's mileage performance. Any such changes will be notified to the Operator.

7. Accuracy of the Data and Audit Requirements

7.1 The Operator shall use its best endeavours to ensure that mileage reporting is complete and accurate. In the event that the Operator is found (by whatever means) to have inaccurately declared the extent of Deductible Lost Mileage the Corporation shall have the right to recover from the Operator any monies due to the Corporation in accordance with clause 33.

7.2 The Operator shall keep all records and documentation relating to mileage for a minimum period of 12 (twelve) months or such other period as may be specified by the Corporation. This documentation must be sufficient detail to support the information provided to the Corporation under paragraph 3 above, and must include the following:

7.2.1 duty or bus time cards;

7.2.2 log cards (duty or bus based) detailing lost mileage;

7.2.3 supervisors log sheets (both mobile and garage based);

7.2.4 iBus log;

7.2.5 daily maintenance / engineering call out sheets;

7.2.6 staff allocation sheets;

7.2.7 daily incident books;

7.2.8 daily audit reports from the Corporation's'Inform' computer installed in the garage, or the Operator's own electronic equipment where the information can be produced; and

7.2.9 any other similar document by which the Operator can verify whether or not mileage has been operated.

7.3 The information to be recorded in respect of the log cards (referred to in paragraph 7.2.2 above) must include the following as a minimum:

7.3.1 driver (s) name and number;

7.3.2 bus and duty number (s);

7.3.3 time of departure from/arrival at the garage;

7.3.4 details of all out of service (dead) journeys;

7.3.5 details of all operated trips/part trips including start/finish points and times of departure/arrival;

7.3.6 details of all lost mileage including trip number and from/to points; and

7.3.7 reasons for all lost mileage.

7.4 The Operator shall comply at its own expense with any reasonable recommendations by the Corporation in relation to the amendment or implementation of documentation and procedures in respect of mileage recording.

7.5 The Corporation and its employees agents and contractors shall have a right of access at all reasonable times on giving reasonable notice to the Operator's premises in order to audit all matters referred to in this Schedule VI. The Corporation shall have the right to take copies of such records and information as are necessary in connection with any such audit. The Operator shall allow copies to be taken on its equipment at no cost to the Corporation.

8. Reporting of Service Disruptions

8.1 The Corporation maintains a system for the recording and dissemination of information relating to significant service disruptions. The data reported to, and held by, the system is used to advise operators of current road conditions to enable effective management and control of services. In addition, it is used by the Corporation to assess performance and the validity of mileage returns and other data collected in accordance with the provisions of Schedule V.

8.2 It is important that the data held by the system is as comprehensive and accurate as possible. The Operator shall take appropriate measures to ensure that staff are aware of the system and that they report significant disruptions as defined and in the manner explained in guidance notes issued by the Corporation from time to time.

8.3 The Corporation may introduce from time to time systems to record expected service disruptions arising from known future events and report actual impact of such events on services. The Operator shall co-operate with the implementation and operation of such systems.

LONDON BUSES: LOST MILEAGE RETURN For use in the event of incorrect or non-availability of iBus MTV data			**SUMMARY FORM (A)**
OPERATOR: _____	**GARAGE CODE:** _____	**ROUTE NO:** _____	**WEEK ENDING:** ____/____/____

REASON FOR USE (tick as applicable): Schedule Missing from iBus ☐ Incorrect Schedule in iBus ☐ MTV Application Unavailable ☐

		Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	
Scheduled In-Service Mileage									
Lost Miles	Staff								
	Mechanical								
	Other Deductible								
	Traffic								
	Other Non-Deductible								
Total Lost Mileage									
Operated Mileage									
Operated Mileage Before Non-Deductible Losses									
Operated Mileage (%)									
Operated Mileage Before Non-Deductible Losses (%)									

LONDON BUSES: LOST MILEAGE RETURN For use in the event of incorrect or non-availability of iBus MTV Data						**DETAIL FORM (B)**	
OPERATOR: _____			**GARAGE CODE: _____**		**ROUTE NO: _____**	**WEEK ENDING: ____/____/____**	
Date	Time	Duty	Trip	From - To	Miles Lost	Cause Code *	Details / Reasons #
				Total			

* Cause Code Categories: **ST -** Staff **MC -** Mechanical **OD -** Other Deductible **TR –** Traffic **ON -** Other Non-Deductible

 # Reasons must be entered for all lost mileage recorded as OD or ON lost mileage

SCHEDULE VII

QSI PERFORMANCE

1. Introduction

2. Operator's Obligations

3. Route Categorisation, Minimum Performance Standards, and QSI Thresholds

4. Monitoring of QSI Performance

5. Performance Reporting

6. Data Suspensions

7. The Introduction of MARQUIS – *Please note it is no longer intended to introduce MARQUIS however an alternative iBus electronic system is planned. This Schedule will therefore be updated to reflect the iBus system in due course. The obligations within this Schedule remain in place.*

8. Seasonalisation

SCHEDULE VII

QSI PERFORMANCE

1. Introduction

1.1 The provision of Reliable Services is a high priority for bus passengers. Therefore, subject to paragraph 1.2 below the Operator is required to ensure that the Working Timetable is operated in full, with no cancellations and with all buses departing on time.

1.2 The Corporation recognises that it is not always possible to meet the objective set out in paragraph 1.1 above and in such circumstances is prepared to accept the Minimum Performance Standard set out in Schedule ID. The Corporation has developed a process for setting the Minimum Performance Standard which reflects passengers' requirements for Reliable Services, but also recognises the impact of prevailing operating conditions. This process includes a mechanism for route categorisation whereby the differing levels of operating difficulties encountered from time to time are taken into account in setting the Minimum Performance Standard.

1.3 The Operator's performance of the Services shall be monitored against the Minimum Performance Standard. The Corporation has adopted an objective, passenger-orientated approach to monitoring the Reliability of the Services. The public can be expected to regard the Services as being Reliable if there is a high probability that the buses depart at or close to the advertised time or at the published regular intervals. Monitoring the Operator's QSI Performance sets out to examine if this objective is met.

1.4 Monitoring QSI, route categorisation and the setting of the Minimum Performance Standard are explained further in *"QSI Monitoring, Route Categorisation and Minimum Performance Standards"* (as set out in Annex C).

2. Operator's Obligations

2.1 The Operator acknowledges and agrees that one of its primary obligations under the Route Agreement is to provide Reliable Services. The Operator is therefore expected to use its best endeavours to ensure that all buses operate in accordance with the Working Timetable and depart on time or at the intervals shown, as appropriate. In addition, the Operator acknowledges and agrees that:

2.1.1 departure times or service intervals, as appropriate, shall be published at bus stops and elsewhere; and

2.1.2 passengers expect there to be Reliable Services in accordance with the published information.

2.2 The Operator acknowledges and agrees that its overall performance in respect of Reliability of the Services under the Route Agreement shall be monitored by the

Corporation (and its employees, agents and contractors) and be measured against the Minimum Performance Standard in accordance with this Schedule VII.

2.3 The Operator acknowledges that the Corporation is developing the MARQUIS System with the intention for it to be used in lieu of the Manual QSI Surveys and the Operator agrees to co-operate (acting reasonably and in good faith) with the Corporation in relation to the introduction of the MARQUIS System. Subject to paragraph 7 below, the Corporation reserves the right at anytime to use any data from the MARQUIS System in lieu of the Manual QSI Surveys.

3. Route Categorisation, Minimum Performance Standards and QSI Thresholds

3.1 For the purposes of QSI Performance, bus routes are defined as either High Frequency Routes or Low Frequency Routes. For High Frequency Routes, five route categories (four for Low Frequency Routes) have been identified as specified in *"Monitoring QSI, Route Categorisation and Minimum Performance Standards"* (as set out in Annex C).

3.2 The Corporation will set a Minimum Performance Standard for each route category and will generally allocate each of the Services to a category in accordance with the procedure contained in *"Monitoring QSI, Route Categorisation and Minimum Performance Standards"* (as set out in Annex C). Provided that the Corporation reserve the right in its absolute discretion to allocate the Services to a different category from that set out in *"Monitoring QSI Route Categorisation Minimum Performance Standards".*

3.3 From the commencement of the Route Agreement, the Minimum Performance Standard for the Services shall be as set out in Schedule ID. Unless otherwise stated in Schedule ID, or adjusted or varied in accordance with the provisions of the Route Agreement, the Minimum Performance Standard shall be fixed for the duration of the Route Agreement (and any extension thereto).

3.4 From the commencement of the Route Agreement the route categorisation for the Services (i.e. High Frequency Route or Low Frequency Route) shall be as set out in Schedule ID.

3.5 In addition to the Minimum Performance Standard, the Corporation shall set a QSI Threshold for the purposes of assessing whether the Operator is entitled to a contract extension in accordance with the provisions of Schedule IX and clause 2. The QSI Threshold shall be as set out in Schedule ID and shall unless adjusted or varied in accordance with the provisions of the Route Agreement be fixed for the duration of the Route Agreement.

3.6 Subject to the provisions of paragraph 7 below, the route categorisation process and the setting of the Minimum Performance Standard and QSI Threshold shall not be affected by the introduction of the MARQUIS System as the method by which the Corporation assesses QSI Performance.

4. Monitoring of QSI Performance

4.1 The Operator's QSI Performance shall be monitored by the Manual QSI Surveys which shall be conducted at a frequency and at such times as the Corporation considers appropriate and in accordance with the number of Manual QSI Surveys scheduled to be carried out in any Quarter, as set out in Schedule ID. Provided always that the Corporation undertakes a minimum of 90% of the scheduled, number of Manual QSI Surveys in any Quarter (before allowing for any surveys excluded for reasons beyond the control of the Corporation) with any shortfall below that level being recouped in the following Quarter.

4.2 The general locations at which the Manual QSI Surveys shall be conducted shall be as set out under the heading QSI Coverage in Schedule ID. The observations will normally be made at or close to the locations shown on the Working Timetable. Actual departure times of buses from a selection of points will be observed and recorded.

4.3 The Corporation shall use its reasonable endeavours to ensure that the shift pattern used for Manual QSI Surveys shall be as outlined in *"Monitoring QSI, Route Categorisation and Minimum Performance Standards"* (as set out in Annex C).

4.4 The Corporation shall calculate the Operator's QSI Performance as follows:

4.4.1 for High Frequency Routes (where the emphasis is on the provision of regular Services and the minimisation of long gaps), the average excess wait time (the average time that an intending passenger waits longer than the average scheduled wait, in accordance with the Working Timetable) shall be calculated, together with other statistics as may be appropriate. The excess wait time will be the difference between the average actual wait time, derived from the proportion of buses observed, and the average scheduled wait time, derived from the number of expected buses as set out in the Working Timetable; and

4.4.2 for Low Frequency Routes (where the emphasis is on the provision of punctual Services), the percentage of buses operating "on-time" shall be calculated, together with statistics as may be appropriate, by comparing the actual observed departure times with the specified departure times set out in the Working Timetable. A bus will be regarded as "on time" if it departs from a scheduled timing point not more that two and a half minutes early or not more than five minutes late.

4.5 A description of the Manual QSI Surveys and a full explanation of the methodology used to calculate QSI statistics for purposes of assessing the Operator's QSI Performance is provided in *"Monitoring QSI, Route Categorisation and Minimum Performance Standards"* (as set out in Annex C).

4.6 Subject to the provisions of paragraph 7 below, the monitoring of QSI Performance as described above, will inevitably be affected and require amendment upon the introduction of the MARQUIS System.

5. Performance Reporting

5.1 The Corporation shall provide to the Operator a Quarterly QSI Performance Report summarising the Operator's performance during the previous Quarter based on the results of the Manual QSI Surveys or the MARQUIS System as appropriate. The Quarterly QSI Performance Report will be issued to the Operator no later than 25 Working Days after the end of the Quarter to which it relates. As a minimum the Quarterly QSI Performance Report will include:

5.1.1 route details, route category and Minimum Performance Standard and if appropriate any agreed changes to the route details, route category or Minimum Performance Standard;

5.1.2 start and end dates of the Quarter;

5.1.3 QSI Performance for the Quarter;

5.1.4 confirmation of any agreed Data Suspensions for a previous Quarter and notification of any applications for Data Suspensions being considered by the Corporation at that time;

5.1.5 if a Data Suspension is agreed for a previous Quarter, the Contractual QSI Performance for that Quarter; and

5.1.6 QSI Performance for the Payment Year to date.

5.2 The QSI Performance (and if applicable Contractual QSI Performance) for the Payment Year to be used by the Corporation to calculate Performance Payments (if any), shall be shown in the Performance Payment Statement provided by the Corporation to the Operator in accordance with paragraph 10 of Schedule IVD.

5.3 At its discretion, the Corporation will continue to prepare other reports (periodic, quarterly and annual) on QSI Performance for the purposes of monitoring the Services and reporting the performance of the Services to key stakeholders, both internally and externally. Such reports include but are not limited to route level presentations, operator league tables and borough reports. For the avoidance of doubt, these reports will present actual QSI Performance not Contractual QSI Performance.

5.4 Prior to the beginning of each Payment Year, the Corporation will provide to the Operator a timetable for the processing of QSI data from the Manual QSI Surveys ("QSI data") and calculation of QSI Performance during that year. For each Payment Period, the schedule will include the dates on which the QSI data will be available to the Operator as set out in paragraph 5.5 below. Any comments or corrections on the QSI data must be submitted to the Corporation by no later than 28 days after the end of the Quarter to which the QSI data relates.

5.5 For Low Frequency Routes, the Corporation will provide to the Operator on a weekly basis tables showing the linking of observed buses to scheduled buses. For High Frequency Routes the Operator may request the Corporation to provide QSI data for a

specified day, time or location. The Corporation reserves the right to charge the Operator a fee for the production of each report requested.

5.6 Subject to the provisions of paragraph 7 below, performance reporting by the Corporation and access to QSI data is likely to change and require amendment upon the introduction of the MARQUIS System.

6. Data Exclusions/Suspensions

6.1A QSIs are intended to measure service Reliability as perceived by the passenger. Operators are expected to take all reasonable measures to maintain Reliability in the event of both foreseeable and unforeseeable disruptions. However, it is acknowledged that situations occasionally arise where it is appropriate to exclude observations over very short term time periods (one day or less) at individual route point/shift level. Data may be excluded at the sole discretion of the Corporation, based on verifiable data supplied by Centrecomm or other sources as appropriate. The Corporation will determine which data (if any) to exclude and therefore the Operator shall not, in the normal course of events, submit requests for short-term data exclusions. Guidelines outlining the grounds on which data may be excluded are included in *" Monitoring QSI, Route Categorisation and Minimum Performance Standards"* (as set out in Annex C).

6.1 To cater for instances of exceptional operating conditions which persist over a significant period of time and where factors outside of the Operator's reasonable control have adversely affected the QSI Performance, the Corporation may consider an application for a Data Suspension from the Operator for the exclusion of such potentially unrepresentative data. For example, a Data Suspension may be considered when dealing with:

6.1.1 major incidents with wide ranging impacts, lasting some time after the incident; or

6.1.2 major road–works lasting a few weeks which do not warrant a new Working Timetable.

6.2 Any application for a Data Suspension must always be based on a full Quarter(s).

6.3 The Operator must notify the Corporation of its intention to apply for a Data Suspension by no later than the last day of the Quarter in question. The Operator must then submit any application for a Data Suspension within four weeks of the end of the Quarter for which the suspension is being sought. Failure to comply with the provisions of this paragraph will result in the Corporation not considering the application for a Data Suspension.

6.4 Provided the Operator has complied with the provisions in paragraph 6.3 above the Corporation shall consider an application by the Operator for a Data Suspension and may in its absolute discretion agree a Data Suspension by notifying the Operator in writing of its decision(s). In assessing an application for a Data Suspension, the Corporation shall take into account the actions taken by the Operator to mitigate the effects of the event or incident in question. The Corporation's assessment will take the following into account:

6.4.1 the assessment by the Operator at the earliest possible juncture, of the potential impact of the event;

6.4.2 prompt action by the Operator to enter into discussions with the Corporation to evaluate possible means of minimising disruption;

6.4.3 the introduction of schedule changes in consultation with the Corporation;

6.4.4 the introduction of standby buses;

6.4.5 the use of additional supervisory/control staff;

6.4.6 changes to duty rostering;

6.4.7 initiatives on the Operator's part to minimise disruption to passengers;

6.4.8 performance of other services likely to have been affected; and

6.4.9 any other factors or considerations that may be relevant.

6.5 Subject to paragraph 6.6 below, if the Corporation agrees a Data Suspension the QSI Performance for the Quarter(s) subject to a Data Suspension shall be disregarded and replaced with the better of:

6.5.1 the Minimum Performance Standard adjusted by the Corporation to reflect seasonal factors; or

6.5.2. the Operator's QSI Performance for the equivalent Quarter(s) of the previous Payment Year.

provided that paragraph 6.5.1 shall always apply in the event that the Minimum Performance Standard for the current Payment Year differs from the Minimum Performance Standard in the previous Payment Year.

6.6 In the case of the Corporation agreeing a Data Suspension in the first Payment Year of the Route Agreement, the disregarded data will always be replaced by the Minimum Performance Standard adjusted by the Corporation to reflect seasonal factors.

6.7 The adjusted QSI Performance in accordance with paragraphs 6.5 and 6.6 above shall be referred to in the Route Agreement as the "Contractual QSI Performance".

6.8 Subject to the provisions of paragraph 7 below, processes related to Data Suspensions shall not be affected by the introduction of the MARQUIS System as the method by which the Corporation assesses QSI Performance and Contractual QSI Performance.

6.9 For the avoidance of doubt any Data Suspension agreed by the Corporation shall not relieve the Operator from any of its obligations under the Route Agreement and are only relevant in assessing whether the QSI Performance should be replaced in accordance with paragraph 6.5.

7. The Introduction of MARQUIS

7.1 The Corporation shall be entitled to use any data from the MARQUIS System for the purposes of monitoring the Operator's QSI Performance in accordance with this Schedule VII and for any other purpose (with the exception of assessing the mileage operated on the Services, for which paragraph 6.1 of Schedule VI shall apply) provided that:

7.1.1 the Corporation has given to the Operator at least 28 days written notice of its intention to do so; and

7.1.2 the Corporation can demonstrate that the MARQUIS System has been satisfactorily tested and has been operational for a period of at least three consecutive months.

7.2 If the conditions in paragraph 7.1 have been met, upon commencing use of the MARQUIS System under this Route Agreement the Corporation shall for a minimum period of three consecutive months calculate QSI Performance based on both the Manual QSI Surveys and data from the MARQUIS System. The Corporation shall report the results of both data sources to the Operator. At the end of the three month period, the Parties shall negotiate in good faith to agree any changes to the Minimum Performance Standard that are appropriate in all the circumstances as a result of the increased volume of data available from the MARQUIS System. If the Parties agree that no change to the Minimum Performance Standard is necessary, or the Parties agree an appropriate change to the Minimum Performance Standard, the Corporation shall be entitled to use the data from the MARQUIS System to ascertain the QSI Performance with effect from the Quarter immediately following such agreement.

7.3 If it is not possible for the Parties to agree to a change to the Minimum Performance Standard (if appropriate) in accordance with paragraph 7.2 within a period of 28 days (following the three month period) then the:

7.3.1 Minimum Performance Standard shall remain unchanged; and

7.3.2 the Corporation shall be entitled to discontinue the Manual QSI Surveys and use data from the MARQUIS System in its place provided that such data replicates as far as possible the QSI Coverage previously provided by the Manual QSI Surveys.

7.4 The Corporation shall be entitled to amend this Schedule VII and "The MARQUIS System" (as set out in Annex C) at anytime, to reflect any changes following the introduction of the MARQUIS System, provided the conditions referred to in paragraph 7.1 have been met.

8 Seasonalisation

8.1 The Minimum Performance Standard (and the QSI Threshold where appropriate) set out in Schedule ID may, under certain circumstances, need to be seasonally adjusted to take account of the exclusion of a particular Quarter's QSI Performance. The

circumstances under which such seasonal adjustment of the Minimum Performance Standard (and the QSI Threshold where appropriate) will apply are as follows:

8.1.1 in the event that the Initial Payment Year consists of only two or three full Quarters, then the Minimum Performance Standard for the Initial Payment Year shall be seasonally adjusted based on the number of full Quarters that comprise of the Initial Payment Year;

8.1.2 if the Corporation agrees to a Data Suspension, in accordance with paragraph 6 above, and it is appropriate to substitute a seasonally adjusted Minimum Performance Standard rather than the QSI Performance for the equivalent Quarter of the previous Payment Year;

8.1.3 if the Minimum Performance Standard (and/or if appropriate the QSI Threshold) are varied in accordance with the provisions of the Route Agreement, during a Payment Year (or during the Primary Assessment Period in the case of the QSI Threshold); and/or

8.1.4 if for any other reason the Parties agree that the Minimum Performance Standard (and/or the QSI Threshold) should be seasonally adjusted.

8.2 An explanation of the background of the need for seasonalisation and the derivation of seasonal factors is explained in *" Monitoring QSI, Route Categorisation and Minimum Performance Standards"* (as set out in Annex C).

8.3 The need for and means of adjustments for seasonal factors shall not be affected by the introduction of the MARQUIS System as the method by which the Corporation assesses QSI Performance.

SCHEDULE VIII

BUS MYSTERY TRAVELLER SURVEY; BUS OPERATOR'S GUIDE

1. Performance Monitoring
2. Survey Details
3. Reporting
4. Quality Assurance

Appendix A - The ideal bus driver

Appendix B - Ideal vehicle presentation

Appendix C - Definitions

SCHEDULE VIII

BUS MYSTERY TRAVELLER SURVEY

The programme monitors service quality and compliance with contractual requirements utilising “mystery shopping” survey and auditing techniques to measure pre-defined, key aspects of service delivery (i.e. the driver and the vehicle) in accordance with the procedure detailed in the attached Bus Operator’s Guide, version 1, published and issued to all Bus Operators from time to time (current version - May 2010 edition).

Bus Mystery Traveller Survey

BUS OPERATORS' GUIDE

May 2010

Version 1

CONTENTS

1. Performance Monitoring Programme

1.1. Introduction

The Bus Mystery Traveller Survey (MTS) has been designed to provide robust and actionable data to bus operating companies allowing them to improve performance.
The programme monitors service quality and compliance with contractual requirements utilising 'mystery shopping' survey and auditing techniques to measure pre-defined, key aspects of service delivery (i.e. the driver and the vehicle).

The key performance objectives of the monitoring programme are to evaluate performance against a standard for the ideal bus driver and ideal bus presentation.

The ideal bus driver (Appendix A) has been defined as someone who:

- Takes passengers where they want to go in safety and comfort
- Contributes to providing a reliable service
- Is helpful and courteous at all times
- Actively checks tickets
- Wears uniform and is smart in appearance

Ideal bus presentation (Appendix B)

- Clean
- Good condition
- Free of damage and vandalism
- Blinds correctly adjusted
- Ancilliary equipment in working order
- Notices, advertisements and running numbers appropriately displayed

The 'Big Red Book' was produced by TfL for distribution to all bus drivers. The book provides guidance on how and why drivers are monitored, supported by a range of background information and useful tips.

1.2. Monitoring programme

The MTS is conducted on TfL's behalf by TNS RI, a leading market research agency. The survey comprises two elements:

- Driver section - assessment of vehicle handling, customer interaction and professionalism of bus drivers;

- Vehicle section - assessment of the vehicle environment, exterior and blinds

1.3. Performance monitoring changes

The major differences between the MTS and the previous monitoring programme are:

- Combination of previous Driver Monitoring Survey and Vehicle Monitoring Survey into one assessment
- Reduced sample size
- Revision to scoring and weighting system to align with customer priorities and to simplify by removing composites.
- Making data more available through advanced internet portal
- Rationalisation of assessment areas that most items are now scored to ensure every aspect of the driver, and especially the vehicle, are contributing to the total score of the assessment. This can be noted in the Driver and Vehicle sections and assessment guidelines below.

1.4. Assessment areas

1.4.1. Driver section

The Driver section utilises mystery shopping techniques covering four assessment areas. Each area covers a number of aspects of driver performance and vehicle handling:

- **PROFESSIONALISM**
  - Driver wearing uniform
  - Driver wearing hi-vi
  - Driver appearance
  - Avoiding chatting to people standing next to cab
  - Driver attention while passengers are boarding
  - Not listening to music or using a mobile phone
  - Avoiding leaving cab unattended

- **INTERACTION**
  - Driver attitude
  - Helpfulness of driver information
  - Dispute handling
  - Use of PA system

- **SERVING THE STOP**

- Pulling up close to kerb
- Pulling up near bus stop
- Allowing time for customers to reach a seat/space or hold on
- Waiting for all passengers who were waiting at the stop to reach the bus before pulling off
- Calling at stop when bus not full

- **COMFORT & SAFETY**
  - Smoothness of acceleration
  - Smoothness of braking
  - Speed
  - Dangerous driving
  - Door operation

1.4.2. Vehicle section

The Vehicle section covers nine areas of vehicle condition:

- **HEATING & LIGHTING**
  - Interior lights on when required
  - Lights were working correctly

- **BLINDS**
  - Route number was displayed on the front, side and back of the bus
  - Route number displayed was correct
  - Route number and destination displayed was readable

- **LITTER**
  - Clutter on the dashboard of the bus
  - Level of litter
  - Were there any spills

- **SEATS**
  - Condition of the seat structure
  - Level of defacing on the structures
  - Condition of seat cushions
  - Level of defacing on the seat cushions
  - Cleanliness of the seat structure and cushions
  - Level of wear of the seat cushions
  - Any fading mismatches between the seats

- **PANELS**
  - Cleanliness of the panels, ceiling and other fixtures and fittings
  - Condition of the panels, ceiling and other fixtures and fittings

- Defacing to the panels, ceiling and other fixtures and fittings

- **FLOORS & STAIRS**
  - Level of ingrained dirt on the bus floor
  - Condition of the floor
  - Level of defacing to the floor
  - Level of ingrained dirt on the stairs
  - Condition of the stairs
  - Level of defacing to the stairs

- **WINDOWS**
  - Cleanliness of the windows
  - Damage to the windows
  - Etching on the windows
  - Graffiti on the windows

- **NOTICES**
  - Condition of the notices and adverts

- **EXTERIOR**
  - Cleanliness of the exterior of the bus
  - Condition of the exterior of the bus
  - Extensive mismatches with the exterior paintwork
  - Defacing on the outside of the bus

2. Survey Details

2.1. Sampling and fieldwork

2.1.1. Number of assessments

A target number of 1700 assessments is completed each period. The number of assessments undertaken provides robust data at garage level and reflects scheduled mileage (a proxy for passenger volumes) at both garage and operator level.

2.1.2. Journey planning

Journey plans have been devised to meet the sample requirements whilst linking a number of individual assessments into sequences. The linked sequences create a journey for completion by an assessor working a single shift.

Journey planning takes into consideration the geographic spread of the garages, location and frequency of routes and time of day/day of week targets applied to the sample as a whole. Particular attention is paid to small garages to ensure

that a spread of routes is covered and ensuring one assessor does not undertake all assessments for that garage.

2.1.3. Smaller Garages

Within the sample, adjustments have been made for smaller and larger garages by applying a minimum of 10 assessments and a maximum of 30 assessments per period respectively.

Dedicated night buses and buses operating on school routes have been excluded from the survey.

2.1.4. Spread of assessments

Time of day and day of week targets are also set at both operator and garage level to ensure a spread of assessment times. The assessment day is divided into time bands with the proportion of assessments for each time band determined by network passenger volumes.

2.1.5. Service Changes

Target assessments for each garage are updated each period to reflect service changes.

2.1.6. Double deck buses

When travelling on double-deck buses the assessor assesses the interior of only one deck. To ensure that across the whole survey one lower deck assessment is made for each upper deck assessed assessors are provided with clear guidelines based on their Journey Plan.

2.1.7. Articulated buses

On articulated buses the assessors assess either the front or rear half of the bus. Similar rules as those applied for double deck vehicles are in place for articulated buses to ensure that across the whole survey one front section assessment is made for each rear section assessed.

2.1.8. Paying the fare

The survey represents payment by Oyster and Bus Pass/Travel Card payment. Journeys are rotated to ensure a spread of payments methods across the quarter. Payment and tickets requirements are specified for each individual sequence according to targets and incorporated within the journey plans. Comprehensive information is provided to the assessors on ticket types, availability and where they can be purchased.

2.1.9. Data collection and capture

The assessments are undertaken by a panel of assessors employed by TNS RI. The optimum panel size is approximately forty trained assessors with a spread of ages and gender.

The panel size and spread is regularly reviewed to ensure that it provides sufficient coverage.

Assessments are made by the assessors equipped with hand-held electronic devices with a pre-loaded questionnaire designed to follow the chronological flow of a journey. The use of electronic data collection provides flexibility, quality control, ease and speed of data capture and speed of reporting.

2.2. Questionnaire

2.2.1. Questionnaire design principles

The questionnaire comprises three types of assessment questions:

- Simple binary (Yes/No) questions:

Did the Oystercard reader appear to be working?	Yes
	No

- Scaled questions:

What sort of answer did they give you?	Basic answer
	Full/Helpful answer
	Answer obviously wrong
	Driver said they didn't know

- The third type of assessment question requires the assessor to provide an assessment and then an explanation or reason for recording a particular response. This is used where there may be mitigating circumstances for the driver being unable to answer the question, for example the driver was making a call on the bus radio:

Why was the driver not engaging with passengers?	Dealing with other customers
	Dealing with other matter
	Watching CCTV
	No apparent reason for not engaging
	Driver making a call on bus radio
	Other good reason (please comment): e.g. driver is distracted from something on the road
	Other bad reason (please comment): e.g. driver is eating/ drinking

The reasons for the driver being distracted when dealing with a customer are used in determining the scoring for this assessment item (see Section 2.6.1 on scoring). The “Other good reason” and “Other bad reason” options exist to allow the assessor to record details of behaviour that don’t fit any of the other classifications.

The vehicle section of the questionnaire has been designed to capture detail on the cleanliness, and condition of each bus assessed. It covers the bus exterior and interior and an assessment is made across the areas of the bus/deck seen by the assessor.

The majority of interior and exterior aspects of the vehicle are assessed using a four or five point scale.

The assessments levels are shown below, with an example of the definitions for each level.

A definitions document can be found in Appendix C.

Area	Level	Definition Example
CONDITION	None visible	No visible damage
	Minor	Slight damage visible on inspection to small area
	Moderate	Heavier damage easily visible to small area OR Slight damage visible on inspection to several small areas
	Extensive	Heavier damage, easily visible to several small areas or larger area OR Extensive damage anywhere.
	Hazardous	Damage that could cause injury
CLEANLINESS	None visible	Free of dirt or grime. It is visible that it has been thoroughly cleaned.
	Minor	Small areas of dirt or grime. Dirt starting to build up
	Moderate	Heavier build up of dirt or grime. Immediately noticeable
	Extensive	Extensive areas covered in heavy, dirt or grime
DEFACING	None Visible	No defacing visible
	Light	Slight defacing visible on inspection of a small area
	Moderate	Heavier defacing easily visible to small area OR Slight defacing visible on inspection to several small areas or larger area
	Extensive	Heavier defacing, easily visible to several small areas or larger area OR Extensive defacing anywhere
	Hazardous	Sexual or racist defacing.

In addition, if any aspect of the interior or external condition of the vehicle is assessed as being in a hazardous condition this will be treated as a Reportable Incident. Sexually or racially offensive graffiti is also classified as a Reportable Incident (see section 2.5)

2.2.2. Questionnaire format

The questionnaire is designed in a format that is suitable for use with the electronic data capture equipment used by the assessors and has been designed

and tested to follow a logical sequence to allow easy completion in the order the journey is made.

The electronic data capture equipment incorporates logical routing so assessors can only see those questions which are appropriate to their experience (i.e. if they pay by Oyster card they only see questions relating to that payment method). At the end of the questionnaire they can review their answers and any questions which have not been answered are highlighted.

Each questionnaire must be completed in full before assessors continue their journey or start to go home.

2.3. Driver sections and assessment guidelines

Details of the journey, payment and vehicle are recorded by the assessor at the start of each journey before boarding the bus.

The following sections of this Guide provide details of the questions that make up the four areas assessed in the driver section of the survey: Professionalism, Interaction, Serving the stop and Comfort & safety.

2.3.1. Professionalism

These questions include if the driver was wearing a uniform, if they wore a hi-vi, whether they held any conversations, if they were well presented, if they paid attention to boarding passengers. It also asks if the driver used an earpiece, listened to a radio or used a mobile phone and if they left the cab unsecured without good cause – these are Reportable Incidents if they do.

Q3.1 Was the driver wearing uniform?		**Q3.2aiii** Was the driver wearing a hi-vi (hi visibility jacket)		**Q3.2** Was the driver well presented in appearance?		**Q8.2** Conversation with someone standing next to cab			
Yes	No	Driver wearing hi-vis	Driver not wearing hi-vis	Driver well presented	Driver not well presented	NA - No one next to cab	NA - On Upper Deck	No	Yes

Q4.2a - Reason for not looking at printed ticket							
Dealing with other customers (Good reason)	Dealing with other matters (Good reason)	Watching CCTV (Good reason)	No apparent reason for not checking (Bad reason)	Driver making a call on bus radio (Good reason)	Other Good reason	Other Bad reason	Other
Q4.5a - Reason for not engaging with passengers when boarding?							
Dealing with other customers (Good reason)	Dealing with other matters (Good reason)	Watching CCTV (Good reason)	No apparent reason for not checking (Bad reason)	Driver making a call on bus radio (Bad reason)	Other Good reason	Other Bad reason	Other

Q9.8 Driver wore earpiece / used mobile / listened to music		**8.5a** Upon leaving the bus, did the driver secure the cab?			**8.5ai** What was the reason?						
Yes (RI)	No	Yes	No	Unable to see	Change of driver (Good reason)	Driver went to the toilet (Good reason)	Driver went into a shop (Bad reason)	Other Good reason	Other Bad reason	Don't know	Other please comment

Uniform - There is no standard uniform for bus drivers but they are expected to wear the uniform issued by the company for whom they work. The assessors identify if the driver is wearing a uniform by looking for a shirt/top or jacket with a company logo. Wearing another item of clothing such as a hat with a branded logo would negate wearing a uniform, resulting in the driver being assessed as not wearing a uniform.

Appearance - The driver does not need to be wearing uniform to be well presented. The assessors are instructed that the driver should not be wearing jeans, trainers or non-company baseball caps and there should be no visible tears, grime or stains on their clothing.

The drivers should not wear a high visibility vest whilst in the driver's cab. Note that where high visibility stripes are incorporated into uniform jackets, this will not affect scores.
If the assessor judges that the driver is not well presented, they are required to provide an explanation choosing all options that apply to specify what was wrong.

Conversation with someone standing next to the driver's cab - assessors are instructed that as a rule drivers must not talk to another person while they are driving. The only exception to this is if they need to make an announcement on grounds of safety or in an emergency, when briefly talking to a member of staff (e.g. a controller about the service, but not chat to other drivers) or to make short announcements about the bus location or operational matters.

Concerning the identification of staff members, assessors include any relevant official in uniform (e.g. TfL staff, bus operating company officials, other bus drivers, police or community support officers).

Driver attention when passengers boarding
Wearing an earpiece/using a mobile phone or headset/listening to music radio – Drivers are not allowed to have a radio playing in the cab. Talking on a mobile phone is illegal and not permitted. Drivers are also not allowed to listen to anything through headphones or talk into mouthpieces. If the driver is observed doing any of these by the assessor it is recorded as a Reportable Incident.

If the driver is wearing an earpiece that is clearly a hearing aid, this is not recorded as a Reportable Incident.

Bus left unattended while passengers on board - if the bus is left unattended while passengers are on board, the assessor records this as a Reportable Incident. However, in certain circumstances (e.g. for a driver to go to the toilet in exceptional circumstances) the driver may leave the bus while passengers are on board. In these situations the driver should always turn off the engine and secure the cab.

The assessor provides comments on the reason (if known) plus the length of time the bus was left unattended.

Sometimes it is necessary to change driver mid-way along the route. If a crew change occurs while an assessor is on board the bus, they are instructed that the change should be done with the minimum of delay (typically 2-3 minutes) and that a driver should never leave a bus unattended with passengers on board.

2.3.2. Interaction

This section covers the driver's response to questions, the handling of any disputes and the quality of any PA system announcements the driver makes.

Q4.7 When you asked your question how did the driver respond/what was their manner?				**Q8.2d** Driver's manner in answering question from other passenger			
Polite / Professional / Friendly	Indifferent / Ignored Passenger	Rude / Sarcastic	Abusive (RI)	Polite / Professional / Friendly	Ignored / Indifferent	Rude / Sarcastic	Abusive (RI)

4.6 When you asked your question did the driver answer you?			**Q4.6a** Helpfulness of driver's answer to your question			
Yes	No	Unable to ask question	Basic answer	Full/helpful answer	Answer obviously wrong	Driver said they didn't know

Q8.4 How did the driver handle the situation? (Disputes)					**Q8.6a** Driver's PA announcement				
Professional	Ignored / Indifferent	Rude / Sarcastic	Abusive (RI)	Driver unaware of dispute / argument	Helpful	Unhelpful	Could not understand	Could not hear	Too loud

Questions to the driver - The assessor asks the driver a question that is relevant and appropriate to the route in order to judge the driver's route knowledge and courtesy in relating to the customers on the bus.

The questions are designed to allow the driver to demonstrate basic knowledge of the route being worked and basic ticketing knowledge.

In making the assessment of the driver's knowledge the assessors are instructed that all bus drivers should know basic information only about the route they are driving on. The minimum requirement is the principal locations along the route, including the origin and destination. In addition, for the route they are driving on the driver is also expected to know the Underground, National Rail and Docklands Light Railway stations, bus stations and tram stops. The Bus Service Guide section of the Big Red Book provides a list of principal locations on each London bus route.

For example: drivers on route 11 would be expected to know that the route serves the following principal locations:

Liverpool Street Station (Tube and Rail station), Bank (Tube and DLR station), Mansion House (Tube station),
St. Paul's, Ludgate Circus (CityThameslink Rail station), Fleet Street, Aldwych, Trafalgar Square (Charing Cross Tube and Rail station), Westminster (Tube station), Victoria (Tube and Rail station), Victoria Coach Station, Sloane Square (Tube station) , Chelsea, Fulham Broadway (Tube station)

Drivers may give more information about landmarks, other routes or services, or where to find out further information but this is not expected.

In response to ticketing questions, while drivers may know specific locations along a route where an Oyster card can be purchased or topped up, the assessor will be more concerned with the driver knowing, in general, that passengers can buy and top up cards at some newsagents, Underground stations and online.

Drivers are also expected to know the time of the last bus on that route and the approximate length of time to destinations along the route.

Driver's response - drivers are always expected to be courteous to passengers and, in addition to the assessor's question being a test of the driver's route knowledge, it is also used to assess the driver's manner.

If the driver is 'abusive' in their response then this is recorded as a Reportable Incident.

Terminations, delays or disruptions – assessors are instructed not to board a bus if it is clear (i.e. displayed on the blinds) that it is stopping at a destination short of its regular destination. However if the assessor boards a bus which is stopped short during a journey and this was not evident to the assessor when boarding, then it is recorded as Yes at Q8.7.

Open boarding and payment method – If the bus being assessed is an articulated bus with open boarding the electronic data capture equipment routes the questionnaire past the payment questions.

Similarly, once the assessor has answered the payment method question, only questions relating to that method of payment are shown

Ticketing - the assessors are provided with clear instructions on how to recognise if the Oyster card reader is working correctly or not. They are also instructed that the driver needs to look engaged in the ticket checking process (checking the Oyster readout on the ETM, visually checking printed tickets and so on). It is recognised, however, that this may not always be achievable (e.g. if the driver is dealing with a customer query).

Dispute handling - this question requires an explanation to be provided by the assessors, who are instructed to put in as much detail as possible to ensure the driver's behaviour is clearly understood and an appropriate assessment made. The basic rule, though, is that the driver should always be professional and courteous to passengers, staff and other road users, even when provoked.

The assessors are provided with the following guidelines of the most frequent disputes they are likely to encounter during their journeys and how drivers are expected to respond. Obviously, this cannot be a comprehensive list covering all situations and eventualities and it is for this reason that this assessment item allows for open-ended comments from the assessors.

Possible areas of dispute:

Fare disputes

At all times the driver should be professional and never accuse anyone of fraud. If there is a dispute or appears to be a problem the driver should politely point this out and, where not at a Pay Before You Board Route/Area, ask the passenger to pay the cash fare. Sometimes, the problem can be resolved by the driver issuing an Unpaid Fare Notice.

If the Oyster card reader indicates that a passenger's Oyster card is invalid, the driver should check what is wrong and try to resolve the problem. In a few cases, drivers may withdraw the pass but they must always be professional and never accuse anybody of fraud.

If there is not enough money on a pre-pay Oyster card, the driver should try and advise the passenger of this and do one of three things: explain where the passenger can get further help, invite them to pay a cash fare to make their journey (this may need to be from a Roadside Ticket Machine) or give them an Unpaid Fare Notice if they are unable to pay (and/or) in obvious distress.

Drivers are expected to politely challenge teenagers who do not present their Oyster card if they believe the young person is aged 11-18. If the driver believes they are over 10 and have not got a valid Oyster card, the driver should ask them to pay a cash fare. If the child refuses to pay, the driver can refuse to take them. If an individual or group of teenagers are threatening or abusive the drivers are not expected to put themselves at risk.

If the card reader indicates that a Freedom Pass is invalid, the driver should ask to see the photocard instead, allow them to travel free if it is valid and advise them to get a replacement pass.

Drivers should not ask blind and visually impaired people to use the card reader if it is causing them a problem.

There are also some groups of passengers that do not need to show the driver a ticket:

- Children do not need to show a ticket or photocard if they look under 11.
- Blind people with guide dogs
- Wheelchair users. Anybody accompanying a wheelchair user, however, does need to show a valid ticket/pass or pay a cash fare.

If a passenger refuses to pay a cash fare, drivers should not allow them to travel. However, the driver must not leave anybody who appears to be in obvious distress stranded. If somebody cannot buy a ticket, the driver should issue an Unpaid Fare Notice.

If a passenger offers payment and the driver does not have enough change drivers can help by asking if another passenger can assist with change, although this is not compulsory. If another passenger cannot help, the passenger should be allowed to travel and an Unpaid Fare Notice issued.

There are a number of other tickets and ticketing situations drivers will encounter (e.g. allowing Underground passengers onto bus in the event of disruptions to Underground services) and that can be a cause of dispute. In assessing whether the driver has behaved appropriately in resolving these situations, the key consideration for assessors is that at all times, drivers should be courteous and professional and never accuse anybody of fraud.

Assessors are likely also to encounter situations where ticketing equipment is not working or the driver is unable to process a fare. These situations can also lead to disputes between drivers and passengers and in making assessments of how a driver handled these situations assessors are provided with the following guidelines:

If a Roadside Ticket Machine is not working and passengers cannot buy tickets before boarding, the driver can, at their discretion, offer to take passengers to the next stop where a ticket can be bought from a functioning ticket machine. If this is not possible or the machine has taken a passenger's money, then the driver should issue an Unpaid Fare Notice.

If the driver's ticket machine breaks down the driver should give each cash fare paying passenger an emergency ticket and if the Oyster card reader is not working drivers should let passengers with Oyster Cards travel without payment. All other passengers should pay or present a valid ticket. If the bus breaks down or is turned short of its original destination, drivers should ask passengers who have paid cash or who have used a Pay As You Go Oyster card to come and see them. The driver should explain that they can transfer onto any other London bus service going the same way, and remind PAYG users not to touch in on the next bus. The driver must give a transfer ticket to the driver(s) of the bus(es) taking these passengers. Transfer tickets must not be given to passengers. So far as is practical, drivers should make sure all passengers are transferred to another bus and not left stranded. The needs of visually or hearing impaired passengers should also be taken into account by the driver.

Wheelchairs and buggies

Once again, in making the assessment the assessor records the manner in which the driver resolved any dispute bearing in mind that, despite any provocation by passengers, the driver must always be professional.

The assessors are provided with the following guidelines to make their assessment of the appropriateness of the driver's behaviour in dealing with a dispute involving wheelchair users and people with young children with buggies.

Wheelchair users have priority over the designated space on buses as this is the only safe place they can travel. If the space is already occupied by another passenger or buggy, drivers are expected to ask them to move or fold their pushchair down to make room. However, if the passenger refuses, drivers cannot make them.

Nobody already on board the bus should be asked to leave.

If a passenger refuses to fold their buggy down, drivers should politely explain why to the wheelchair user and advise them to wait for the next bus. Most buses only have room for one wheelchair.

There is no set limit to the number of buggies allowed on buses. The number carried will depend on the size and type of bus, how busy it is and how many buggies are already on board. Drivers are told to allow as many unfolded buggies onto their bus as is practical.

Passengers with buggies should only ever be asked to fold them if it will cause an obstruction or a wheelchair user requests to come aboard and there is not enough room. It is acceptable for drivers to pre-warn passengers with buggies before they board that they may have to fold them.

Passengers with double buggies may board through the centre doors, after asking permission from the driver. The passenger should show or present a valid ticket/pass or pay a cash fare in the usual way.

Dealing with anti-social behaviour

Drivers are not expected to get out of their cabs to intervene in situations where passengers are behaving in an anti-social way (e.g. smoking or playing loud music).

There are things the driver can do, however, depending on the situation. For example, buses are progressively being fitted with public address systems which give drivers the option to trigger an automated announcement such as “please remember smoking is not permitted on London’s buses”. In more serious cases, drivers can radio TfL’s emergency control centre to summon assistance from the emergency services. The main guidance for assessors in making assessments of how a driver deals with anti-social behaviour on the bus is that the driver must not do anything to aggravate the situation.

Refusing to allow animals or goods onto the bus

Under certain circumstances the driver can refuse to allow animals on the bus. In such circumstance the driver must be courteous.

Guide dogs and other assistance dogs must be allowed to travel at all times and all animals travel free. Other dogs and ‘inoffensive’ animals may be carried at the discretion of the driver.

Drivers can also refuse to allow anything on board which appears to be dangerous, bulky or likely to damage the fittings of the bus and/or soil other passengers’ clothes. Examples of such items include petrol cans, open containers, open bottles or cans of alcohol and extremely bulky items of luggage (anything more than 2 metres long and/or anything one passenger cannot carry by themselves).

Handling complaints

On occasions, assessors may observe passengers who wish to make a complaint about a driver and demand to see the driver's identification. In such situations the driver need not show an ID badge, but should avoid a confrontation with the passenger by directing them to the information poster displayed on each deck of the bus that provides details how to contact London Buses Customer Services.

2.3.3. Serving the stop

This section covers how well the driver positioned the bus at the stop, bus stop obstructions, awareness of customers at the stop, allowing time for customers to get to a seat or space and calling at all stops unless the bus is full.

Q2.1a Failed to pull up close enough to kerb (boarding)							
No reason (too far from kerb)	Blocked by other buses (Good reason)	Blocked by other vehicles (Good reason)	Roadworks (Good reason)	Blocked by street furniture (Good reason)	Blocked by railings (Good reason)	Other (Good reason)	Other

Q10.1a Failed to pull up close enough to kerb (alighting)

No reason (too far from kerb)	Blocked by other buses (Good reason)	Blocked by other vehicles (Good reason)	Roadworks (Good reason)	Blocked by street furniture (Good reason)	Blocked by railings (Good reason)	Other (Good reason)	Other

Q2.2a - Failed to pull up near to bus stop (boarding)					
No reason (too far from stop)	Blocked by other buses (Good reason)	Blocked by other vehicles (Good reason)	Roadworks (Good reason)	Other (Good reason)	Other

Q9.5 Moving off				**Q2.2b -** Waited for all passengers who were waiting at the stop to reach the bus before pulling off	
Allowed passengers time to get to seats or hold on	Occasionally moved off too soon for passenger comfort	Frequently moved off too soon for passenger comfort	No regard for passenger safety and placed someone in danger (RI)	Yes	No

1.20 Was the bus that did not stop full?			
Yes	No	Not Visible	Other

Pulled up close enough to the kerb - the driver should pull in close enough to the kerb so that passengers do not have to step into the road. If the bus is not judged close enough by the assessor they are required to provide reasons using all the options that apply to describe what the reason was. Scores will not be affected for reasons that are beyond the driver's control (e.g. a parked vehicle).

In assessing this item, the assessor does not take into account how far the bus is from the stop. This is recorded separately at Q2.2.
If the door of the bus is obstructed by railings or street furniture the assessor is instructed to record 'No' at Q2.1 irrespective of how close the driver pulled up to the kerb.

Assessors are briefed on the procedure for a wheelchair user boarding and alighting the bus.

At all bus stops the driver is expected to check and make sure that all passengers who want the bus have time to board or alight (assessors recognise that the bell has been rung by the illuminated "bus stopping" sign inside the bus).

As with the boarding sections of the assessment, this section also covers how well the driver positioned the bus at the stop and bus stop obstructions for passengers alighting.

Getting to a seat/space - assessors are instructed that drivers should give elderly and disabled passengers enough time to sit down or hold on before moving off. However, it is acceptable for the driver to accelerate away gently so that passengers can steady themselves.

Before closing the doors and pulling away, drivers must make sure all the passengers who were waiting have got on the bus. Once they have closed the doors, it is down to the driver's discretion whether he/she opens again for new passengers at that stop.

Door opening - the doors should never be open when the bus is moving and drivers should generally only let passengers on or off the bus at designated bus stops. However, assessors are instructed that in exceptional circumstances (e.g. the bus is stuck in traffic for a significant amount of time) the driver can exercise discretion and pull in to let passengers board or alight provided it is safe to do so.

Bus full if passing stop – the bus should only fail to call at a scheduled stop if it is full. If the assessor observes a bus on the route they are waiting to assess which is not full pass their stop this is recorded as a reportable incident. The only valid reason for failing to call at a scheduled stop is if it is full.

2.3.4. Comfort & safety

This section comprises questions regarding smoothness of ride and whether the assessor felt in danger due to poor driving standards.

<table>
<tr><td colspan="4">Q9.2 Smoothness of acceleration</td><td colspan="4">Q9.3 Smoothness of braking</td></tr>
<tr><td>Good - felt comfortable</td><td>Occasionally too harsh – felt uncomfortable</td><td>Frequently too harsh – serious discomfort</td><td>Felt in danger (RI)</td><td>Good - felt comfortable</td><td>Occasionally too harsh – felt uncomfortable</td><td>Frequently too harsh – serious discomfort</td><td>Felt in danger (RI)</td></tr>
<tr><td colspan="4">Q9.4 Speed</td><td>Q9.7 Felt in danger because of the driver's poor driving for any other reason?</td><td colspan="3">Q9.6 Door operation</td></tr>
</table>

Good - felt comfortable	Occasionally too harsh – felt uncomfortable	Frequently too harsh – serious discomfort	Felt in danger (RI)	No	Yes Felt in danger (RI)	Doors operated correctly	Doors opening or closing whilst vehicle moving (RI)	Doors left open whilst vehicle moving (RI)	N/A on upper deck

In assessing the smoothness of ride the assessor does not make a technical or operational assessment of the driving standards. This is assessed using the Driver Quality Monitoring survey conducted on behalf of TfL by the Driving Standards Agency.

The assessor makes the assessment acting as a customer using their own knowledge and experience. The assessor takes into account that it is central to the bus driver's role to get passengers where they want to go in safety and comfort. If a driver accelerates too quickly or pulls up too sharply, corners too severely, or travels down the road too quickly this is recorded by the assessor. The assessor also takes into account whether they felt uncomfortable at any time during their journey as a result of the driving standards or vehicle handling.

If at any time during their journey the assessor feels that they or any passengers are endangered because of driving standards or vehicle handling, this is recorded as a Reportable Incident.

2.4. Vehicle sections and assessment guidelines

The following sections of this Guide provide details of the questions that make up the nine areas assessed in the vehicle section of the survey: Heating & lighting, Blinds, Litter, Seats, Panels, Floors & stairs, Windows, Notices and Exterior.

2.4.1. Heating & lighting

Q6.5 Were interior lights on when required?	**Q6.6** Were all lights working correctly?	**6.4d** Temperature on the bus

N/A Daylight	Yes	No	Yes	No	Heating was switched on in very warm/hot weather (RI)	Heating was apparently not switched on in very cold weather (RI)	Neither of the above

Interior lights on when required – If the interior lights are required due to a low level of natural light then this question will be assessed.

All lights working correctly – All interior lights visible to the assessor will be included in the assessment. For all to be deemed working correctly there must be no flickering.

Temperature on the bus – Where the interior of the bus is very warm due to the weather the assessor will record whether it appeared that the heating was switched on. Where the interior of the bus is very cold due to the weather the assessor will record whether it appeared that the heating was not switched on.

2.4.2. Blinds

Front Blinds - Route and destination							
Q1.1a Route number and destination displayed on the front of the bus?		**Q1.1ai** Were they correct or incorrect?			**Q1.1bii** Was the route number and destination readable?		
Yes	No	Both correct	One or more incorrect	Unable to tell (unreadable)	Some/All unreadable	Some/All readable with difficulty	All easily readable

Side and Rear Blinds - Route		
Q10.3a Route number displayed	**Q10.3b** If route number was displayed, were they correct or incorrect?	**Q10.3c** Was the route number readable?

on the side and the rear of the bus?							
Yes	No	Both correct	One or more incorrect	Unable to tell (unreadable)	Some/All unreadable	Some/All readable with difficulty	All easily readable

Blinds should be easily readable. Assessors record whether the information required on the front, side and rear blind is present and easily readable. If it is not easily readable they record whether it was readable with difficulty or unreadable. The reason why it is unreadable is then collected, for example if it was incorrectly aligned, faded, poorly lit etc.

2.4.3. Litter

Q1.4 Clutter on the dashboard at the front of the bus?		**Q6.1** Level of litter			**Q6.2** Were there any liquid spills?	
Yes	No	No litter	Some litter	Lots/offensive litter	No	Yes

Dashboard free from clutter – the dashboard should be free from litter or clutter of any kind. An exception is made for a notice displaying the running number.

2.4.4. Seats

Q6.7b Condition of the seat structure?				
No signs of damage	Minor damage	Moderate damage	Extensive damage	Hazardous damage (RI)

Q6.7e Level of defacing of structure?

No signs of defacing	Light defacing	Medium defacing	Heavy defacing	Offensive defacing (RI)

Q6.7c Condition of seat cushions?				
No signs of damage	Minor damage	Moderate damage	Extensive damage	Hazardous damage (RI)

Q6.7f Level of defacing of cushions?				
No signs of defacing	Light defacing	Medium defacing	Heavy defacing	Offensive defacing (RI)

Q6.7a Cleanliness of the seat structure and cushions?				**Q6.7d** Level of wear of the seat cushion?				**Q6.7g** Extensive fading mismatches between seats?	
No signs of dirt	Light dirt	Moderately dirty	Very dirty	No signs of wear	Light wear	Moderate wear	Heavily worn	Yes	No

Condition & defacing of seat structure – the seat structure should be free from damage including bad repairs. It should also be free from graffiti or etching. Assessors will note the condition of all seat structures visible.

Condition & defacing of seat cushions –seat cushions should be free from damage including bad repairs. They should also be free from graffiti or etching. Assessors will note the condition of all seat cushions visible.

Cleanliness of seat structure & cushions – assessors will assess the cleanliness of all seats visible.

Level of wear of seat cushion – assessors will assess the level of wear of all seat cushions visible.

Extensive fading mismatches between seats – fabric mismatches must be obvious for a 'Yes' to be recorded.

2.4.5. Panels

Q6.11a Cleanliness of the panels, ceiling and other fixtures and fittings?				**Q6.11b** Condition of the panels, ceiling and other fixtures and fittings?				
No signs of dirt	Light dirt	Moderately dirty	Very dirty	No signs of damage	Minor damage	Moderate damage	Extensive damage	Hazardous damage (RI)

Q6.11c Defacing to the panels, ceiling and other fixtures and fittings?				
No signs of defacing	Light defacing	Moderate defacing	Heavy defacing	Offensive defacing (RI)

Cleanliness, condition & defacing of the panels, ceiling and other fixtures & fittings – assessors are instructed to assess the cleanliness, level of damage (including bad repairs) and level of defacing to all internal walls, grab handles, designated luggage areas and other internal areas of the bus not assessed elsewhere.

2.4.6. Floors & stairs

Q6.9a Level of ingrained dirt on the bus floor?				**Q6.9b** Condition of the floor?				
No ingrained dirt visible	Minor dirt	Moderate dirt	Extensive dirt	No signs of damage	Minor damage	Moderate damage	Extensive damage	Hazardous damage (RI)

Q6.9c Level of defacing to the floor?				
No signs of defacing	Light defacing	Moderate defacing	Heavy defacing	Offiensive defacing (RI)

Q6.10a Level of ingrained dirt on the stairs?				
No ingrained dirt visible	Minor dirt	Moderate dirt	Extensive dirt	NA – single decker bus/could not assess stairs

Q6.10b Condition of the stairs?					
No signs of damage	Minor damage	Moderate damage	Extensive damage	Hazardous damage (RI)	NA – single decker bus/could not assess stairs

Q6.10c Level of defacing to the stairs?				
No signs of defacing	Light defacing	Moderate defacing	Heavy defacing	Offensive defacing (RI)

Level of ingrained dirt, condition and defacing of floor – assessors will consider the level of ingrained dirt, damage (including bad repairs) and defacing of all areas of the floor visible to them.

Level of ingrained dirt, condition and defacing of stairs – this will only be assessed where the assessor has had the opportunity to inspect the stairs in the course of their trip.

2.4.7. Windows

Q6.8a Cleanliness of the windows?				**Q6.8b** Was there any damage to the windows?	
No signs of dirt	Light dirt	Moderately dirty	Very dirty	No Hazardous damage	Hazardous damage (RI)

Q6.8c Windows in terms of etching?					**Q6.8d** Windows in terms of graffiti?				
No signs of etching	Light etching	Medium etching	Heavy etching	Offensive etching (RI)	No signs of graffiti	Light graffiti	Medium graffiti	Heavy graffiti	Offensive graffiti (RI)

Cleanliness & damage to windows – all windows visible to the assessor will be assessed. Hazardous damage to the windows will be recorded as an RI.

Etching & graffiti on windows – all windows visible to the assessor will be assessed.

2.4.8. Notices

Q6.12 Condition of the notices and adverts			
No damage/good condition	Minor damage	Moderate damage	Extensive damage

Condition of notices & adverts– all notices / adverts visible to the assessor will be assessed.

2.4.9. Exterior

Q6.14a Cleanliness of the exterior of the bus?				**Q6.14b** Condition of the exterior of the bus ?				
No signs of dirt	Light dirt	Moderately dirty	Very dirty	No signs of damage	Minor damage	Moderate damage	Extensive damage	Hazardous damage (RI)

Q6.14c Extensive mismatches with the exterior paintwork?		**Q10.2** Any offensive graffiti or etching on the outside of the bus?			
Yes	No	Graffiti (RI)	Etching (RI)	Stickers (RI)	No

Cleanliness & Condition of exterior of the bus – only that portion of the exterior visible to the assessor as they board and alight will be assessed when assessing the cleanliness and condition. Bad repairs will be recorded as damage.

Extensive mismatches with the exterior paintwork – paint mismatches must be obvious for a 'Yes' to be recorded.

Offensive graffiti or etching on the outside of the bus – Graffiti of a racist, sexual or otherwise offensive nature will be recorded as an RI. Only that portion of the exterior visible to the assessor as they board and alight will be assessed.

2.5. Reportable Incidents

Where an assessment item is notifiable as a Reportable Incident, these are highlighted in the questionnaire and the electronic data capture equipment automatically alerts the assessor for additional details. When the assessor records a Reportable Incident an automatic email alert is sent to the TNS RI team with the relevant details.

Bus operators will receive notification of any Reportable Incidents within 48 hours of the incident being reported. Incidents reported by assessors at weekends are reported to TfL on Monday mornings (i.e. within approximately 72 hours for any weekend incidents).

In the MTS, Reportable Incident assessment items are:

- Driver wearing earpiece / using a phone / listening to music
- Driver leaving the cab unsecured without a valid reason
- Driver abusive in their response to assessor's question
- Driver abusive to other passenger
- Driver moving off without regard for passenger safety
- Driver failing to call at designated stop unless bus full
- Feeling in danger due to poor driving
- Leaving doors open / operating doors while vehicle is moving
- Heating on or off when not appropriate
- Hazardous damage to the vehicle interior/exterior
- Offensive defacing to the vehicle interior/exterior

2.6. Scoring and weighting

The assessment method and reporting has been designed to provide a transparent scoring system to provide an evaluation plus explanation of how the score has been determined. This is to allow both London Buses and bus operators to understand the score for each journey and to take action to remedy defects.

The basic unit of assessment is the journey which builds up into route, garage and operator scores

The survey has been designed to provide robust garage scores quarterly and annually. However, the electronic reporting system allows period reports to be produced for each garage and individual assessment reports on a weekly basis. Scores for each operating company and network scores are grossed up from the garage scores.

2.6.1. Question scoring

Assessors record their observations but do not score them. Scores are assigned automatically once the raw data has been verified by TNS RI.

2.6.2. Binary questions

Responses to simple Yes/No questions (e.g. Was the driver wearing uniform?) are assigned the following response weights:

Response	Score
Yes	0
No	10

2.6.3. Scaled questions

Responses to scaled questions (e.g. when you asked your question how did the driver respond/what was their manner?) are assigned the following response weights:

Response	Score
Polite	0
Ignored/Indifferent	5
Rude/Sarcastic	10
Abusive (RI)	50

All Reportable Incidents automatically attract a weight of 50.

2.6.4. Section scoring

The scores for each of the twelve sections of the MTS are calculated in six stages:

Step 1: Calculate scores for each question response;
Step 2: Calculate number of assessments in the section;
Step 3: Calculate score for each assessment question:
Step 4: Divide by number of assessments made;[1]

[1] The scoring system derives a weighted average rather than a simple average as some questions are applicable in every assessment, whereas others are only relevant in certain circumstances. The weighted average takes the individual question base sizes into account when calculating the section average scores. Therefore, if a section comprises four questions

Step 5: Multiply each question by Importance Weight.[2]
Step 6: Derive section score by adding together the question scores.

Example: Interaction

This section comprises six measures (as below): Driver attitude, Driver attitude to others, Driver responsiveness, Helpfulness of driver information, Dispute handling and Driver PA announcement. These measures are scored as follows to derive an overall section score of 21.02.

When you asked your question how did the driver respond/what was their manner?			**Driver's manner in answering question from other passenger**				
Polite / Professional / Friendly	Indifferent / Ignored Passenger	Rude / Sarcastic	Abusive (RI)	Polite / Professional / Friendly	Ignored / Indifferent	Rude / Sarcastic	Abusive (RI)
1595	100	5	0	200	5	5	0
0	5	10	50	0	5	10	50
0	500	50	0	0	25	50	0
10.1			1.38				

	When you asked your question did the driver answer you?			**Helpfulness of driver's answer to your question**			
	Yes	No	Unable to ask question	Basic answer	Full/helpful answer	Answer obviously wrong	Driver said they didn't know
Assessments	1675	20	5	1000	690	5	5
Response score	0	10	0	0	0	10	10
Subtotal	0	200	N/A	0	0	50	50
Weighted score	3.67			1.84			

and one of those questions is applicable in only half of the assessments, then this question will have only half of the weight of the other three when the section score is calculated.

[2] The Importance Weight takes into account the relative importance of an assessment item.

	How did the driver handle the situation?					Driver's PA announcement				
	Professional	Ignored / Indifferent	Rude / Sarcastic	Abusive (RI)	Driver unaware of dispute / argument	Helpful	Unhelpful	Could not understand	Could not hear	Too loud
Assessments	20	5	1	1	0	100	1	5	5	5
Response score	0	5	10	50	0	0	10	10	10	5
Subtotal	0	25	10	50	N/A	0	10	50	50	25
Weighted score	1.56					2.48				

Step 1: Calculate scores for each question response by multiplying the number of assessments by the response score (shown above),

Step 2: Calculate number of assessments in the section (excluding the number of assessments where the response is unscored: i.e. N/A):

(1595+100+5+0) +
(200+5+5+0)+(1675+20)+(1000+690+5+5)+(20+5+1+1)+(100+1+5+5+5) = 5448 assessments

Step 3: Calculate score for each assessment question by adding together the scores:

Driver attitude: (0+500+50+0) = 550
Driver attitude towards others: (0+25+50+0) = 75
Driver responsiveness: (0+200) = 200
Helpfulness of information: (0+0+50+50) = 100
Dispute handling: (0+25+10+50)) = 85
PA announcement: (0+10+50+50+25) = 135

Step 4: Divide each question score by number of assessments made:

Driver attitude: (550/5448) = 0.1010
Driver attitude towards others: (75/5448) = 0.0138
Driver responsiveness: (200/5448) = 0.0367
Helpfulness of information: (100/5448) = 0.0184
Dispute handling: (85/5448) = 0.0156
PA announcement: (135/5448) = 0.0248

Step 5: Multiply each question score by the Importance Weight:

Driver attitude:	(0.1010 * 100) = 10.1
Driver attitude towards others:	(0.0138 * 100) = 1.38
Driver responsiveness:	(0.0367 * 100) = 3.67
Helpfulness of information:	(0.0184 * 100) = 1.84
Dispute handling:	(0.0156 * 100) = 1.56
PA announcement:	(0.0248 * 100) = 2.48

Step 6: Derive the weighted section score by adding together each question score.

(10.1+1.38+3.67+1.84+1.56+2.48) = 21.02

Please note that in the example given, the scores have been displayed as rounded. The actual calculation uses unrounded scores.

2.6.5. Overall Driver and Vehicle score

The overall scores for driver and vehicle are obtained by adding together the weighted section scores for each.

3. Reporting

To provide easy access to data from the monitoring programme for both the bus operating companies and TfL, a web-based reporting system is being introduced. The reporting system has the flexibility to view journey, garage, company and network levels' results from the monitoring programme.

The following reports will be provided as standard:

- Summary reports at network, operator and garage level.
- Tracking reports showing historical data and time period comparisons
- League tables to allow performance to be judged between operators, garages and routes
- Detailed reports showing results by vehicle type, deck assessed, time of day/day of week vehicles assessed.

For all reports, other than league tables, a password system will be used by operating companies. This will ensure the user will only be able to view data on garages, routes and journeys managed by their own company.

The basic reporting unit will be the garage score derived from the individual journey assessments to provide robust garage scores quarterly and annually.

The reporting system will, however, also provide weekly and monthly progress reports at garage level.

Scores for operating companies and the network will be grossed up from these garage scores.

4. Quality Assurance

Rigorous quality assurances processes are in place at all stages of the monitoring programme to ensure that the results are valid, robust and an accurate record of what the assessors observed.

As shown in the flowchart overleaf, the quality assurance processes cover the three key stages of the monitoring programme:

- Planning and design
- Survey implementation
- Analysis and reporting

4.1. Planning and design

The planning and design stages of the Mystery Traveller Survey are key to ensuring data accuracy. It is at this stage that risks are assessed and steps built into the survey process to eliminate or minimise risks that could adversely affect the quality of the survey results. The aim is to proactively design out risks rather than taking remedial action after the data has been collected. This includes at the project conception and survey design stages as well as the management of the monitoring programme.

4.2. Implementation

This aspect of the quality assurance processes is concerned with the people conducting the surveys - their recruitment, training and supervision.

Before undertaking any assessments each assessor attends up to two day's training covering specific aspects of their work plus Health and Safety requirements and use of the electronic data equipment.

A team of supervisors then conduct three levels of supervision:

- Unannounced spot checks - these checks are to establish that assessors are at the correct locations at the right time and are competent in using their equipment

- Unannounced accompanied supervisions - these are more detailed supervisions with a supervisor accompanying an assessor during their shift to verify the accuracy of the assessor's observations

- Appraisals - full accompaniments of assessors and overall performance review.

Before assessments made by newly trained assessors are included in the results from the monitoring programme, assessors must have gone through the above supervision process and achieved the required standards.

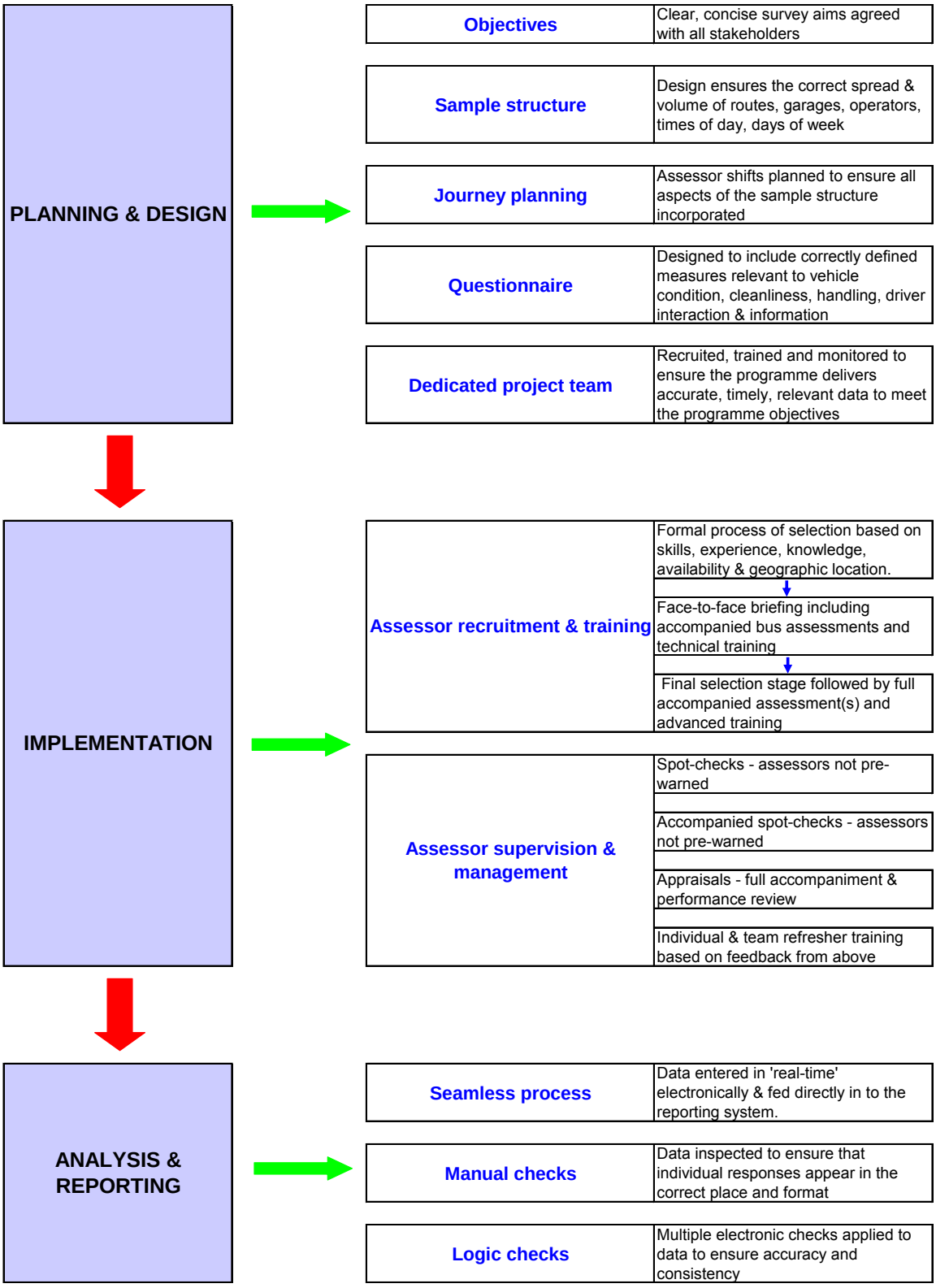
Through this supervision process the performance of each assessor is monitored closely to ensure their competency and accuracy of their observations. Where problems are identified these can be identified and addressed speedily through training, closer supervision or removal from the assessor panel.

4.3. Analysis and reporting

This final stage of the quality assurance process is critical to verifying the accuracy of the results once they have collected by the assessors and feeds directly back to the planning and design stages of the monitoring programme. It is also at this stage that one of the main benefits are the electronic data capture system is realised. By using electronic data capture there is no need for manual inputting of the data into the analysis and reporting systems thereby removing the risk of human error.

The electronic data capture system also allows the survey questionnaires to include logic checks which are verified at the analysis and reporting stage of the process. In order to identify any systematic error the data is also manually scrutinised for inconsistencies - both within the data and over previous periods. Any inconsistencies are then investigated and either validated, corrected or removed from the data set.

Once the results have been received by TfL from TNS RI, further consistency and logic checks are applied to the reports before releasing them to the bus operating companies or TfL's management teams.


PLANNING & DESIGN
Objectives
Clear, concise survey aims agreed with all stakeholders
Sample structure
Design ensures the correct spread & volume of routes, garages, operators, times of day, days of week
Journey planning
Assessor shifts planned to ensure all aspects of the sample structure incorporated
Questionnaire
Designed to include correctly defined measures relevant to vehicle condition, cleanliness, handling, driver interaction & information
Dedicated project team
Recruited, trained and monitored to ensure the programme delivers accurate, timely, relevant data to meet the programme objectives
IMPLEMENTATION
Assessor recruitment & training
Formal process of selection based on skills, experience, knowledge, availability & geographic location.
Face-to-face briefing including accompanied bus assessments and technical training
Final selection stage followed by full accompanied assessment(s) and advanced training
Assessor supervision & management
Spot-checks - assessors not pre-warned
Accompanied spot-checks - assessors not pre-warned
Appraisals - full accompaniment & performance review
Individual & team refresher training based on feedback from above
ANALYSIS & REPORTING
Seamless process
Data entered in 'real-time' electronically & fed directly in to the reporting system.
Manual checks
Data inspected to ensure that individual responses appear in the correct place and format
Logic checks
Multiple electronic checks applied to data to ensure accuracy and consistency

4.4. Data usage and expert witnesses

Assessors either currently or previously employed to manage or conduct the monitoring programme cannot provide evidence to bus operating companies or TfL for disciplinary hearings. They also cannot be used as expert witnesses in insurance claims or legal action of any kind.

In the event of an accident or emergency taking place while an assessor is working on board the bus the assessor should behave and be treated as any other passenger.

4.5. Health & Safety

In conducting the monitoring programme, TfL and TNS RI make every effort to ensure that the health and safety of those engaged in the work are protected to the highest standards. In addition to meeting legal requirements, every effort is made to remove or mitigate any potential risk to assessors working in the operating environment.

4.6. Monitoring programme management

Management of the monitoring programme is the responsibility of TfL's Customer Research team who work closely with London Buses Contracts and Tendering and Performance teams.

The programme is conducted on TfL's behalf by TNS RI who have been contracted to conduct this work until June 2013 prior to which the contract will be put out to tender in accordance with the legislative requirements of the European Union procurement processes.

At this time, it is anticipated that a new three year contract will be awarded with an option for TfL to extend the contract for a further two years subject to satisfactory performance by the external supplier.

4.7. Data management and storage

The data gathering, management, storage and reporting of the monitoring programme complies with the requirements of the Data Protection Act 1998.

Commercially sensitive data in the reporting programme will be classed as exempt under the Freedom of Information Act 2000.

In managing and reporting the monitoring programme TNS and TfL adhere to the Market Research Society's guidelines contained in the Code of Conduct, Code of Conduct for Mystery Shopping and Guidelines for collecting personal data for attributable purposes.

The surveys conform to British Accreditation Bureau's standard ISO 20252 for market research.

The following TfL policies apply to the management and implementation of the monitoring programme

- Alcohol and Drugs
- Equality and Inclusion
- London Living Wage
- Health and Safety
- Web Accessibility

APPENDICES

Appendix A: The ideal bus driver

1. Takes passengers where they want to go in safety and comfort

   - Drivers should serve bus stops safely and correctly, pulling up as close to the kerb as possible.

   - Drivers must always drive at a safe and comfortable speed with smooth acceleration, braking and cornering. Elderly and disabled passengers should be given sufficient time to get to a seat or hold on before moving off.

   - Drivers must know and assist passengers with basic information about the route.

2. Contributes to providing a reliable service

   - Drivers should contribute positively towards providing a reliable bus service.

   - Drivers should understand the difference between high frequency routes (where headway is important) versus low frequency routes (where adherence to the schedule is key).

   - In the event of a curtailment or diversion, drivers should use the PA system to ensure effective communication with passengers.

   - Drivers should ensure that they have logged correctly onto iBus and make full use of the system, as appropriate.

3. Is helpful and courteous at all times

   - Drivers should be polite and helpful to passengers, staff and other road users.

   - When handling challenging situations drivers should remain calm and adopt the correct procedure.

   - Incidents should be reported as appropriate.

4. Actively checks tickets

- Drivers to be actively engaged in the ticket checking process.
- Drivers should take reasonable steps to challenge passengers not holding a valid ticket.

5. Wears uniform and is smart in appearance

- Drivers are expected to wear the uniform issued by their company. As a minimum a uniform means a shirt or top garment with relevant company logo.
- All clothing should be in good condition with no visible tears or grime. Drivers should not wear jeans or inappropriate headwear.
- Drivers should not wear earpieces (other than medically prescribed) and should not listen to radios in the cab.

Appendix B: Ideal Vehicle Presentation

1. External Requirements	
Item	**Primary Attribute** **Essential**
Cleanliness	Entire visible bodywork is free from dirt, ingrained grime and graffiti. Joints, edges, wheel hubs and other dirt traps are completely clean.
Bodywork condition	Bodywork is free of dents, scratches and ill-fitting / missing panels and trim. Paintwork is not faded or worn and complies with contractual specification. Paintwork does not show replaced panelling. Livery is “complete” with no mismatching panels or obviously missing fleetnames.
Windows	All external glazing is completely clear, clean with no etching or graffiti or obstructions (except where super-rear adverts are applied). There are no signs of watermarks due to hard water being used in bus wash.
Blinds	Blinds are in approved style, are clean, straight, set correctly and can be easily read in all lighting conditions. Blinds are set to show correct information. Lettering is bright, unfaded yellow and all blinds are effectively illuminated at night. Out of service buses to show approved “Not in service” display.
Adverts	All adverts present are complete with no panels missing or lose. All advert frames in perfect condition with no parts missing. No adverts or logos, including driver vacancies, on windows unless approved.
Signage	Only required signage present and correctly applied in accordance with specifications and legal requirements. Running numbers to be displayed in approved style and locations.

2. Internal Requirements	
Item	**Primary Attribute** **Essential**
Cleanliness	Interior, including ceilings, floors, side panels, window frames, internal glazing, seats, handrails and light defusers to be clean, with no ingrained dirt, litter or graffiti.
Windows / surfaces	All internal glazing to be clear and translucent and free of etching, graffiti and stickers. All panelling and seat backs completely free of etching.
Condition	All internal surfaces, handrails and seating free from damage and visible wear and tear. All seat cushions to have matching moquette (or other approved material). Seat moquette shows no signs of fade or wear and all seat backs to be the same colour. No rattling noises anywhere inside the bus.
Technical	OBNSS, Oyster readers, lights, bells, CCTV screens (if fitted), ramps and doors all working correctly.
Notices and adverts	Only required notices present, visible and correctly applied. No out-of-date or non-approved notices present. All legal documentation correctly displayed. Vehicle registration number on “combined notice” must be clear and matches vehicle’s ID.
Litter	No litter anywhere. Dashboard to be free of clutter and newspapers.
Temperature	Is appropriate to the weather conditions.

Appendix C: Definitions

Overview

The definitions listed below are intended to outline points for consideration when completing the assessment. It is not possible to include all possible scenarios that will be encountered in the field and therefore assessors should always use their best judgement based on the principles described and exhibited below.

Approach to the Assessment

The assessment has been designed in such a way as to be reflective of the customer’s experience. Therefore any problems identified should be considered and, where appropriate, described with reference to their impact on customers.

As part of the assessment the assessor should not be taking any allowances into account. For example the design of the bus should not affect the way that a question is answered and the assessor should not consider how easy something is to clean or repair. Similarly for driving the assessor should not make allowances for certain road conditions. However these types of comments should be included where verbatims are required.

When assessing the vehicle the assessor should get an overall impression of the deck or area of the bus where they are seated/standing. If possible the assessor should try and move

seat/space at least once and move towards the back of the deck so that they can see the majority of the environment. They should also vary where they sit on the bus for each assessment, not always sit in exactly the same seat on every assessment that they do.

General Rules

Comments

There are a number of questions within the questionnaire that allow assessors to enter general comments e.g. 6.4b, 8.5iv, 9.6v, 9.8b and10.2dii.

Bus environment

When assessing areas of the bus environment such as defacing, damage or cleanliness the impact on the customer should be considered. The principle of looking at the extent and the area covered should therefore be considered when carrying out the assessment. For example damage to the floor is defined using the following principles:

Scale	Definition
None Visible	No visible damage to the floor
Minor	Slight damage visible on inspection to small area of the floor
Moderate	Heavier damage easily visible to small area of the floor OR Slight damage visible on inspection to several small areas or larger area
Extensive	Heavier damage, easily visible to several small areas or larger area OR Extensive damage anywhere to the floor.
Hazardous (RI)	Damage to the floor could cause injury.

Similarly defacing to the seat cushions would follow the same principles

Scale	Definition
None Visible	No defacing visible on the seat cushions
Light	Slight defacing visible to the seat cushions
Medium	Heavier defacing easily visible to small area of seat cushion OR Slight defacing visible on inspection to several small areas or larger area
Heavy	Heavier defacing, easily visible to several small areas or larger area OR Extensive defacing anywhere on the seat cushion.
Offensive (RI)	Sexual or racist defacing.

Definition of Terms

Damage	Bad repairs should be included in your assessment of damage.
Etching	Scratches made deliberately, sometimes using a key or other sharp object.
Hazardous	In general this term covers any observed problem that places customers or their property in danger.
Ingrained Dirt	'Black sludge' or dirt that has built up over time.
Mismatches	Noticeable differences in shapes / patterns of material or fading of one part in relation to another.
Panels, fixtures and fittings	This includes all parts of the bus that are not assessed individually for example the internal walls of the vehicle, grab handles that are not part of the stairs, areas demarcated for depositing luggage, window frames, mirrors and bins.
Seat Cushions	Generally fabricated from fabric or plastic. This is the area of the seat that one comes into contact with when sitting on a seat.
Seat Structure	The unit in / on which the seat cushions are housed, generally fabricated from metal and / or plastic.
Litter	Is anything that people drop. Chewing gum that is worn in and 'blackened' should be included in cleanliness.

Additional points to note by assessors:

Question No.	Question Text	Scale	Definition
1.1Bii	Was the route number and destination readable?	All easily readable – Readable with difficulty - Unreadable	Readable with difficulty means that the route and destination can be surmised from the information visible. Unreadable means information is obscured and could not be read by someone with little knowledge of the bus network.
1.4	Were there	Yes – No	Only the Run Number

	newspapers, bags or other clutter on the dashboard at the front of the bus (that you could see from the outside)?		should be placed on the dashboard. Anything else would count as clutter.
2.1	Did the driver pull up close enough to the kerb so all passengers could step on and off the bus directly from the pavement?	Yes – No	Entry point should not be further out than double lines on the side of the road.
2.2	Did the driver pull up near the bus stop?	Yes – No	The bus stop should be between the front of the bus and the back of the back door.
3.1	Was the driver wearing uniform?	Yes – No	One should be able to see the company logo in order to record a Yes. Wearing an additional non-regulation item (such as a logo other than that of the company) would incur a No.
3.2Aii	If no, what was wrong? Clothing too casual	Yes – No	Casual clothing such as jeans would receive a Yes.
6.1	Level of litter	No litter – Some Litter – Lots/offensive litter	Lots includes larger items such as multiple dumped newspapers and multiple fast food cartons. Dumped food causing an odour would be classed as offensive litter, as would vomit, dog mess and other items which make the journey unpleasant. Some litter implies fewer, smaller items. Neat piles of newspapers or leaflets left on the bus should be included as litter.
6.7A	Which best describes the CLEANLINESS of the seat structure and cushions?	No signs of dirt – Light Dirt – Moderately Dirty – Very Dirty	Light dirt implies that the seats at first glance look clean. Moderate dirt is obvious but a

			reasonable person would consider using the seat if no other was available. Very dirty implies a reasonable person would not want to use the seat under any circumstances.
6.7C	Which best describes the CONDITION of the seat cushions?	No signs of damage – Minor damage – Moderate damage – Extensive damage	Minor damage includes small rips and loose threads. Moderate damage covers a larger area. Extensive damage includes deep rips and slashes as well as removal of the outer fabric.
6.7D	Which best describes the level of WEAR of the seat cushions?	No signs of wear – Light wear – Moderate wear – Heavily worn	Light wear implies small signs of wear to small areas of the seat cushions. Moderate wear means a seat is beginning to show its age such as thinning or frayed edges that is more widespread. Heavily worn means that the seat is threadbare.
6.8A	Which best describes the cleanliness of the windows?	Light dirt – Moderately dirty – Very dirty	Light dirt includes dirt only visible on closer inspection such as dried rain or light bird droppings. Moderately dirty is makes it difficult to see outside. Very dirty means it is impossible to make out landmarks outside the bus.
6.8B	Was there any damage to the windows?	No signs of damage – Hazardous damage	Hazardous damage could include a broken pane.
6.9B	Which best describes the CONDITION of the floor?	No signs of damage– Light damage – Medium damage – Extensive damage – Hazardous	Minor damage is not immediately obvious and can include light cracks. Moderate damage is more immediately noticeable. Extensive damage could include would be very obvious.

		damage	Hazardous damage could include dangerous damage such as gaps in the floor panels or loose metal bars.
6.12	What was the condition of the notices and adverts	No damage – Minor damage – Moderate damage – Extensive damage	Minor damage would include curled up corners or a slight lifting from the frame / panel. Moderate damage would include tears or small areas missing. Extensive damage would include large rips, areas greater than 50% missing or damage rendering the notice unreadable. Observations based on any notices and adverts visible from where the assessor sat or stood should be used to answer this question.
7.5J	Rate the VOLUME quality of the audio announcement	Too quiet to hear clearly – Quiet – Good – Loud – Too loud for comfort	Quiet implies concentration is required to hear the announcement. Loud implies the announcement is annoying / intrusive. Too loud for comfort means that the volume startles / booms.
9.2	Smoothness of acceleration?	Good, felt comfortable – Occasionally too harsh, felt uncomfortable – Frequently too harsh, serious discomfort – Felt in danger	Occasional means up to three occurrences in a ten minutes. Frequently means more than three occurrences in ten minutes.
9.3	Smoothness of braking?	Good, felt comfortable – Occasionally too harsh, felt uncomfortable – Frequently too harsh, serious discomfort –	Occasional means up to three occurrences in a ten minutes. Frequently means more than three occurrences in ten minutes.

		Felt in danger	
9.4	Speed	Good, felt comfortable – Occasionally too harsh, felt uncomfortable – Frequently too harsh, serious discomfort – Felt in danger	Occasional means up to three occurrences in a ten minutes. Frequently means more than three occurrences in ten minutes.
9.5	Moving off	Allowed passengers time to get to seats or hold on – Occasionally moved off too soon for passenger comfort – Frequently moved off too soon for passenger comfort – No regard for passenger safety and placed someone in danger	Occasional means up to three occurrences in a ten minutes. Frequently means more than three occurrences in ten minutes
9.7	Did you or another passenger feel in danger because of the driver's poor driving for any other reason?		This question should catch all other incidents where passengers are put in danger.

SCHEDULE IX

CONTRACT EXTENSIONS

1. Contract Extension Criterion
2. Procedure
3. Assignments/Novations
4. Subcontracting
5. Data Suspensions
6. Changing Standards
7. Day/Night Services

Appendix A – Contract Extension Notice

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SCHEDULE IX

CONTRACT EXTENSIONS

1. Contract Extension Criterion

1.1 The QSI Threshold, Minimum Performance Standard and the Quarters that shall apply during the Extension Assessment Period are set out in Schedule ID (provided that the QSI Threshold and Minimum Performance Standard may be adjusted in accordance with the Route Agreement).

1.2 The Operator shall be entitled to an automatic extension of the term of the Route Agreement if:

1.2.1 the QSI Performance (or if appropriate the Contractual QSI Performance) during the Primary Assessment Period, has met or exceeded the QSI Threshold ("the Primary Extension Criterion");

2. Procedure

2.1 Within thirty days of the end of the sixth last full Quarter prior to the Initial Expiry Date, the Corporation shall assess the Operator's QSI Performance during the Extension Assessment Period.

2.2 In the event that the Operator has met or exceeded the Contract Extension Criterion as set out in paragraph 1 above and is therefore entitled to an automatic extension to the term of the Route Agreement, the Corporation shall issue a Contract Extension Offer Notice as set out (in Appendix A hereto) and the provisions set out in clause 2 of the Route Agreement shall apply.

2.3 In the event that the Operator has failed to meet the Contract Extension Criterion, then the Corporation shall notify the Operator accordingly.

3. Assignments / Novations

3.1 In the event that the Route Agreement is assigned or novated in accordance with clause 22:

3.1.1 the QSI Performance shall be based on the new operator's QSI Performance from the date of such assignment or novation provided that if an assignment or novation takes place at any time during the Primary Assessment Period, the Operator's QSI Performance for the relevant period prior to such assignment or novation shall apply to the Contract Extension Criterion and the new operator's QSI Performance shall apply following such assignment or novation.

4. Subcontracting

In the event that all or any part of the Services are subcontracted in accordance with the Route Agreement the subcontractor's QSI Performance during the Extension Assessment Period shall be deemed to be the Operator's for the purposes of this Schedule IX.

5. Data Suspensions

In the event of the Corporation agreeing a Data Suspension (in accordance with paragraph 6 of Schedule VII) for any of the Quarters making up the Primary Assessment Period, then the QSI Performance for the relevant Quarter(s) shall be substituted with the Contractual QSI Performance.

6. Changing Standards

6.1 In the event that the Minimum Performance Standard and/or the QSI Threshold are adjusted in accordance with the provisions of the Route Agreement and the effective date of such change is during the Primary Assessment Period and is other than the first day of the Primary Assessment Period then for the purposes of satisfying the Primary Extension Criterion, the adjusted Minimum Performance Standard and/or QSI Threshold shall take effect from the first day of the Quarter following the effective date of the change.

6.2 If an adjustment to the Minimum Performance Standard and/or QSI Threshold (pursuant to paragraph 6.1) is from the first day of the Primary Assessment Period then the Primary Extension Criterion shall be assessed by using such adjusted Minimum Performance Standard and/or QSI Threshold.

6.3 If an adjustment to the Minimum Performance Standard and/or QSI Threshold (pursuant to paragraph 6.1) is effective from the first day of a Quarter not being the first day of the Primary Assessment Period then the Primary Extension Criterion shall be assessed by calculating a composite Minimum Performance Standard and/or QSI Threshold derived by averaging the Minimum Performance Standards and/or QSI Thresholds assigned to each of the Quarters. Each Quarter will be assigned the appropriate Minimum Performance Standard and/or QSI Threshold depending on whether it comes before or after the change, adjusted to reflect seasonal factors. The calculations and seasonal factors will be in accordance with the procedure set out in *"QSI Monitoring, Route Categorisation and Minimum Performance Standards"* (as set out in Annex C).

7. Day/Night Services

7.1 In the event that the Services are operated on a 24 hour basis:

7.1.1 the Operator's QSI Performance (and if applicable the Contractual QSI Performance) during the Contract Extension Criterion shall only be assessed in respect of the day time services (as specifically identified in Schedule I).

CONTRACT EXTENSION NOTICE

The Managing Director
Operator's name
Operator's address]

[Date]

Dear _____

Route Agreement No. [_____]

Route No. [_____]

In accordance with clause 2 of the above referenced Route Agreement, we are pleased to advise that your performance has met the Primary Extension Criterion as set out below.

Primary Extension Criterion	
Primary Extension Period QSI Threshold Contractual QSI Performance	

You are therefore entitled to an automatic extension of the term of the above referenced Route Agreement for a two-year period up to the Extended Expiry Date (i.e. _____201_).

You are required to acknowledge your receipt of this Contract Extension Notice and to confirm your acceptance or otherwise thereof, by completing the duplicate copy of this Notice where indicated below and returning it to the undersigned by no later than _____ 201_. Failure to do so shall be deemed to be a rejection by you of the right to an extension to the Route Agreement.

Yours sincerely

_____

We accept/ do not accept* the contract extension as outlined above

Signed_____ on behalf of _____ dated _____200_.

SCHEDULE X

TICKETING AND TICKETING EQUIPMENT

A. Introduction

B. Ticketing Equipment and Emergency Ticket Packs

C. Ticket Rolls and Garage Terminal Rolls

D. Information and Data From Ticketing Equipment

E. Rights of Access to and Audit of Revenue Data

SCHEDULE X

TICKETING AND TICKETING EQUIPMENT

A. INTRODUCTION

The Corporation shall supply the Operator with the equipment listed below, for the use by the Operator in operating the Services. The Corporation, in accordance with paragraph 3 of Schedule XB below, shall determine the quantities of each item of equipment that will be supplied from time to time.

ITEM

Electronic Ticket Machine
Smartcard Reader

Drivers Module
Emergency Ticket Pack
Garage Terminal
Power Supply Unit
Personal Computer
Printer
Modem (On line Communication)
ETM and Smartcard Reader Installation Tools

The following additional equipment is supplied for 'Open Boarding' bus services only:
Remote Smartcard Reader
Remote Smartcard Reader installation tools

The following additional equipment is supplied for conductor-operated bus services only:
PTID
PTID Terminal
PTID locker

NOTES

For practical purposes, the Corporation's Ticketing Equipment is not "routebound" and may be utilised on any route operated under contract to the Corporation at the garage concerned. For the avoidance of doubt, the Operator shall not, without the Corporation's prior written approval, use the Corporation's Ticketing Equipment on any of its commercial services.

The Corporation shall provide the Operator with a statement of the current quantities supplied in respect of a garage, whenever there is a variation in the quantity of any item of equipment supplied in respect of that garage.

B. TICKETING EQUIPMENT AND EMERGENCY TICKET PACKS

1. The Corporation or its agents or contractors shall supply to the Operator such Ticketing Equipment and Emergency Ticket Packs in such volumes and of such type as the Corporation in its reasonable opinion considers necessary for the Operator to operate the Services. For the avoidance of doubt the Ticketing Equipment and Emergency Ticket Packs remain the property of the Corporation (or where applicable, and where notified by the Corporation, the agent or contractor of the Corporation which supplied the Ticketing Equipment and/or Emergency Ticket Packs) and the Operator shall not in any way act or refrain from acting in any way which may impair or affect the Corporation's or the agent's or contractor's title (as the case may be) to such Ticketing Equipment and/or Emergency Ticket Packs.

2. The type of Ticketing Equipment and/or Emergency Ticket Packs supplied pursuant to paragraph 1 may change from time to time and the Operator shall co-operate fully with the Corporation and its agents or contractors in respect of the introduction of any new types of Ticketing Equipment and/or Emergency Ticket Packs and, where appropriate, the installation of the same on the Operator's vehicles and at the Operator's garages and other locations as appropriate.

3. In determining the volume of Ticketing Equipment and Emergency Ticket Packs which shall be reasonably necessary for the Operator to operate the Services the Corporation may have regard to:

   3.1 any views expressed by the Operator as to their requirements;

   3.2 the number of vehicles used by the Operator in operating the Services or in the case of crew routes the number of duties or the number of conductors employed on that route;

   3.3 the number of ticket machines and Emergency Ticket Packs and/or such other devices as are necessary to cover any short-term equipment failures.

   provided that the Corporation shall make the ultimate decision as to the appropriate volume of Ticketing Equipment and Emergency Ticket Packs supplied.

4. The Corporation shall issue, or arrange for the issue of, the Ticketing Equipment and Emergency Ticket Packs to a location (in or around Greater London) named by the Operator.

5. The Operator shall not without the prior written consent of the Corporation use the Ticketing Equipment or the Emergency Ticket Packs for any purposes other than for the provision of bus passenger transport services on behalf of and under contract to the Corporation.

6. The Operator shall not without the prior written consent of the Corporation use other types of ticket issuing and/or pass recording equipment for the purposes of operating the Services or for any purposes associated therewith.

7. Other than removing the Ticketing Equipment and Emergency Ticket Packs provided for on-bus use from the vehicles used in the normal operation of the Services for the purposes of maintenance or when a vehicle is no longer to be used in the provision of the Services, the Operator shall not alter the garage or other location where the Ticketing Equipment and Emergency Ticket Packs are based without the prior written consent of the Corporation such consent not to be unreasonably withheld. In addition, under no circumstances must the Operator fit or remove baseplates on any of the vehicles or change the positioning of any garage-based equipment.

8. Except as otherwise specifically authorised in accordance with paragraph 10 of this part B all installation, removal and maintenance of the Ticketing Equipment shall be undertaken by the Corporation or its agents or contractors and subject to paragraph 20 of this part B shall be undertaken at the Corporation's expense. The Operator shall permit the Corporation or its agents or contractors, access to the Operator's garage or other location and to the Operator's vehicles at all reasonable times for the purposes of installation or removal of Ticketing Equipment and for the purposes of servicing, maintenance or repair of Ticketing Equipment.

9. The Operator shall permit the Corporation or its agents or contractors to do such works as are necessary to carry out the installation or removal of Ticketing Equipment from the Operator's garage or other location or from the Operator's vehicles. The Corporation shall ensure that all such works shall be done with reasonable skill and care and shall indemnify the Operator against any damage caused to the Operator's garage or other location or to the Operator's vehicles as a result of the negligent execution of such works.

10. The Operator shall, at its expense and in accordance with specifications which may be issued by the Corporation or its agents or contractors, be responsible for preparing vehicles to be used on the Services to accept the Ticketing Equipment. The Operator shall be responsible for changing over defective equipment or equipment required by the Corporation's agents or contractor for servicing or maintenance or repair as mentioned in paragraph 11of this part B. Unless otherwise instructed to do so by the Corporation in writing the Operator shall immediately refer all maintenance requirements in relation to the Ticketing Equipment directly to the Corporation's agents or contractors (whose details the Corporation shall advise to the Operator in writing) and shall comply with such conditions in respect thereof as the Corporation may from time to time notify to the Operator in writing.

11. The Operator shall ensure that Ticketing Equipment is made available to the Corporation or its agents or contractors for the purposes of servicing, maintenance or repair as and when required by the Corporation or requested by the Operator.

12. Subject to the provisions of paragraph 7 of this part B, in the event that the Operator wishes to alter the garage or other location where the Ticketing Equipment and Emergency Ticket Packs are based or wishes to open a new garage or location for which Ticketing Equipment and/or Emergency Ticket Packs will be required the Operator shall give the Corporation (or, if instructed by the Corporation, its agents or contractors) a minimum of 8 (eight) weeks notice of the date that the change shall be effective and shall permit the Corporation or its agents or contractors access:

12.1 in the case of a new garage or location, a minimum of 5 (five) weeks prior to the date at which the Services shall be provided from the new location; or

12.2 in the case of the closure of an existing garage or location, a minimum of 5 (five) weeks after the date at which closure will be effective for the purposes of installation of Ticketing Equipment or the provision of the Emergency Ticket Packs at the new garage or location or to complete such works as are necessary to ensure the removal of the Ticketing Equipment and Emergency Ticket Packs from the garage or location, as appropriate. Any such removal shall be carried out with due regard to the Operator's requirements and all such Ticketing Equipment and Emergency Ticket Packs as are necessary for provision of the Services are no longer required for that purpose. For the avoidance of doubt nothing in this paragraph shall permit the Operator to change or require the change of location of Ticketing Equipment in any vehicle.

13. In the event that the Operator requires the installation of additional garage based Ticketing Equipment or the removal of excess garage based Ticketing Equipment any such changes shall be subject to prior agreement by the Corporation, such agreement to be sought a minimum of 5 (five) weeks prior to the Operator's required date and the Operator shall permit the Corporation or its agents or contractors access:

13.1 in the case of the installation of additional Ticketing Equipment, a minimum of 2 (two) weeks prior to the required date; or

13.2 in the case of the removal of excess Ticketing Equipment, a minimum of 2 (two) weeks prior to the required date

for the purposes of installation of the additional Ticketing Equipment or to complete such works as are necessary to ensure the removal of the excess Ticketing Equipment.

14. In the event that the Operator intends to use a vehicle in the operation of the Services that requires the installation of Ticketing Equipment and it is considered reasonably necessary pursuant to paragraph 1 of this part B to provide Ticketing Equipment for that vehicle the Operator shall:

14.1 in the cases where the Corporation or its agents or contractors are responsible for the installation of Ticketing Equipment on the vehicles:

14.1.1 give the Corporation or its agents or contractors a minimum of 8 (eight) weeks written notice of this requirement or such other period as may be agreed by the Parties from time to time; and

14.1.2 make any such vehicle available to the Corporation or its agents or contractors a minimum of 1 (one) week prior to the date on which the vehicle is scheduled for use in the operation of the Services for the purposes of installing Ticketing Equipment on the vehicle.

15. In accordance with Schedule II all vehicles used in the operation of the Services shall be fitted with the Ticketing Equipment provided pursuant to paragraph 1 of this Schedule.

16. Clause 4.14 of the Route Agreement shall apply to the removal of any Ticketing Equipment from any vehicle that the Operator intends to withdraw from the operation of the Services.

17. The Operator shall be responsible for the safe-keeping of the Ticketing Equipment and Emergency Ticket Packs unless they are in the possession of the Corporation or its agents or contractors (not being the Operator) and any costs incurred or revenue potentially lost as a result of loss or misuse of the Ticketing Equipment and/or Emergency Ticket Packs shall be paid to the Corporation by the Operator.

18. The Operator shall operate the Ticketing Equipment and take such steps as are necessary for its safekeeping and to keep it in good working order in accordance with instructions and procedures issued by the Corporation or its agents or contractors to the Operator from time to time, including the guidelines contained in "*London Buses Ticketing Equipment- An Operator's Guide*"*"*(as set out in Annex C)*.*

19. The Operator shall make use of the Emergency Ticket Packs in accordance with the provisions of Schedule XI.

20. Without prejudice to clause 4.12 of the Route Agreement any Ticketing Equipment which is lost or damaged by reason of the Operator, its employees, contractors or agents:

    20.1 carrying out any modification, adjustment, repair or maintenance of the Ticketing Equipment without the prior written consent of the Corporation;

    20.2 tampering or interfering with or applying any attachments to the Ticketing Equipment which have not been authorised by the Corporation;

    20.3 failing to install the parts of the Ticketing Equipment for which it has responsibility for installation in a proper and careful manner;

    20.4 failing to look after or to keep the Ticketing Equipment securely;

    20.5 failing to use the ticket rolls and/or garage terminal rolls supplied by the Corporation;

    20.6 subjecting the Ticketing Equipment to unusual physical or electrical stress; or

    20.7 failing to exercise due skill and care in handling the Ticketing Equipment or neglecting or misusing the Ticketing Equipment

    shall be repaired or replaced at the expense of the Operator or, if the Corporation requires, the Operator shall pay to the Corporation a sum equal to the full replacement value of such Ticketing Equipment.

21. Upon expiry or termination of this Route Agreement the Operator shall immediately return all Ticketing Equipment and Emergency Ticket Packs supplied hereunder to the Corporation. If the Operator fails to return the Ticketing Equipment and/or Emergency Ticket Packs, the Corporation or its agents or contractors shall have the right to enter the Operator's premises and vehicles to recover the same. The Operator shall pay to the Corporation a sum equal to the full replacement value of any such Ticketing Equipment not returned to or recovered by the Corporation and, in the case of Emergency Ticket Packs a sum equal to the total value of the contents of the same as if the Emergency Ticket Pack had not been opened and no tickets issued from it in respect of any Emergency Ticket Pack not returned to or recovered by the Corporation.

C. TICKET ROLLS AND GARAGE TERMINAL ROLLS

1. The Corporation or its agents or contractors shall supply to the Operator ticket rolls and garage terminal rolls in such volumes and of such type and at such frequencies as the Corporation in its reasonable opinion considers necessary for the Operator to operate the Services.

2. The Operator shall not without the prior written consent of the Corporation use the ticket rolls and/or garage terminal rolls supplied pursuant to paragraph 1 of this Part C for any purposes other than for the provision of the Services.

3. The Operator shall not use the ticket rolls and/or garage terminal rolls other than those provided by the Corporation or its agents or contractors for the purposes of operating the Services.

4. The Operator shall be responsible for the safekeeping of the ticket rolls and garage terminal rolls unless they are in the possession of the Corporation or its agents or contractors (not being the Operator) and any costs incurred as a result of loss or misuse of the ticket rolls or garage terminal rolls shall be paid to the Corporation by the Operator.

5. Upon expiry or termination of this Route Agreement the Operator shall immediately return all unused ticket rolls and garage terminal rolls supplied hereunder to the Corporation and/or its agents or contractors as notified by the Corporation. If the Operator fails to return the ticket rolls and/or garage terminal rolls, the Corporation shall have the right to enter the Operator's premises to recover the same. The Operator shall pay to the Corporation a sum equal to the full replacement value of any such ticket rolls and/or garage terminal rolls not returned to or recovered by the Corporation.

D. INFORMATION AND DATA FROM TICKETING EQUIPMENT

1. The Operator shall supply the data and information set out in Schedule V paragraph 5 to the Corporation.

E. RIGHTS OF ACCESS TO AND AUDIT OF REVENUE DATA

1. The Operator shall maintain systems which accurately record and control the Operator's handling of fares revenue and payment of the same to the Corporation, Ticketing Equipment, Emergency Ticket Packs and any other equipment or items provided by the Corporation or its agents or contractors to the Operator for the provision of the Services as follows:

   1.1 the Operator's allocation of Ticketing Equipment and Emergency Ticket Packs to vehicles and/or staff;

   1.2 the location of Ticketing Equipment and Emergency Ticket Packs;

   1.3 duties worked against receipts paid in by duty;

   1.4 ticket sales information to cash paid in;

   1.5 the Operator's procedure for dealing with paying in irregularities (e.g., more or less cash being paid in that is being accounted for on the Ticketing Equipment);

   1.6 the Operator's procedure for ensuring that all on-bus fares revenue collected on the Services is allocated to the Services and that the correct fares revenue is paid to the Corporation; and

   1.7 the location of equipment, other than Ticketing Equipment, and other items provided by the Corporation its agents or contractors;

   and shall undertake regular checks of and document these systems in order to test their success and put in place such measures as are necessary to eliminate any shortfalls in these areas.

2. The Operator shall provide to the Corporation as required details (including full documentation) of the systems adopted in accordance with the requirements of paragraph 1 of this part E and any other date security procedures adopted by the Operator to maintain accurate and reliable records of sales information. The Corporation, its employees, agents and contractors shall have the right to audit all such systems.

3. In relation paragraphs 1.1 and 1.2 of this part E, the Operator shall comply with minimum requirement of records and control set out in the *London Buses Ticketing Equipment- An Operator's Guide"* (as set out in Annex C).

4. The Operator shall at its own expense comply with any reasonable recommendations of the Corporation in relation to amendment or implementation of procedures relating to the above.

5. The Operator shall keep all records relating to revenue including a garage terminal receipt for each duty operated or in the absence of this a ticket machine waybill for each

duty operated for a minimum of 6 (six) months, all data from the Ticketing Equipment for a minimum of 12 (twelve) months, all accounting records for a minimum of 7 (seven) years provided that if data, records or information shall fall into more than one of the aforementioned categories such data, records or information shall be kept for the longer period indicated.

6. The Corporation's employees, agents and contractors shall have a right of access, on giving reasonable notice, to the Operator's premises in order to exercise the rights of audit set out in paragraph 1 and 2 of this part E and in order to inspect fares revenue receipt information, Ticketing Equipment, Emergency Ticket Packs and any other equipment or item provided by the Corporation or its agents or contractors to the Operator and any other accounting records or supporting information kept by the Operator relating to the provision of the Services.

7. The Corporation's employees, agents and contractors shall have the right to take copies of such records and information referred to in paragraph 5 of this Part E as are necessary in connection with any audit carried out pursuant to paragraph 1 and/or 2 of this part E above. The Operator shall allow copies to be taken on its reprographic equipment at no cost to the Corporation.

8. In the case of Ticketing Equipment, Emergency Ticket Packs and any other equipment or items provided by the Corporation or its agents or contractors to the Operator the Corporation reserves the right to instruct the Operator to carry out its own audit of this equipment and items in such form as the Corporation may reasonably request and provide the results of such audit to the Corporation.

SCHEDULE XI

FARE COLLECTION ARRANGEMENTS, TICKET CHECKING AND INSPECTION

1. The Operator shall ensure that:

   1.1 all revenue handed over to the Corporation in accordance with Schedule IVC is net of any adjustments calculated and authorised in accordance with this Schedule and the Operator shall provide such information as the Corporation may reasonably require in support of such adjustments; and

   1.2 its drivers and conductors (in this Schedule collectively referred to as drivers) and other staff as appropriate carry out and comply with the following procedures (as amended from time to time by the Corporation).

2. Emergency Ticket Packs

2.1 The Operator shall ensure that on commencement of duty the driver will have issued to him/her an Emergency Ticket Pack which bears a uniquely identifying serial number.

2.2 In the event of the ticket machine becoming inoperable during the duty the Emergency Ticket Pack will be opened and the tickets issued in lieu of tickets from the ticket machine. Each Emergency Ticket Pack ticket is individually numbered and denotes a value and tickets may be issued in multiples of any combination to total any exact fare.

2.3 The Emergency Ticket Pack contains a waybill which must be completed in full showing details of the tickets issued and at the end of the duty the Emergency Ticket Pack (complete with unused tickets) and the waybill shall be handed in by the driver at the garage.

2.4 The Operator shall check the completion of the waybill and shall return all part used Emergency Ticket Packs and the accompanying waybills to the Corporation, or where notified to its contractors or agents.

2.5 The used Emergency Ticket Pack will be replaced by the Corporation or where notified its contractor or agent with a uniquely serial numbered new Emergency Ticket Pack.

2.6 All monies collected or received by the Operator as a result of the use of Emergency Ticket Packs shall be paid to the Corporation by the Operator in accordance with Schedule IVC.

3. Ticket Annulment

3.1 In the event of a ticket being issued in error the driver shall withdraw the ticket and use the annulment function on the ticket machine to produce a ticket annulment slip. The withdrawn ticket and the annulment slip shall be handed in at the driver's garage at the end of his/her duty.

3.2 The Operator shall not submit ticket annulments to the Corporation as a claim for reimbursement (as the revenue total is automatically adjusted) but should retain them at the garage for inspection purposes for a minimum of 6 months.

3.3 In the event that a driver fails to hand in the withdrawn ticket and the annulment slip at the end of his/her duty the annulment shall be treated as invalid and must be added to the revenue total data by way of a manual adjustment.

4. Ticket Issued in Error (TIE)

4.1 Where a ticket has been issued in error but where it is not possible to follow the annulment procedure (set out in paragraph 3) the driver shall withdraw the ticket, issue the correct ticket to the passenger and make any necessary cash adjustment. The withdrawn ticket must be appropriately marked with a cross on the front of the ticket and handed in to the driver's garage at the end of his/her duty together with a full written report completed on the prescribed form as issued by the Corporation and varied from time to time, detailing the mistake and where possible the name and address of the passenger.

4.2 The Operator shall not submit such written reports and withdrawn tickets to the Corporation but should retain them at the garage for inspection purposes for a minimum of 6 months.

4.3 The value of the TIE shall be payable by the Operator to the Corporation, as if the ticket had not been issued in error.

5. Passenger cannot pay

5.1 The passenger shall be refused travel unless he/she is a vulnerable person (which includes but is not limited to young children, old people, people with disabilities, pregnant women, women or older children travelling late at night and people who are in distress as a result of something happening to them), in which case he/she shall be allowed to travel provided the driver issues the passenger with a completed Unpaid Fare Notice in the form set out at Appendix A to this Schedule XI (supplied by the Corporation and as set out in Appendix A to this Schedule XI) and completes and hands-in the appropriate portion of the Unpaid Fare Notice at the garage at the end of his/her duty.

5.2 The Operator shall submit all returned portions of Unpaid Fare Notices to the Corporation each week.

6. Passenger without correct change where the driver or other passengers cannot provide change

6.1 If the correct change cannot be given immediately this should be done as soon as practicable. If the passenger completes the intended journey before it is possible to

give change an Unpaid Fare Notice shall be issued and the procedures set out at paragraphs 5.1 and 5.2 of this Schedule XI shall then apply.

7. Presentation of an Invalid Pass to Driver

7.1 Where a pass has been presented which:

7.1.1 is a child-rate pass being used by an adult (18 years or over);

7.1.2 is more than one (1) day out of date;

7.1.3 has a Photocard number which differs from that on the Photocard;

7.1.4 clearly belongs to someone else;

7.1.5 has been altered or mutilated; or

7.1.6 has not been produced with a Photocard

the driver shall withdraw the pass together with any Photocard and issue the passenger with an Unpaid Fare Notice. If the pass is one day out of date, the driver shall withdraw the pass only and not the Photocard. The passenger's name shall be obtained and verified if possible. A Pass Withdrawal Envelope (PWE) details of which are set out in the Big Red Book published and updated by the Corporation from time to time (current version 2nd Edition) shall be completed and the correct portion given to the passenger.

7.2 The procedures set out in paragraphs 5.1 and 5.2 of this Schedule XI shall then apply.

7.3 Where a pass is invalid for a reason other than as specified in paragraph 7.1 above, it is not to be withdrawn, but the cash fare must be charged for the journey being taken and the value of the ticket issued shall be payable by the Operator to the Corporation in accordance with Schedule IVC.

7.3a The driver shall submit the withdrawn pass to their garage at the end of his/her duty in accordance with instructions given on the Unpaid Fare Notice pad.

7.3b The Operator shall submit all withdrawn passes to the Corporation each week in accordance with instructions given on this subject

8. Ticket Irregularities found by the Corporation's Officials

8.1 If the Corporation's Revenue Protection Inspector is on ticket checking duties, and finds a ticket irregularity, he may issue a "credit note" to the driver to be paid in lieu of takings.

8.2 The Operator shall submit any such “credit notes” to the Corporation at the end of each week.

8.3 The value of any tickets issued in these circumstances shall not be payable by the Operator to the Corporation.

9. Penalty Fares

9.1 The Corporation’s Revenue Protection Inspectors shall be responsible for imposing and collecting the proceeds of Penalty Fares. If the vehicle is equipped with suitable Ticketing equipment, the Corporation’s Inspector may hand over the proceeds of any Penalty Fares collected to the driver and the driver shall issue a Penalty Fare ticket for the amount of each Penalty Fare collected and handed over to the driver. The driver shall not refuse to collect the Penalty Fare for this purpose.

9.2 The value of the Penalty Fares Revenue shall be payable by the Operator to the Corporation in accordance with Schedule IVC.

10. Re-issued Tickets

Under no circumstances whatsoever may used or withdrawn tickets be re-issued. Drivers must not have used tickets (except withdrawn and Saver tickets) in their possession at any time.

11. Instructions from the Corporation’s Officials and Police Officers

The Corporation’s Revenue Inspection Officials will have the authority to request information from the driver that is relevant for the official to carry out his or her duties. The Corporation Revenue Protection Inspectors or a Police Officer has the authority to instruct the driver to stop or hold the vehicle at a bus stop or in a safe location if there is cause to suspect that the driver may endanger passengers in their duty.

UNPAID FARE NOTICE

Reference no: UFN2010

Unpaid Fare Notice

COVER

Use these forms to help deal with ticketing problems.

INSIDE FRONT COVER

MAYOR OF LONDON

Transport for London

INSIDE BACK COVER

Unpaid Fare Notice (UFN)
If you allow someone to travel without payment, both parts of the UFN must be filled in as far as possible.

Fill in the driver section completely including the date, time, location and route number. Make sure you tick one of the 'reason for issue' boxes and add extra information on the back especially if you suspect a passenger is regularly trying to avoid paying their fare. (There is no need to get a name and address.)

The information you give is collated and used to target regular offenders by Revenue Protection staff.

Give the passenger the bottom part of the form and hand in the top part at the end of your duty.

Pass Withdrawal Envelopes (PWE)
If you withdraw tickets or Oyster cards, please use a Pass Withdrawal Envelope. Fill out the information on the front and seal the withdrawn pass/ticket in the envelope. Please then fill out the Passenger's Copy and give it to them. There is no need to fill out a UFN. Hand in any PWEs at the end of your duty.

If a Revenue Protection Inspector boards your bus on a trip where you have issued a form, tell them **immediately**.

When to issue a form.

You must not allow anyone to travel on your bus if they do not have a valid ticket or pass, unless:

- You need to withdraw an invalid ticket or damaged Oyster card/photocard (PWE only)
- They're in distress/potentially vulnerable (for example, a victim of crime or are unable to look after themselves)
- A Roadside Ticket Machine has taken their money without issuing a ticket
- They are offering to pay their fare, but you don't have enough change
- If you feel threatened by a bus to passenger who cannot or will not pay their fare
- You believe there is another good reason for not leaving someone stranded

See inside front cover for details about filling in these forms.

SCHEDULE XII

OPERATOR'S OVERALL PERFORMANCE

1. Termination for poor overall performance

1.1 The Operator's overall performance in respect of its obligations under this Route Agreement shall be monitored in accordance with Schedule V. If in the reasonable opinion of the Corporation the Operator's overall performance in respect of its obligations under this Route Agreement is not to the standards required by the Corporation, as set out in this Route Agreement, the Corporation shall be entitled to terminate the Route Agreement pursuant to clause 27.1.3.

1.2 Without prejudice to the generality of clause 27.1.3, and by way of guidance only, the Operator's overall performance shall not be considered by the Corporation to be to the standards required by the Corporation as set out in this Route Agreement if, in any 12-month period, there are three or more failures of any one or more of the following types:

1.2.1 failure by the Operator to operate the Minimum Operated Mileage Standard as an average over any period of 12 consecutive weeks;

1.2.2 failure by the Operator to provide Reliable Services, (the Corporation shall assess whether there has been a failure to provide Reliable Services by reference to Schedule VII);

1.2.3 failure by the Operator to provide safe and environmentally acceptable Services taking into account, for example:

1.2.3.1 the type, frequency and severity of accidents and incidents;

1.2.3.2 the results of the Department for Transport's tests or other tests carried out on the Operator's vehicles;

1.2.3.3 the safety and environmental performance of the Operator's vehicles; and/or

1.2.3.4 the Operator's non-compliance with any relevant health and safety or environmental legislation or any other regulation;

1.2.4 failure by the Operator to ensure that the vehicles used in operating the Services satisfy the requirements of this Route Agreement (for example but without limitation that the Operator has not complied with the requirements of Schedule II); and/or

1.2.5 any other material or persistent failure by the Operator, its employees, agents or contractors to comply with any of the terms of this Route Agreement.

1.3 In assessing the Operator's overall performance and considering whether to terminate the Route Agreement under clause 27.1.3, the Corporation shall review the

circumstances appertaining to the operation of the Services, including, without limitation, consideration of:

1.3.1 abnormal levels of congestion;

1.3.2 the progress of any actions, such as recently implemented service changes, or changes waiting introduction or any other proposed actions by the Operator to improve performance; and

1.3.3 the time periods relating to 1.3.1 and 1.3.2 above

provided that consideration of such issues shall not relieve the Operator of any of its obligations set out in this Route Agreement and shall not be construed in anyway as a waiver of any right or remedy available to the Corporation.

SCHEDULE XIII

SUSPICIOUS PACKAGES, CARRIAGE OF ANIMALS AND OTHER MATTERS

1. Action To Be Taken When Suspicious Packages Are Found On Buses
2. Carriage of Animals
3. Carriage of Luggage
4. Contra-Flow Bus Lanes
5. Driving in Oxford Street

SCHEDULE XIII

SUSPICIOUS PACKAGES, CARRIAGE OF ANIMALS AND OTHER MATTERS

1. Action To Be Taken When Suspicious Packages Are Found On Buses

1.1 A driver or conductor (in this schedule unless context otherwise requires, collectively referred to as drivers) and where appropriate other staff who are made aware of, or who find a suspicious package, object, or the like, on their bus must comply with the following:

1.1.1 do not ignore it;

1.1.2 do not move, touch or tamper with it; and

1.1.3 attempt to establish ownership, if this is unsuccessful then;

1.1.3.1 do not transmit or permit any person to transmit from any radio or mobile phone within 25 metres of it;

1.1.3.2 protect all passengers/staff, by evacuating them safely and quickly;

1.1.3.3 move away all passengers, pedestrians and keep all road users at least 150 metres from the bus;

1.1.3.4 switch off engine, isolate electrics and leave bus doors open;

1.1.3.5 inform the police via the most appropriate means either by calling Code Red from another bus radio at a safe distance (50 metres or approximately the length of five buses) or by dialing 999 from a landline. They shall be responsible for calling other emergency services if necessary; and

1.1.3.6 stand by at the scene to identify themselves to the first police officer who arrives, comply with his/her directions and remain there until released by the police officer.

1.1.3.7 do not drive into a bus station

2. Action To Be Taken When Suspicious People are Found on Buses

2.1 A driver or conductor (in this schedule unless context otherwise requires, collectively referred to as drivers) and where appropriate other staff who see a passenger acting suspiciously or are made aware of a passenger acting suspiciously on their bus by another passenger or a third party must comply with the following:

2.1.1 pull over safely (not at a bus stop)

2.1.2 evacuate the passengers by telling them the bus has a problem

2.1.3 switch off the engine

2.1.4 call Code Red

2.1.5 stay at the scene and be identified when police arrive

2.1.6 be prepared to give a description of the suspicious person

2.1.7 when you have been cleared by the police, call Code Red and let CentreComm know

2.1.8 do not use a radio or mobile phone within 50m (roughly the length of five buses)

3 Carriage Of Animals

3.1 Drivers are legally obliged to allow any Assistance Dog on board such as guide dogs or hearing dogs accompanying disabled persons.

3.2 Drivers must permit dogs or other inoffensive animals to be carried by passengers. Discretion may also be exercised, in appropriate circumstances, to allow such animals to be carried in the lower deck of double-deck buses. Such animals should be under control and on a lead and shall be carried at the owner's risk and must not be allowed on seats.

4. Carriage Of Luggage

Passengers must be permitted to carry, free of charge, all reasonable items of luggage, provided such luggage does not obstruct the gangway or stairs or occupy seats and is not likely to be a danger or inconvenience to other passengers. Hazardous and/or inflammable substances (excluding medical equipment) cannot be carried on buses for safety reasons. Passengers are not permitted to carry open bottles or cans of alcohol on buses and drivers are required to ensure that this is adhered to, without putting themselves in danger. Pushchairs and buggies can be carried, for no extra cost, at the driver's discretion, providing that they do not block seats or gangways, as further detailed in *"Guidelines for the Carriage of Buggies on Buses"* (as set out in Annex C).

NOTE: The condition under which items of luggage are carried may be varied by the Corporation from time to time, e.g. when there is a high level of security alert.

5. Contra-Flow Bus Lanes

5.1 Drivers must exercise special care when driving in contra-flow bus lanes, ensuring that dipped headlights are switched on, that they keep to a safe speed no greater than 10mph, and that they are on the alert for pedestrians who may attempt to cross the bus lane.

5.2 The Corporation reserves the right to require the Operator to adhere to specific speed limits in certain other locations, other than in contra-flow bus lanes, from time to time.

6. Driving In Oxford Street

6.1 Drivers must use dipped headlights at all times when driving in Oxford Street and defined pedestrianised zones and other roads as notified by the Corporation from time to time. In addition, wherever possible, drivers should also use dipped headlights in all other locations at all times. New vehicles should be configured to allow such operation.

SCHEDULE XIV - LOST PROPERTY ARRANGEMENTS

A. Address and Hours of Opening

B. Forms and Equipment

C. Claims and Correspondence

D. Claims at Garages for Lost Property with Fees to be Charged

E. Property Found on Vehicles

F. Lost Property Found Within Bus Garages

G. Animals

H. Examination of Lost Property

I. Recording and Labelling of Lost Property

J. Safe Custody of Lost Property

K. Despatch of Lost Property to the Lost Property Office

L. Public Enquiries About and Claims for Lost Property

M. Perishable Articles

N. Property of an Exceptional or Dangerous Nature

O. Period Tickets, Passes (other than staff free passes), Scholars Term Tickets, Scholars Identity Cards and Concessionary Fare Bus Permits.

P. Staff, Dependent, Retired and Other Privilege Passes and Identity Cards

SCHEDULE XIV

LOST PROPERTY ARRANGEMENTS

The following procedure in respect of lost property handed in at garages must be strictly observed by the Operator.

A. ADDRESS AND HOURS OF OPENING

1. The London Transport Lost Property Office (the "Lost Property Office") is located at 200 Baker Street, London NW1 5RZ and is open to the public as follows: -

MONDAYS TO FRIDAYS	0930 hours to 1400 hours
SATURDAYS, SUNDAYS AND PUBLIC BANK HOLIDAYS	Closed all day

2. Staff of the Operator seeking advice in connection with lost property may telephone 020 7918 1260 between the hours of 0730 and 1630 Mondays to Fridays. This telephone number is provided for official use only and must under no circumstances be disclosed to member**s** of the public.

3. Members of the public seeking advice in connection with lost property should be given the following telephone number 020 7486 2496 or such other number as may be notified to the Operator from time to time.

4. Notices shall be displayed outside all garages advising the public that all enquiries (including those about lost property) should be made before XX.XX hours (the actual time shown shall be the subject of local arrangements), after which time the garage is closed to the public. After that time, the Operator's staff need not restore lost property to claimants who should be given a polite apology, referred to the notice displayed, and advised that the garage is closed after the time stated for security reasons. If the garage is not open to the public for such enquiries this shall be stated on a notice outside the garage with a reference to where the public should make enquiries.

5. The notice set out in Appendix A (or any revised version issued by the Corporation from time to time) shall be displayed outside all garages advising the public of the scale of charges applicable when claiming lost property.

B. FORMS AND EQUIPMENT

1. The Operator shall use the forms and equipment specified in this Schedule (as amended by the Corporation or the Lost Property Office from time to time) when dealing with lost property.

2. The Operator shall be issued with the following forms and equipment (which list may be amended from time to time by the Corporation) free of charge:

   2.1 Form 705/21 (2) - Particulars of lost property found;

2.2 Form 705/36 - Summary form;

2.3 Form 705/23(3) - Enquiry form for lost property;

2.4 Form 602/12 - Lost property label;

2.5 Form 27241/043 -Lost property envelope (small); and

2.6 Form 27241/046 - Lost property envelope (medium).

3. The Operator shall ensure that all forms shall be completed legibly in ink.

4. Certain members of the public are entitled to claim a VAT refund in respect of the charges made for lost property. In cases where a "tax invoice" for this purpose is requested, the following information must be sent by the Operator by way of a memorandum to the *Chief Accountant, Transport for London, Windsor House, 42 - 50 Victoria Street, London SW1H OTL* and the claimant advised that the "tax invoice" will be sent by post from that office in due course:

4.1 name and address;

4.2 date claimed;

4.3 amount charged;

4.4 description of article; and

4.5 serial number of Form 705/21(2)

C. CLAIMS AND CORRESPONDENCE

1. Claimants should be advised that property is not available at the Lost Property Office until 1200 hours on the day after collection from the garage.

2. All correspondence received at the garages regarding lost property shall be sent to the Lost Property Office, endorsed with any available information that may assist in tracing the property.

D. CLAIMS AT GARAGES FOR LOST PROPERTY WITH FEES TO BE CHARGED

1. All claimants for lost property which is still on hand at the garage shall be required to pay a fee of £2.00 per article or such other fee as the Corporation may from time to time determine. This set fee applies to all articles of lost property. Staff of the Operator who lose articles are in precisely the same position as the general public. Except in cases where an article has been inadvertently left on the bus or in the garage in the normal course of duty, the appropriate lost property fee is payable.

2. In cases where property is claimed at the garage and payment of the fee will cause hardship to the claimant (e.g. an old age pensioner) the Lost Property Office should be contacted for advice. It must be clearly understood that each case will be dealt with on its merits.

3. In no circumstances shall the Operator advise a claimant that any fees paid will be refunded.

4. The amount charged should be entered by the garage official on duty on the bottom right hand side of Form 705/21(2) and then the claimant should sign and give his name and address in the space provided. The charge must be entered before the form is signed. A separate form must be completed and signed for each article. For the avoidance of doubt all military kit, equipment and the like if claimed at the garage is subject to the above fee.

5. Claimants of locked bags and cases should be requested to open the article so that the value of the contents may be assessed.

6. Wherever lost property is claimed at garages, the appropriate section on the right hand side of Form 705/21(2) should be completed, care being taken to ensure that, where an article is claimed on behalf of the owner, the owner's name is inserted in the second line of the alternative indemnity. In order that the garage concerned may have a record of such cases, the name and address of the claimant, together with the fee paid, should be shown on the reverse of the garage copy of Form 705/21(2).

7. All fees shall be forwarded to the Lost Property Office in the manner set out in Section K paragraph 8.

E. PROPERTY FOUND ON VEHICLES

1. Conductors, drivers and driver/operators shall retain in their possession all property found on their vehicle, whether found by themselves or by other persons, and shall on completion of their duty hand such property to the garage official on duty who shall arrange for particulars thereof to be recorded on Form 705/21(2) (In the section for "Particulars of Lost Property Found"). The name and address of the finder must be stated and the time at which the property is handed in at the garage. If it is handed in or over by a passenger, this fact must be recorded. The appropriate counterfoil of the Form shall be handed to the conductor, driver or driver/operator as a receipt for the property.

2. When a conductor, driver or driver/operator deposits two or more articles found during the course of his or her duty, a separate Form 705/21(2) should be completed for each article otherwise considerable confusion is caused when the Lost Property Office endeavours to trace lost articles.

3. Any alteration to the entries on Form 705/21(2) must be initialled by the garage official concerned in the presence of the conductor, driver or driver/operator.

4. It should be particularly noted that if the property is claimed before it is handed in at the garage, and the conductor, driver or driver/operator is satisfied as to ownership, he or she shall hand the property to the claimant without fee or reward but must obtain a receipt for

the property with the claimant's name and address and must give a full description of the property on his or her "Cash Total Sheet". It shall be the conductor's, driver's or driver/operator's responsibility to draw the attention of the garage official on duty to such a receipt and to furnish the necessary details to enable form 705/21(2) to be completed. The form should be clearly endorsed "Claimed on Vehicle".

5. Conductors, drivers and driver/operators must sign that portion of Form 705/21(2) dealing with lost property which is retained by the Operator. This must be done in ink and, in order to avoid disputes, any alterations made on the form must be initialled.

F. LOST PROPERTY FOUND WITHIN BUS GARAGES

Property from passengers using the Services which is found by an employee of the Operator within the confines of the Operator's garage or other premises shall be handed in to a garage official who shall complete Form 705/21(2) in respect of each item of property handed in.

G. ANIMALS

When animals and/or pets are handed in as lost property, the local RSPCA should be notified and requested to collect them. The telephone number of the local RSPCA should be available for the garage staff. Form 705/21(2) must be completed in respect of each animal.

H. EXAMINATION OF LOST PROPERTY

1. Unlocked bags, purses, wallets and the like must be opened by a garage official on duty and a full description of the contents entered upon Form 705/21(2) which should be signed by the conductor, driver or driver/operator or other person handing in the property as certifying the correctness of the entry.

2. Wage packets etc. allegedly containing cash, (whether or not they are contained in other property) shall be examined and the actual contents determined and noted.

3. Period tickets and other travel permits issued by any member of the TfL Group or London Underground Limited shall be dealt within the manner set out in Section O and P.

4. The London Transport Act 1982 provides that where the name and address of the owner of any lost property is readily ascertainable and the address is within the United Kingdom the Lost Property Office shall notify the owner that the lost property is in the possession of the Lost Property Office. Accordingly all items of lost property shall be examined by a garage official and where the name and address of the probable owner can be ascertained these details shall be entered on Form 705/21(2) in the section headed "name and address of probable owner." There shall also be endorsed on the Form information as to where these details were obtained. For this purpose it will be sufficient for the Operator to endorse the form with for example "Name on" or "Name inside".

5. The responsibility for advising the owner of the lost property that the item is in hand rests with the Lost Property Office and not with the Operator or the garage where the property was handed in and in no circumstances shall the Operator contact the owner directly.

I. RECORDING AND LABELLING OF LOST PROPERTY

1. Form 602/12 (Lost Property Label) shall be attached to all lost property with the exception of small articles such as rings, keys, necklaces, spectacles etc. which must be enclosed in a Lost Property Envelope of the appropriate size. When articles are described, umbrellas should be shown as either lady's or gentleman's, straight or crook handle. The colour of cover should also be stated. Gloves should be described as lady's or gentleman's, single or pair, leather or cotton etc. Handbags, purses, wallets should be described as lady's or gentleman's, with the material and colour clearly stated.

2. Envelopes should not be used for gloves and books, which should be tied with string and labelled. Gloves should not be tied round the fingers. Single gloves must be entered on separate Forms 705/21(2) and labelled separately. They must on no account be batched and entered on one form.

3. Locked bags and cases must not be opened (unless they are treated as a suspect package) but detailed on Form 705/21(2) as "Locked".

4. To avoid damage, umbrellas and walking sticks must be tied together at the top and bottom before being despatched to the Lost Property Office.

5. When loose money is handed in the Operator shall indicate on Form 705/21(2) the exact position on the vehicle or in the garage where it was found (e.g. nearside, front seat, upper deck).

6. Immediately after recording, the lost property must be securely parcelled, tied with string and sealed.

J. SAFE CUSTODY OF LOST PROPERTY

The safeguarding of all lost property shall be the responsibility of the Operator until it is collected by the Lost Property Office (or its representative) and the garage official on duty shall place the same in the safe immediately after receipt. Without prejudice to the Operator's general duty to safeguard lost property, the Operator shall pay particular regard to the safekeeping of valuable items of lost property for example, jewellery and money. Bulky parcels, tins of paint etc. should be put in a cupboard which must be kept locked.

K. DESPATCH OF LOST PROPERTY TO THE LOST PROPERTY OFFICE

1. Arrangements for the collection of lost property from the Operator's garages for transmission to the Lost Property Office shall be as notified to the Operator by the Corporation and/or the Lost Property Office from time to time.

2. The Operator and its garage officials shall ensure that property received by them, with the exception of items specified below, is packed in the transit bags provided for this purpose.

3. Each item of lost property must be accompanied by a completed Form 705/21(2). A full description of the item of lost property must be given on the main body of the form. The counterfoil should contain only a bare reference to the item being despatched (e.g attaché case handbag containing £1.50).

4. Forms 705/21(2) are numbered and the forms must be completed in numerical order.

5. Any Form 705/21(2) which has been incorrectly completed, damaged or which is not required for use must be returned to the Lost Property Office endorsed accordingly.

6. In the case of damaged articles Form 705/21(2) should be endorsed to the effect that the article was found damaged.

7. The Operator shall complete a Summary Form (705/36) in respect of each batch of lost property to be despatched to the Lost Property Office.

8. The Summary Form (705/36), the originals of all Forms 705/21(2) referred to thereon placed in numerical order and any cash in respect of fees (which shall be placed in a plastic cash bag) shall be placed together in one sealed envelope and shall then be put into the transit bag with the lost property referred to on the forms.

9. If lost property is not collected on the date arranged by the Corporation and/or the Lost Property Office in accordance with paragraph 1 above but is retained by the Operator for the benefit of the loser, the reference number of Form 705/21(2) in respect of property retained must be shown on the first Summary Form completed after the property has been handed in and on any subsequent summaries until the particular Form 705/21(2) is sent to the Lost Property Office.

10. A copy of Forms 705/36 and Forms 705/21(2) should be retained for garage records. It should be particularly noted that, in the event of no lost property having been dealt with at the garage on any particular day, a "NIL" return must be entered on Form 705/36, together with the next consecutive garage number, and the form forwarded to the Lost Property Office via the Lost Property Offices representative. It is essential that "NIL" returns are forwarded to the Lost Property Office in these cases.

11. The transit bags shall be sealed using the equipment provided by the Lost Property Office and shall be prepared ready for handing over to the Lost Property Offices representative immediately on their arrival at the garage. As the bags from the garage will be sealed, no receipt for the property will be given by the Lost Property representative. The Lost Property representative will, however, if requested, initial the garage copy of Form 705/21(2) when articles are handed to him or her separately.

12. Exceptionally bulky articles or articles such as tins of paint or bottles containing liquid etc. which would be likely to cause damage to other articles in the event of breakage, must not be placed in the transit bag but must be handed to the Lost Property Offices

representative separately. Form 705/21(2) in respect of such articles should, however, be placed in the bag.

13. Should there be any doubt as to the advisability of despatching by transit bag any article, document or the like, one of the Operator's garage officials should telephone the Lost Property Office for guidance.

14. For the avoidance of doubt, loose insurance, health or unemployment cards, Government passes and permits, family allowance books, pension books and insurance papers must be sent to the Lost Property Office.

L. PUBLIC ENQUIRIES ABOUT AND CLAIMS FOR LOST PROPERTY

1. People enquiring about lost property should be given a copy of Form 705/23(3) "Enquiry for Lost Property", which the enquirer should be advised to complete and forward by post to the Lost Property Office. (Garage staff are not required to complete these forms or accept them for onward transmission).

2. If the lost property has already been forwarded to the Lost Property Office the Operator must be satisfied that the claimant's description of the lost property matches that on Form 705/21(2) before he gives the claimant the serial number of that form to assist him in claiming the lost property from the Lost Property Office.

M. PERISHABLE ARTICLES

1. Perishable articles, i.e. those likely to become objectionable or to deteriorate within a short period, must not be sent to the Lost Property Office but must be retained at the garage and, after a period of 48 hours, should be destroyed or disposed of. The relevant Form 705/21(2) must be endorsed accordingly and sent to the Lost Property Office.

2. Where perishable goods are contained in or are with other property, the whole of the property should be sent to the Lost Property Office i.e. the perishable goods should not be extracted and retained at the garage unless they have deteriorated or are deteriorating to an extent likely to damage the article or property in which they are contained. In this event only the perishable goods may be extracted and dealt with as above.

3. The attention of the Operator's Garage Manager must always be drawn to instances concerning perishable goods and it will be his duty to exercise his discretion subject to the procedures set out in this Schedule in the matter of destroying or disposing of any lost property which is or becomes objectionable at any time. Wines, spirits, etc., dry and tinned goods do not come within this category and must be sent to the Lost Property Office.

4. Where doubt exists as to the action to be taken, the Lost Property Office should be consulted by telephone.

N. PROPERTY OF AN EXCEPTIONAL OR DANGEROUS NATURE

1. The Lost Property Office must be immediately notified by telephone in the event of: -

   1.1 mail bags (whether empty or containing postal packets) and;

   1.2 batches of letters (opened or unopened)

   being found on any of the Operator's vehicles or premises. Such articles must be held at the garage pending further instructions. Single letters should be treated as ordinary lost property and forwarded in the usual manner.

2. Save in cases of emergency, property of a dangerous nature must be retained and instructions as to disposal obtained by telephone from the Lost Property Office.

3. The Lost Property Office should be notified by telephone in the event of any property of a specially valuable nature or documents and papers of apparent importance being handed in.

4. Any documents of the Government, Crown, Armed Forces and the like containing information of a secret or confidential nature must be forwarded to the Lost Property Office in the usual manner.
5. All computers, computer software and the like which contain information of the type referred to in paragraph 4 above shall be forwarded to the Lost Property Office in the usual manner.

O. PERIOD TICKETS, PASSES (OTHER THAN STAFF FREE PASSES), SCHOLARS TERM TICKETS, SCHOLARS IDENTITY CARDS AND FREEDOM PASSES AND TRAVEL PERMITS

1. Subject to paragraph 2 below and section P below, period tickets which are valid for travel on any member or the TfL Group and/or London Underground services (including Travelcards, Bus Passes and LT Cards Scholars Term Tickets, Identity Cards, London Boroughs' Freedom Passes and Travel Permits) which are found or handed in to the garage and are not contained in other property, shall be forwarded with a covering memorandum explaining the circumstances in which they were found or handed in to the Ticketing Administration Office, Transport of London, Windsor House, 42 – 50 Victoria Street, London SW1H 0NL or such other address as may be notified from time to time.

2. If the tickets and passes referred to in paragraph 1 above are contained in other property (e.g. a wallet or in a holder which also contains other property, such as a bank card) the ticket or pass together with the other property shall be forwarded to the Lost Property Office in accordance with the procedures set out in this Schedule.

P. STAFF, DEPENDENT, RETIRED AND OTHER PRIVILEGE PASSES AND IDENTITY CARDS

1. Staff, dependent, retired and other privilege passes and identity cards issued by the TfL Group and passes issued by British Rail (and its successors) or any other Operator should, if found loose, (or in a case or holder only) be forwarded without delay to the office of the Personnel Services Manager (Passes and Permits Section), Transport of London, Windsor House, 42 – 50 Victoria Street, London, SW1H 0NL.

2. A form 705/21(2) must be completed in respect of each pass or identity card which should be endorsed (forwarded to Passes and Permits) and sent to the Lost Property Office. The pass number and description must be quoted on the Form, together with the name, location and badge number of the finder or name and address if found by a passenger.

3. Any such passes enclosed in property other than holders e.g. handbags, wallets, shopping baskets etc., should be extracted and forwarded to the Passes and Permits Section as above, Form 705/21(2) being endorsed accordingly. The remainder of the property will be forwarded to the Lost Property Office under the normal lost property procedure.

4. Staff passes and identity cards cannot be claimed locally at garages. Instead the claimant must be referred to the local official or supervisor to whom they normally report or in the case of retired staff passes to the office of issue of the pass.

SCHEDULE XV

PRO-FORMA AGREEMENTS

A - REQUEST TO ASSIGN/NOVATE A ROUTE AGREEMENT.

B - FORM OF ASSIGNMENT.

C - FORM OF NOVATION.

D - SCHEDULE OF AMENDMENTS/FURTHER CONDITIONS TO FORM OF ASSIGNMENT OR FORM OF NOVATION.

E - PARENT COMPANY GUARANTEE.

SCHEDULE XVA

REQUEST TO ASSIGN/NOVATE A ROUTE AGREEMENT

To: London Bus Services Limited

Date:

[Operators Name]
[Operators Address]

Dear Sirs,

In accordance with clause 22 of Route Agreement No. [ ] we hereby request your consent to [assign/novate] the said Route Agreement to [New Operator's name].

We enclose an [assignment/novation] agreement duly completed and executed.

Yours faithfully

On behalf of [Operators Name]

SCHEDULE XVB

FORM OF ASSIGNMENT

ASSIGNMENT OF WHOLE ROUTE AGREEMENT

THIS AGREEMENT is made on the [ ] day of [ ] 201

BETWEEN

1. [Original Operator] whose registered address is at [ ] ("the Operator");

2. [New Operator] whose registered address is at [ ] ("the New Operator"); and

3. LONDON BUS SERVICES LIMITED whose registered office is at Windsor House, 42 – 50 Victoria Street, London, SW1H 0TL ("the Corporation").

WHEREAS:

A. The Corporation entered into an agreement with the Operator dated [ ] being Route Agreement No: [ ] ("the Route Agreement") relating to the operation of bus route(s) [ ].

B. Clause 22 of the Route Agreement provides that the Operator shall not assign the Route Agreement without the prior written consent of the Corporation.

C. The Corporation has agreed that the Route Agreement can be assigned to the New Operator on the terms hereinafter appearing.

IT IS AGREED AS FOLLOWS:

1. The Operator as beneficial owner hereby assigns to the New Operator the full benefit of all its rights under the Route Agreement with effect from [date].

2. In consideration of the Corporation consenting to the assignment of the Route Agreement the New Operator undertakes to the Corporation that it shall with effect from [date entered in clause 1] observe and perform all of the obligations on the Operator's part contained in the Route Agreement and that the Route Agreement shall be deemed to have been made by the Corporation with the New Operator and the Operator jointly and severally as if the definition of the Operator in the Route Agreement included both the Operator and the New Operator.

3. The Corporation acknowledges that the New Operator is entitled to the benefit of the covenants and undertakings given by the Corporation to the Operator in the Route Agreement and that all payments under the Route Agreement from [date entered in clause 1] shall be paid to the New Operator.

4. Notwithstanding any provision of the Route Agreement which prohibits assignment and in consideration of the undertakings on the part of the New Operator, the Corporation hereby consents to the assignment herein contained.

5. With effect from [date entered in Clause 1] and in consideration of the agreement on the part of the Corporation to the assignment, the New Operator agrees with the Corporation:

5.1 that the Route Agreement shall hereafter be varied by [say if changing any terms e.g. including new contract terms, or if the contract reference number is to be changed]; and

5.2 that the performance record of the Operator under the Route Agreement prior to [date entered in Clause 1] shall be and shall be deemed to be the performance record of the New Operator for all purposes under the Route Agreement.

6. The New Operator acknowledges that it has received a copy of the Route Agreement and represents to the Corporation that it has satisfied itself as to the provisions thereof.

7. Each party shall bear its own costs in connection with the preparation and implementation of this Agreement.

8. This Agreement shall be governed by and constructed in accordance with English Law.

IN WITNESS WHEREOF this Agreement has been signed by the authorised representatives of the parties.

Signed by and on behalf of

[The Operator] ……..……..

Typed Name ……..……..

Date ……..……..

Signed by and on behalf of

[The New Operator] ……..……..

Typed Name ……..……..

Date ……..……..

Signed by and behalf of

LONDON BUS SERVICES LIMITED ……..……..

Typed Name ……..……..

Date ……..……..

SCHEDULE XVC

FORM OF NOVATION

NOVATION OF WHOLE ROUTE AGREEMENT

NB – this assumes a "cut-off date" after which the Route Agreement passes to the New Operator, but that outstanding payments are still owed to the Original Operator.

THIS AGREEMENT is made on the [ ] day of [ ] 200

BETWEEN

1. [Original Operator] whose registered address is at [ ] ("the Operator");

2. [New Operator] whose registered address is at [ ] ("the New Operator"); and

3. LONDON BUS SERVICES LIMITED whose registered office is at, Windsor House, 42 – 50 Victoria Street, London, SW1H 0TL ("the Corporation")

WHEREAS:

A. The Corporation entered into an agreement with the Operator dated [ ] being Route Agreement: [ ] (the "Route Agreement") relating to the operation of bus route(s) [ ].

B. Clause 22 of the Route Agreement provides that the Operator shall not novate the Route Agreement without the prior written consent of the Corporation.

C. The Corporation has agreed that the Operator can be released and discharged from the Route Agreement in consideration of the undertakings on the part of the New Operator and on the terms hereinafter appearing.

IT IS AGREED AS FOLLOWS:

1. In consideration of the Corporation consenting to the novation of the Route Agreement the New Operator undertakes to the Corporation and the Operator that it shall with effect from [date] observe and perform all of the obligations on the Operator's part contained in the Route Agreement and shall be bound by the terms of the Route Agreement which would have been borne by the Operator but for the release and discharge contained in this Agreement as if the New Operator were at all times party to the Route Agreement, in lieu of the Operator.

1. Save in respect of any sums receivable by the Operator from the Corporation or payable by the Operator to the Corporation in connection with the Route Agreement up to [date entered in Clause 1] and which have not been paid by the Corporation to the Operator or by the Operator to the Corporation (as the case may be) under or in connection with the Route Agreement up to [date entered in Clause 1] (together the "Sums Receivable"), in consideration of the undertakings given by the New Operator in Clause 1, with effect from [date entered in Clause 1] the Corporation hereby releases and discharges the Operator from all claims and demands whatever in respect of the Route Agreement and

accepts the liability of the New Operator under the Route Agreement in lieu of the liability of the Operator and agrees to be bound by the Route Agreement in every way as if the New Operator were named in the Route Agreement as party to it in place of the Operator.

2. In consideration of the release contained in Clause 2 the Operator agrees to transfer its rights and obligations under the Route Agreement to the New Operator.

4. With effect from [date entered in Clause 1] and for the avoidance of doubt, it is expressly agreed that:

4.1 save in respect of the Sums Receivable any and all rights, claims, counter-claims, demands and other remedies of the Corporation against the Operator accrued under or in connection with the Route Agreement prior to the [date entered in Clause 1] shall be exercisable and enforceable by the Corporation against the New Operator;

4.2 save in respect of the Sums Receivable any and all rights, claims, counter-claims, demands and other remedies of the Operator against the Corporation accrued under or in connection with the Route Agreement prior to [date entered in Clause 1] shall be exercisable by the New Operator against the Corporation ; and

4.3 any and all rights, counter claims, demands and other remedies of the Operator against the Corporation or vice versa in connection with the Sums Receivable shall continue to be enforceable by the Operator against the Corporation and by the Corporation against the Operator.

5. With effect from [date entered in Clause 1] and in consideration of the agreement on the part of the Corporation in Clause 2, the New Operator agrees with the Corporation: -

5.1 that the Route Agreement shall hereafter be varied by [say if changing any terms e.g. including new contract terms, or if the contract reference number is to be changed]; and

5.2 that the performance record of the Operator under the Route Agreement prior to [date entered in Clause 1] shall be and shall be deemed to be the performance record of the New Operator for all purposes under the Route Agreement.

1. The New Operator acknowledges that it has received a copy of the Route Agreement and represents to the Corporation that it has satisfied itself as to the provisions thereof.

2. Each party shall bear its own costs in connection with the preparation and implementation of this Agreement.

8. This Agreement shall be governed by and construed in accordance with English Law.

IN WITNESS WHEREOF this Agreement has been signed by the authorised representative of the parties.

Signed by and on behalf of

[The Operator] ……..

Typed Name ……..

Date ……..

Signed by and on behalf of

[The New Operator] ……..

Typed Name ……..

Date ……..

Signed by and behalf of

LONDON BUS SERVICES LIMITED ……..

Typed Name ……..

Date ……..

SCHEDULE XVD

SCHEDULE OF AMENDMENTS/FURTHER CONDITIONS TO FORM OF ASSIGNMENT/FORM OF NOVATION

The following conditions shall apply to this Agreement.

Signed by and on behalf of

[The Operator] ……..……..

Typed Name ……..……..

Date ……..……..

Signed by and on behalf of

[The New Operator] ……..……..

Typed Name ……..……..

Date ……..……..

Signed by and behalf of

LONDON BUS SERVICES LIMITED ……..……..

Typed Name ……..……..

Date ……..……..

SCHEDULE XVE

FORM OF PARENT COMPANY GUARANTEE

LONDON BUS SERVICES LIMITED

(Letterhead of Parent Company)

To: London Bus Services Limited

Dear Sir/Madam

We,.....("the Guarantor"), understand that you have entered into/agreed to enter into Framework Agreement No.....("the Agreement" which expression shall include any document constituting, amending, supplementing or replacing the same and any Route Agreement entered into (whether before or after the date of this Guarantee) pursuant to the Framework Agreement and any other route agreement (substantially on the same terms and conditions as apply to a Route Agreement) assigned or novated to the Operator prior to expiry of the survival clause in the Framework Agreement) with .....(the "Operator") in respect of the provision of bus passenger services on the condition that the obligations of the Operator under the Agreement shall be guaranteed by a Guarantor.

We are [recite the relationship of the Guarantor to the Operator,] and we warrant to you that this description of our relationship with/to the Operator is true and accurate.

IN CONSIDERATION of the foregoing and of the payment of five pounds (£5) by you to us (receipt of which we hereby acknowledge) WE HEREBY AGREE AND UNDERTAKE with you as follows: -

a) We unconditionally guarantee the proper and punctual performance by the Operator of all its existing and future obligations, undertakings and responsibilities under the Agreement and we shall forthwith make good any default thereunder on the part of the Operator and we shall pay or be responsible for the payment by the Operator of all sums, liabilities, awards, losses, damages, costs, charges and expenses that may be or become due and payable under or arising out of the Agreement in accordance with its terms or otherwise by reason or in consequence of any such default on the part of the Operator.

b) Without prejudice to the obligations expressed in paragraph (a) above, we unconditionally guarantee to provide all resources and support necessary to ensure that the requirements under the Agreement are met at all times, such resources and support shall include, but not be limited to providing additional drivers in the event of any default on the part of the Operator providing the same.

c) This Guarantee shall be a continuing guarantee and shall remain in full force and effect until all obligations to be performed or observed by the Operator under or arising out of the Agreement have been duly and completely performed and observed and the

Operator shall have ceased to be under any actual or contingent liability to you thereunder.

d) Any demand or other notice made by you under this Guarantee shall be duly made if sent by first class recorded delivery post to us.

e) You shall be entitled to enforce this Guarantee without taking any proceedings or exhausting any right or remedy against the Operator or any other person or taking any action to enforce any other security, bond or guarantee.

PROVIDED THAT

1. We shall be under no greater obligation or greater liability under this Guarantee than we would have been under the Agreement if we had been named as the Operator in the Agreement.

2. Our obligations hereunder shall remain in full force and effect and shall not be affected or discharged by;

(a) any alteration or variation to the terms of the Agreement made by agreement between you and the Operator;

(b) any alteration in the extent or nature or sequence or method or timing of any of the Services to be provided under the Agreement;

(c) any time being given to the Operator or any other indulgence or concession to the Operator or any forbearance, forgiveness or any other thing done, omitted or neglected to be done under the Agreement;

(d) any other bond, security or guarantee now or hereafter held by you for all or any part of the obligations of the Operator under the Agreement;

(e) the release or waiver of any such bond, security or guarantee;

(f) any amalgamation or reconstruction or dissolution including liquidation of the Operator;

(g) the liquidation, administration, receivership or insolvency of the Operator;

(h) any legal limitation, disability or incapacity relating to the Operator (whether or not known to you);

(i) any invalidity in, irregularity affecting or unenforceability of the obligations, of the Operator under the Agreement; or

(j) the termination of the Agreement or any part thereof.

3. So long as we remain under any actual or contingent liability under this Guarantee, we shall not exercise any right of subrogation or any other right or remedy of a surety which we may have in respect of any payment made by or sum recovered from us pursuant to or in connection with this Guarantee or prove in any liquidation of the

Operator in competition with you for any sums or liabilities owing or incurred to us by the Operator in respect of any such payment by or recovery from us to take or hold any security from the Operator in respect of any liability of us hereunder. We shall hold any moneys recovered or security taken or held in breach of this provision in trust for you.

4. This Guarantee is irrevocable.

5. The Guarantee, executed and delivered as a deed, shall be governed by and interpreted according to the laws of England and any claim, question, dispute or difference arising out of or in relation to or in connection with this Guarantee may if unresolved be referred in writing by either you or us to be determined by a sole arbitrator (the "Arbitrator") who shall be appointed by mutual agreement or failing agreement by the President of The Chartered Institute of Arbitrators of England and Wales on the application of either you or us. This submission shall be deemed to be a submission to arbitration within the meaning of the Arbitration Act 1996 or any statutory modification or amendment thereof and the award of the Arbitrator shall be final and binding. Without prejudice to your rights under this Guarantee we shall continue to perform our obligations under this Guarantee pending the decision of the Arbitrator.

6. This guarantee is personal to the Guarantor who shall not assign, novate or otherwise dispose in whole or in part any of its rights or obligations under this Guarantee without the prior written consent of you (such consent may be refused at your discretion). For the avoidance of doubt disposal shall be deemed to include but not be limited to any reorganisation of the Guarantor.

7. For the avoidance of doubt we acknowledge and agree that this Guarantee shall apply to any Route Agreement entered into (whether before or after the date of this Guarantee) pursuant to the Framework Agreement and any other route agreement (substantially on the same terms and conditions as apply to a Route Agreement) assigned or novated to the Operator prior to the expiry of the survival clause in the Framework Agreement and that we are willing to guarantee such arrangements in accordance with this Guarantee irrespective of the fact that such arrangements may not be in place or known to us at the date of this Guarantee.

8. *For non-UK resident Guarantors only:*
For the purposes of this Guarantee we hereby appoint.....of..... (to be a London address) to accept service of process on our behalf, and service on the said .....at the said address shall be deemed to be good service on us; and we hereby irrevocably agree not to revoke or terminate such appointment).

(If dealing with a Parent Company domiciled outside England & Wales a Legal Opinion may be required to ensure valid execution - see attached Legal Opinion).

EXECUTED as a DEED under)
THE COMMON SEAL OF (name)
Of Guarantor) in the)
presence of: -)

Director
Director/Secretary

LEGAL OPINION

FOR USE WITH A GUARANTEE

[To: London Bus Services Limited]

Dear Sirs

I am general counsel to .....and I am giving this legal opinion in connection with the making by .....of the Document (as defined below) in your favour.

1. I have examined the Deed of Guarantee (the "Document") dated .....made between..... (the "Guarantor") and London Bus Services Limited (the "Corporation"). Terms defined in or for the purpose of the Document have the same meanings in this opinion.

2. Having considered the Document and any other document, resolution or certificate I deemed necessary to enable me to give the opinion contained herein and having regard to all applicable laws of .....I am pleased to advise that in my opinion:

(a) the Guarantor was incorporated in.....on.....for an indefinite period as [a limited company] and is a separate legal entity, is subject to suit in its own name, and, to the best of my knowledge, no steps have been, or are being, taken to appoint a receiver or liquidator (or similar encumbracer or officer) over, or to wind up the Guarantor;

(b) the Guarantor has the necessary power and authority, and all necessary corporate and other action (including approvals and consents of members, stockholders, debenture holders or governmental or other regulatory authorities) in.....has been taken to enable the Guarantor to:

(i) Sign and deliver the Document and perform the obligations undertaken by it thereunder; and

(ii) guarantee the Corporation in respect of the obligations of the Guarantor under the Document;

and implementation by the Guarantor of the foregoing will not cause:

(aa) any limit on the Guarantor or its directors (whether imposed by the documents constituting the Guarantor, statute or regulation or, to the best of my knowledge, agreement or otherwise) to be exceeded;

(bb) any law or order to be contravened;

(cc) any default under, or give rise to an obligation to create any security interest of any nature whatsoever pursuant to, any agreement or other instrument or any judgement or

other requirement known to us to which the Guarantor is a party or by which it or any of its assets is bound;

(c) the Document has been properly signed and delivered on behalf of the Guarantor and the obligations on the part of the Guarantor contained in the Document, assuming them to be valid and binding according to English law by which they are expressed to be governed, are valid and legally binding on and enforceable against the Guarantor under the laws of..... and in the courts of .....

(d) the signature, delivery and performance of the Document by the Guarantor constitute private and commercial acts by it rather than public or governmental acts;

(e) it is not necessary or advisable under the laws of.....in order to ensure the validity, enforceability and priority of the obligations of the Guarantor or the rights of the Corporation under the Document that the Document be filed, registered, recorded or notarised in any public office or elsewhere or that any other instrument relating thereto be signed, delivered, filed, registered or recorded, that any tax or duty be paid or that any other action whatsoever be taken;

(f) the obligations of the Guarantor under the Document rank at least equally and rateably (pari passu) in point of priority and security with all other unsecured obligations of the Guarantor;

(g) there is no withholding in respect of duties, taxes or charges to be deducted from any payment, whether of principal, interest, fees or otherwise, to be made by the Guarantor pursuant to the Document, and the arrangements contemplated by the Document do not give rise to any charge whatsoever to taxes in .....

(h) there are no registration, stamp or other taxes or duties of any kind payable in ..... in connection with the signature, performance or enforcement by legal proceedings of the Document;

(i) the Corporation will not violate any law or regulation in .....nor become liable to tax in.....by reason of entering into the Document or performing its obligations thereunder. It is not necessary to establish a place of business in .....in order to enforce any provision of the Document;

(j) to the best of my knowledge, information and belief and after having made due enquiry the choice of English law to govern the Document will be upheld as a valid choice of law in any action in the ..... Courts;

(k) the consent to the jurisdiction by the Guarantor contained in the Document is valid and binding on the Guarantor and not subject to revocation;

(l) to the best of my knowledge, information and belief and after having made due enquiry any judgement for a definite sum given by the High Court of Justice in England against the Guarantor would be recognised and accepted by the Courts without re-trial or examination of the merits of the case.

3. I do not purport to be expert on and do not purport to be generally familiar with or qualified to express legal opinions based on any law other than the laws of ..... and accordingly express no legal opinion herein based upon any law other than the laws of ……

Signed . . . . . .

SCHEDULE XVI

iBUS EQUIPMENT

1. Introduction

1.1 The Corporation is committed to introducing new measures to improve the standard of bus services provided to passengers throughout Greater London. One such measure includes the introduction of a new communications, control and information project, the iBus system

1.2 Pursuant to clause 4 of the Route Agreement, the Corporation may (at its expense) provide and fit electronic equipment to certain of the buses used by the Operator in order to facilitate the provision of iBus.

1.3 In the event that iBus equipment is provided to the Operator by the Corporation, the Operator shall, without prejudice to clause 4, comply with the requirements set out in this Schedule XVI which includes Attachments 1-3 (inclusive). In the event of any conflict or ambiguity between the requirements in this Schedule and the terms and conditions of the Route Agreement, the terms and conditions of the Route Agreement shall prevail.

2. Definitions

In this Schedule and its Attachments, unless the context otherwise requires:

2.1 "Caesar" or "Caesar System" the electronic scheduling, database that allows bus operators to submit bus timetable scheduling data which the Corporation may feed in to iBus and other systems.

2.2 "Corporation Service Desk" means the single point of contact between the Operator and the Corporation for reporting incidents and making service requests.

2.3 "Countdown" means the trade-marked marketing name of the system that provides 'real-time' bus arrival predictions using data generated from iBus for the benefit of passengers via the web, SMS, signs and other channels as required by the Corporation.

2.4 "iBus Equipment" means any and all equipment provided by the Corporation in accordance with the Route Agreement in relation to the iBus System including (without limitation) the items listed in Attachment 1;

2.5 "iBus System" means the iBus equipment and other items operated by the corporation.

2.6 "Nominated Route(s)" means those of the Operator's routes identified by the Corporation for participation in the iBus System.

2.7 "Odometer" means the device, which measures the progress of the Vehicle's Odometer Drive.

2.8 "Odometer Drive" means the means of driving the Odometer appropriate to the Vehicle type and normally mechanical or electronic.

2.9 "Operator's Route(s)" means any bus passenger route(s) operated by the Operator under contract to the Corporation.

2.10 "Operating Contract" means the contract(s) between the Corporation and Operator for the provision of bus services.

2.11 "Route Operation" means the everyday actual operation and experience of the service on a Nominated Route.

2.12 "Service Controller" means the generic name given to an individual employed by the Operator to make use of a Workstation and communications equipment to control Route Operation.

2.13 "Vehicle" means any bus used by the Operator to provide services on the Nominated Route(s) which is to be or has been fitted with iBus Equipment in accordance with the Route Agreement.

2.14 "Vehicle Access Agreement" means the arrangement agreed between the Corporation and Operator for obtaining access to Vehicles, in accordance with the "process for Moves, Changes and Deletions detailed in paragraph 4 of Attachment 2, Part 1 of this document.

2.15 "Workstation" means the VDU, Voice Terminal and associated items defined within iBus Equipment.

3. Inclusion of iBus on Nominated Routes

3.1 The Corporation may from time to time in its absolute discretion notify the Operator that it wishes to include iBus on any of the Operator's Routes and those routes shall thereafter and until otherwise notified by the Corporation be Nominated Routes. The Corporation shall notify and consult the Operator about any Nominated Routes or the removal of any Nominated Route(s) from the iBus System.

3.2 The Corporation shall provide and install such of the iBus Equipment as it considers necessary for the implementation of the iBus System on Nominated Routes. All of the iBus Equipment provided pursuant to the Route Agreement shall remain the property of the Corporation and the Operator shall be responsible for and shall indemnify the Corporation from and against any loss of or damage to the iBus Equipment from the point of delivery to the Operator to the point of return to the Corporation or its nominated agent in so far as said loss or damage is attributable to the actions of the agents and/or employees of the Operator and any subcontractors and agents of the Operator. For the

avoidance of doubt the Operator shall have no liability for loss of or damage to the iBus Equipment due to vandalism by other third parties.

3.3 The iBus Equipment shall be installed on Vehicles used to provide services in relation to Nominated Routes. In the event that any Vehicle fitted with the iBus Equipment ceases to be used on a Nominated Route or is to be used solely on other routes, the Operator shall immediately notify the Corporation who may require the removal of the iBus Equipment from that Vehicle before disposing of the Vehicle in any way. This includes allocation of a vehicle to another Nominated Route transfer to a training fleet, accident damage or refurbishment. On the termination or expiry of any contract with the Corporation relating to the provision of services on a Nominated Route all of the iBus Equipment used on a Vehicle in relation to that Nominated Route shall be removed by the Corporation, unless otherwise agreed. The Operator shall comply with the requirements of Attachment 2 in respect of the matters referred to in this Clause.

4. Operator's Obligations in relation to the iBus Equipment

4.1 Except as expressly set out in the Route Agreement, the Operator shall not install or remove any of the iBus Equipment on or from any Vehicle without the prior written notification or consent of the Corporation.

4.2 The Operator shall be responsible for all of the iBus Equipment in its possession whether or not fitted to Vehicles. The Operator shall take all reasonable steps to ensure that none of the iBus Equipment is misused or in anyway utilised for any purpose other than as set out in this Agreement and that it is kept in clean and good condition.

4.3 The Operator shall not carry out any repairs or maintenance to the iBus Equipment. In the event of any of the iBus Equipment becoming or appearing to become faulty the Operator shall immediately notify the Corporation who shall remove and replace or repair such iBus Equipment upon notification to the Operator.

4.4 In the event that the Operator has no Nominated Routes or in the event of the termination of this Agreement or the termination of expiry of any contact with the Corporation for services in relation to any Nominated Route, all of the iBus Equipment in the possession or control of the Operator relating to the Nominated Routes or this Agreement as applicable shall be returned to the possession of the Corporation through removal of the iBus Equipment by the Corporation or its nominated agents upon reasonable notice.

4.5 Without limiting any other of its obligations, the Operator will comply with the requirements regarding the use and maintenance of the iBus Equipment set out in Attachment 2

5. Provision of Equipment by the Operator

5.1 The Operator shall provide and maintain an Odometer Drive on each Vehicle and shall promptly repair or replace any Odometer Drive, which is faulty or damaged.

5.2 The Operator shall maintain the Vehicle door contacts in good working order at all times.

5.3 The Operator shall provide a suitable electrical power supply and operating environment for the Workstation(s) at all times.

5.4 The Operator shall provide and maintain such other equipment, materials or facilities as may be provided in Attachment 2 and/or as may be reasonably requested by the Corporation from time to time to facilitate the proper use and success of iBus.

6. Access Arrangements

6.1 The Operator shall allow the Corporation or its nominated agents on site access to any Vehicle, garage or depot fitted with the iBus Equipment or indicated in the Corporation or the Operator's records as fitted with the iBus Equipment at the garage, depot or other location at which a Vehicle is usually based or at the garage or depot (as appropriate) for the purposes of inspecting, testing, maintaining and removing the iBus Equipment. Such access shall be by prior agreement in accordance with "Notification of Lead Times on vehicle Movements" (as set out in Annex C).

6.2 The Operator shall at the Corporation's request either allow access to the iBus Equipment held but not installed or (to the extent so requested) return such of the iBus Equipment to the Corporation or its nominated agent for all necessary repairs, maintenance, inspection and testing.

7. Assets and Vehicles – Records Maintenance

7.1 The Corporation shall keep up-to-date records of all of the iBus Equipment.

7.2 The Corporation and the Operator acknowledge that the iBus Equipment, Nominated Route(s) and Vehicle bonnet numbers hereto may change from time to time and hereby agree to maintain up-to-date records relating to such changes.

8. Payment

8.1 Without prejudice to the requirements in clauses 4 or 18 of the Route Agreement, the Operator shall pay the Corporation on demand:

8.1.1 all reasonable costs incurred by the Corporation associated with the removal and reinstallation of any of the iBus Equipment where that is

necessary as a result of the actions of the Operator rather than any instruction of the Corporation; and

8.1.2 all reasonable costs incurred by the Corporation as a result of failure by the Operator to comply with its obligations as set out in this Schedule (including without prejudice to the generality of foregoing any costs wasted as a result of failure by the Operator to allow access pursuant to paragraph 6).

8.2 The Corporation shall not be liable to make any payment to the Operator in respect of the safe and secure storage of the iBus Equipment within reasonable limits. Notwithstanding such limits no payment shall be made by the Corporation unless agreed in writing.

9. Effect on services

9.1 For the avoidance of doubt, the parties acknowledge that the failure of any of the iBus Equipment will not adversely affect the Operator's obligation to provide services on any Nominated Route, and the Operator shall not be entitled under the Route Agreement or any other contract with the Corporation to make any claim in respect of delays in those services in reliance on any the iBus Equipment failure.

ATTACHMENT 1

iBus Equipment

1. On Bus Devices

See The iBus London Equipment for new buses Installation Manual from time to time in force. Current version is Version 16 dated 1st September 2010 - (see Annex C, B-V).

2. Garage Based Equipment

1. Wireless AP Power Injector
2. Wireless LAN Switch
3. Wireless Access Point
4. Wireless Antenna
5. LAN Switch
6. Router
7. DDM Server
8. Desktop Workstations
9. 17" Dual Screen Monitors
10. Keyboard
11. Mouse
12. UPS
13. IP Audio Gateway 4 Port
14. IP Audio Gateway 16 Port
15. TAIT VOICE CONSOLE
16. Patch Panel
17. Cable management
18. RG45 SC TO SC 100FX MEDIA CONVERTOR
19. 50/125 4 core multimode loose tube
20. SC Fibre Optic Patch Panel
21. SC - SC 50/125 1m patch
22. 6u wall mount cabinet
23. 42u Freestanding Cabinet

ATTACHMENT 2

Part 1

Use and Maintenance of iBus Equipment

1. On-going use of the iBus System

1.1 Driver logins must be of suitable quality to ensure high quality Countdown and service control information. The Operator is to ensure that 100% driver logins are correct. For this purpose "driver login" means the keying in by the driver of the correct destination code, route number, duty/running number, trip number and/or such other information as may be required from time to time.

1.2 The Operator agrees to make effective use of the iBus Equipment for the purposes of service control in line with an agreed service control strategy. The Operator will resource each Workstation provided by the Corporation as part of the iBus Equipment within agreed hours with a trained Service Controller trained in accordance with Section 9.3 of this Attachment 2

1.3 The Operator agrees to ensure the On-Board Next Stop Signs (as a part of the iBus Equipment) are switched on at all times during Vehicle use in order to display on-board information

1.4 The Operator will provide five days prior notice to the Corporation Service Desk for the set up of any new iBus user. For this purpose "new iBus user" means any employee of the Operator who is an authorised user of the iBus workstations and who is trained in accordance with Section 9.3 of this Attachment2.

1.5 The Operator will not make any alterations to iBus Equipment and will keep all equipment in good, clean condition.

1.6 The Operator shall continue to maintain the facilities of each Control Room Location as detailed in "Bus Operators Infrastructure Requirements" as set out in Annex C.

1.7 The Operator shall not carry out any repairs or maintenance to the iBus Equipment.

1.8 The Operator will comply with the security policy that governs accepted access and use of the iBus environment (as advised by the Corporation from time to time).

1.9 The Low Bridge Alarm function provided on all buses is provided solely as a warning and not as a fail safe feature. It will be the responsibility of the Operator to ensure that each driver is suitably trained to respond to all alarms provided in an appropriate way.

1.10 The Operator will use the Caesar System in respect of all Nominated Routes in accordance with the Corporation's requirements which are:

- Tendered routes and mid life service changes: the Operator must ensure agreed Caesar compliant "Final Time" schedule(s) are submitted at least six weeks in advance of the service change start. Agreed "Final Duty" schedule(s) must be submitted at least three weeks in advance of the service change start date. In order to meet the route specification, the Corporation may require that the Operator submits schedule amendments before they can be promoted to "Final Time". This must be undertaken within a timescale agreed between the Operator and the Corporation.

- Emergency schedule changes: pending formalisation of the Corporation's exact requirements, each emergency change will be assessed by the Corporation on its' individual merit. The Corporation will liaise with the Operator as to the requirements dependent on the nature of the change.

1.11 Service Control Rooms

- The iBus workstations should be located in a quiet area away from other sources of distraction.

- Where possible, the Service Controller should be able to concentrate on managing service control issues rather than being distracted with other engineering or human resource issues.

- The AVL control room at a garage should be provided with a lockable door.

- The AVL desk should be provided with a remote means of releasing the entry door.

- The Service Controller should be provided with an intercom for visitors to request access to the control room.

- The AVL control room should be acoustically insulated, both from external noise sources and internal reverberation.

- If non-service control staff has to enter the control room, consideration should be given to a dividing countertop to keep visitors away from the AVL workstation. This will allow important queries to be dealt with without disruption to the Service Control staff.

2. Incident management

2.1 The Corporation Service Desk will assign an appropriate Priority (P1, P2 and P3) to all incidents.

2.2 Examples of priority allocation are as follows:

Priority Level	Impact

Priority 1 (P1)	• A fault that prevents a Operator from using a bus due to loss of emergency voice communication, due to the failure of:
	  • Code Red Switch
	  • Press to talk switch
	  • Drivers microphone
	  • Drivers speaker
	• Failure of 25% or more of the voice channels available at a radio base station
	• Loss of a central radio node
	• Complete loss of data centre services affecting multiple Operators

Priority 2 (P2)	• Loss of a garage network link • Complete loss of data centre services affecting a single Operator • Failure of a garage LAN • Failure of a workstation in a Garage with only one workstation. • Failure of a voice workstation in a Garage with only one Voice Workstation

Priority 3 (P3)	• System failure affecting a single user of a non critical service
	  • Failure of an IBIS+ on a Bus
	  • Failure of a mobile radio unit
	  • Failure of a single workstation
	  • Failure of a voice workstation
	• Failure of garage Wireless LAN

2.3 The Corporation will aim to provide an initial response to incidents within 30 minutes of the Operator reporting an incident. Following this initial response, the Corporation and its nominated agents will aim for the following incident resolution targets listed below:

2.3.1 94% of all P1 incidents logged will aim to be resolved within 6 hrs during a 24 hours a day, 365 days a year service window measured over a rolling 12 week period

2.3.2 100% of P1 incidents will aim to be resolved within 1 elapsed Business Day from date and time logged

2.3.3 98% of all P2 incidents logged will aim to be resolved within 12 hrs during a 24 hours a day, 365 days a year service window measured over a rolling 12 week period

2.3.4 100% of P2 incidents will aim to be resolved within 5 elapsed Business Days from date and time logged

2.3.5 97% of all incidents logged will aim to be resolved within 36 hrs during a 24 hours a day, 365 days a year service window measured over a rolling 12 week period

2.3.6 100% of P3 incidents will aim to be resolved within 4 weeks of date and time logged.

2.4 The Operator will proactively check for iBus Equipment faults and register all suspected on-bus and garage iBus Equipment faults and all system configuration anomalies directly to the Corporation Service Desk within 2 hours of detection.

2.5 The Operator will coordinate incident logging with the Corporation Service Desk to avoid duplication of incident recording. The Operator will provide confirmation of satisfactory incident resolution and will provide information, as requested by the Corporation Service Desk, on the progress of incidents, including the completion of satisfaction surveys.

2.6 The Operator will complete basic diagnostic activity as requested by the Corporation Service Desk.

2.7 The Operator will accept and keep secure any components or equipment forwarded by the Corporation (or its iBus Contractor) ahead of an engineer's arrival at the garage.

2.8 The Operator will provide accurate details of bus garage contact details for bus bookings to the Corporation Service Desk.

2.9 The Operator will provide, via the Corporation Service Desk, revised numbers of buses at each garage (make, model, variant, bonnet number, registration number and battery supply voltage), in accordance with Section 4.1 of this Attachment 2

2.10 The Operator will ensure necessary site access, security clearance and/or escort whilst onsite (if required) for iBus Contractor staff.

2.11 The Operator will provide the Corporation and any iBus Contractor access to and use of garage flight steps where available in order to gain access to gantries and roof mounted iBus bus antennae.

2.12 The Operator will provide bus parking information when attending bus faults within a garage such that the engineer can locate the faulty bus such that any delay does not adversely impact the achievement of the KPIs referred to in Section 2.3 of this Attachment 2.

2.13 The Operator shall allow the Corporation or its nominated agents on site access to any vehicle, garage or depot fitted with the iBus Equipment or indicated in the Corporation or the Operator's records as fitted with iBus Equipment at the garage, depot or other location at which a vehicle is usually based or at the garage or depot (as appropriate) for the purposes of inspecting, testing and maintaining the iBus Equipment.

3. Bus availability

3.1 Subject to reasonable notification, the Operator will make the appropriate buses available to the iBus Contractor's field engineering staff (to enable them to undertake repair of on board iBus Equipment):-

3.1.1 at the agreed appointment time between the hours 19:00 to 04:00 Monday to Sunday (or any other time as agreed between the Operator and the Corporation); and

3.1.2 for the duration of such repair.

3.2 The Operator will provide the Corporation or its iBus Contractor with bus shunting resources to test odometer repairs and will ensure the bus is parked in a location where movement is possible (i.e. it is not boxed in by other buses).

3.3 The Operator shall reimburse the Corporation any cancellation charges incurred where a booking for a bus has been agreed between the Operator and the Corporation and the iBus Contractor has encountered a 'No Bus Available'. Such charges will be in line with the costs outlined in Part 2 of this Attachment 2

4. Moves, Adds, Changes, Deletions (MACD)

4.1 The Operator will provide via the Corporation Service Desk a forecast of bus replacement, churn or bus movements between garages, once every four week period.

4.2 Operators will inform the Corporation of the placement of an order for new buses, as soon as possible after contract award. The Operator will provide the Corporation with 15 weeks prior notice of the required installation date for iBus Equipment for all new buses.

4.3 The Operator will make available to the Corporation all buses to be decommissioned within ten days after new replacement vehicles have been commissioned or before vehicles leave the London fleet (whichever is the earlier). The Corporation will charge the Operator for any additional costs incurred for the recovery of iBus Equipment.

4.4 The Operator will provide 15 Business Days prior notice to the Corporation for any on-bus iBus Equipment transfer or decommission requests.

5. Bus Cascades

5.1 The Operator will manage any cascade programme within the time lines specified in paragraph 4.3 of Part 1 of this document.

5.2 The Operator will provide the Corporation with 15 days prior notice for each bus transfer to a different operator and will pay the Corporation all costs associated with on-bus iBus Equipment re-configuration work.

6. Accidental Damage

6.1 The Operator will allow the Corporation's staff or a member of the iBus Contractor's field engineering staff to inspect vandalised and damaged equipment to ascertain the cause of damage.

6.2 The Operator will reimburse the Corporation for equipment replacement or repair and installation costs associated with loss or damage attributable to the actions of the agents and employees of the Operator and any subcontractors and agents of the Operators in line with the charges outlined in Part 2 of this Attachment 2.

6.3 In the event that a Vehicle is removed from a Nominated Route owing to damage to that Vehicle, the Operator is required to notify the Corporation of the Vehicle details. The Corporation may, at its discretion, insist on the removal of the iBus Equipment from the Vehicle as per paragraph 4.3 of this attachment.

7. New buses

7.1 The Operator will ensure that new buses delivered from the manufacturer are delivered equipped with iBus Equipment in a fully compliant state, as set out in "iBus London Equipment for new buses Installation Manual". Any additional work (labour and parts) required to complete this work either by the Corporation or the iBus Contractor will be charged to the Operator, in line with the charges outline in Part 2 of this Attachment 2

7.2 The Operator will not operate a new bus until the vehicle has been fully commissioned in respect of iBus by the Corporation, unless agreed otherwise between the Corporation and the Operator.

7.3 The Operator will ensure that buses are delivered on time from the manufacturer so that the appropriate installation schedules can be achieved. Without limiting its obligations, the Operator will confirm with the Corporation

via the Corporation Service Desk the day prior to the planned installation that the bus will be available.

8. System Management

8.1 The Corporation shall as appropriate consult with the Operator on matters that effect changes, not necessarily limited to, the functionality of iBus environment, working practices and training documentation in so far as it may impact on the Operator before their implementation

9. Training

9.1 iBus training for new drivers will be provided by Operator trainers (or external training agency where applicable). Trainer training courses will continue to be available from time to time provided by or on behalf of the Corporation for additional and new trainers.

9.2 Training must be delivered to any new driver before the iBus equipment is used in an operational or live environment, in line with the iBus section of BTEC.

9.3 iBus training for new Service Controllers will be provided by or on behalf of the Corporation from time to time. Training must be delivered to any new Service Controller before the iBus Equipment is used in an operational or live environment, in line with the iBus section of BTEC.

9.4 All new Report Users must be trained by an agreed Corporation trainer. Corporation will provide trainer training to the Operator's garage trainers (if any). For this purpose "Report Users" are members of the Operator's staff who are required to access and produce performance information reports using the iBus system.

10. Wireless Policy

10.1 Operators may not deploy wireless LAN systems using 802.11a protocol:

- in the garage
- on the bus
- in other TfL environments.

10.2 Operators may use the Corporation's 802.11a facility for CCTV download and will do so under the Corporation's rules and procedures which will include:

- the CCTV server hardware & software being under the Corporation's build control
- an air gap between the CCTV server & non-iBus networks

10.3 The Corporation reserves the right to charge for this service.

10.4 Operators may not deploy GPRS, 3G or any wireless wide area network devices on a bus without the Corporation's prior approval in writing.

ATTACHMENT 2

Part 2

Schedule of Costs

Note that all charges and costs outlined in this section are those applying as at September 2010. The Corporation will be entitled to increase the charges annually on the RPI Commencement Date and each anniversary of that date. The amount of the increase will be in the same proportion as the annual percentage increase (if any) in the Retail Prices Index (RPIx) published in January of the year in which the increase is to occur. For the purposes of this provision, "the RPI Commencement Date" is the 1st May of each year.

1. **Equipment Costs**

As highlighted in paragraph 6 of Part 1, any vandalism or accidental damage of iBus Equipment may result in a charge for the subsequent replacement. The costs of the most commonly charged item, per unit, are given below. Costs of multiples of such equipment will be determined on a case by case basis but will not exceed the unit charges provided below

Bus Antenna	£333.80
TLP Antenna	£24.71
Microphone	£86.69
iBus Unit	£4202.28
MPT Cable	£11.86
ETM Cable	£42.10
Speaker	£61.44
Footswitch	£41.26
DC/DC Converter	£167.82
TRS	£125.94
TRS Bracket	£9.60
TRS Cable	£24.10
MDT	£403.01

Other items may need to be supplied depending on the individual job circumstances and these will be quoted to the operator for acceptance prior to the job being completed.

2. **Installation & Related labour Charges - Buses**

As highlighted in paragraph 6 of Part 1, any vandalism or accidental damage of iBus Equipment may result in a charge for the subsequent installation of such equipment. The charges are given below.

The costs for missed appointments (No Bus Available or NBS) and Vandalism are as follows:

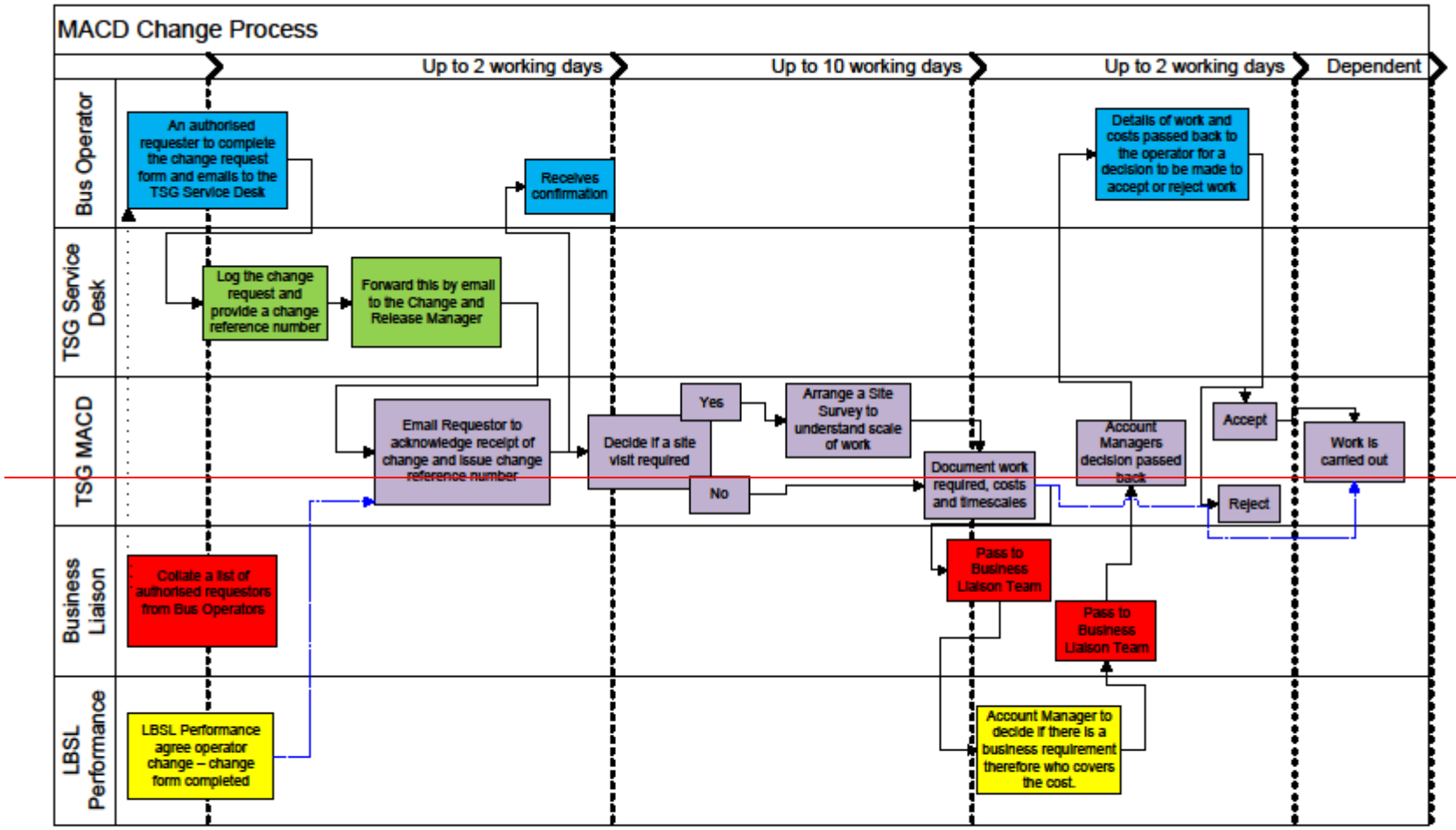
Monday to Friday is £262.03
Saturday £393.05
Sunday's £524.06

1. All NBAs are accompanied, as evidence, by a signature from the Operator's garage representative.
2.In the case of vandalism all parts are charged on top of the labour costs.

The cost for half day visits are as follows:

Monday to Friday £448.08
Saturday £672.14
Sunday £896.18

Please note that thereafter labour charges will be on a time and materials basis.


MACD Change Process
Up to 2 working days
Up to 10 working days
Up to 2 working days
Dependent
Bus Operator
TSG Service Desk
TSG MACD
Business Liaison
LBSL Performance
An authorised requester to complete the change request form and emails to the TSG Service Desk
Receives confirmation
Details of work and costs passed back to the operator for a decision to be made to accept or reject work
Log the change request and provide a change reference number
Forward this by email to the Change and Release Manager
Email Requestor to acknowledge receipt of change and issue change reference number
Decide if a site visit required
Yes
No
Arrange a Site Survey to understand scale of work
Document work required, costs and timescales
Account Managers decision passed back
Accept
Reject
Work is carried out
Collate a list of authorised requestors from Bus Operators
Pass to Business Liaison Team
Pass to Business Liaison Team
LBSL Performance agree operator change – change form completed
Account Manager to decide if there is a business requirement therefore who covers the cost.

Department for Transport

Reported road casualties in Great Britain: 2016 annual report

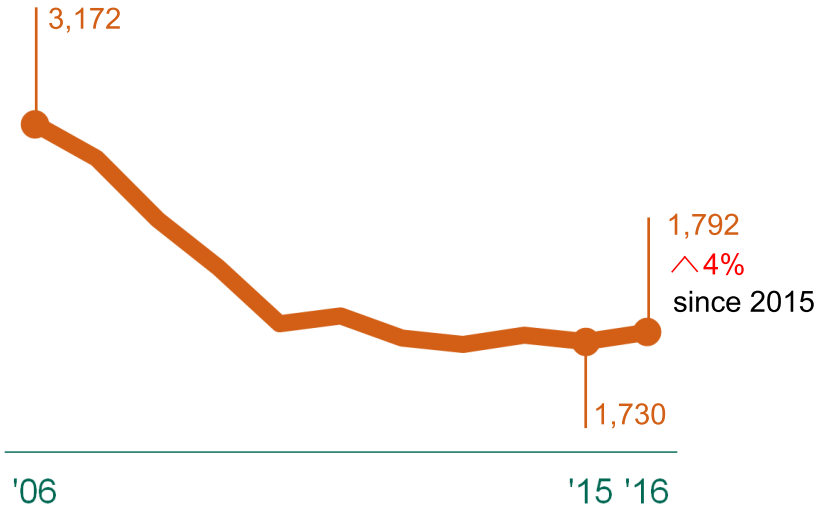
There were 1,792 reported road deaths in 2016, an increase of 4 per cent compared with 2015. This is the highest annual total since 2011. There were 44 per cent fewer fatalities in 2016 compared with 2006.

About this release

This release gives an overview and commentary of reported road casualties in 2016. This is the first release of the headline accident and casualty figures for 2016, which were postponed from 29 June 2017 due to unavailability of data from the Metropolitan Police Service.

In this publication

Fatalities in reported road accidents: GB, 2006-2016



- There were 24,101 people **seriously injured** in reported road traffic accidents in 2016. **However, comparisons of this figure with earlier years should be interpreted with caution due to changes in systems for severity reporting by some police forces.**
- There was a total of 181,384 **casualties of all severities** in 2016. This is around 3 per cent lower than in 2015 and is the lowest level on record.
- **Motor traffic levels** increased by 2.2 per cent between 2015 and 2016.

What we can conclude: There has been a statistically significant decrease in the number of casualties of all severities in road traffic accidents between 2015 and 2016. This indicates that there are a number of factors that have combined together to improve some aspects of safety on Britain's roads.

What we cannot conclude: Although the number of people killed in road traffic accidents has increased between 2015 and 2016, this change is small enough that it can be explained by the natural variation in deaths over time. The 2016 serious injuries figures have been substantially affected, and to a much lesser degree slight injuries, by changes in systems for severity reporting by about half of all police forces. As a result, comparisons with 2015 to serious injuries in particular should be interpreted with caution. See the changes in reporting systems section for more information.

RESPONSIBLE STATISTICIAN: Stephen Reynolds Email: roadacc.stats@dft.gsi.gov.uk
FURTHER INFORMATION: Media: 020 7944 6898 Public: 020 7944 6595

Follow @DfTStats

Summary

The summary table below shows the number of reported road casualties in Great Britain in 2016 compared with previous years.

	2016	Percentage change from: Last year 2015	Five years ago 2011	2010-2014 average
Killed	1,792	↑ 4%	↓ 6%	-
Seriously injured*	24,101	↑ 9%	↑ 4%	↑ 6%
KSI[1] *	25,893	↑ 8%	↑ 3%	↑ 6%
Slightly injured*	155,491	↓ 4%	↓ 13%	↓ 10%
All casualties	181,384	↓ 3%	↓ 11%	↓ 8%

1. KSI - Killed or Seriously injured

**2016 figures for seriously injured and slightly injured casualties compared to 2015 and the 2010-2014 average should be interpreted with caution due to changes in severity reporting by some police forces. Please see the changes in reporting systems section for more information.*

Definition

Casualty: A person killed or injured in an accident. Casualties are sub-divided into killed, seriously injured and slightly injured.

A full list of the definitions used in this release can be found here.

Introduction

This publication provides the number of personal-injury road traffic accidents in Great Britain that were reported by the police in 2016 using the STATS19 reporting system. It also includes the number of people killed or injured in these accidents and which road user group they were in.

The figures make up part of a long running series going back to 1926. The current set of definitions and detail of information goes back to 1979, providing a long period for comparison.

Further Information

Information about the data collected, notes, definitions and guidance is available here.

The raw data used to create the statistics (except for a few sensitive and personal variables) are available for download here.

The information used to create these statistics are collected by police forces, either through officers attending the scene of accidents or from members of the public reporting the accident in police stations after the incident.

There is **no obligation for people to report all personal-injury accidents to the police** (although there is an obligation under certain conditions, as outlined in the Road Traffic Act). These figures, therefore, **do not represent the full range of all accidents or casualties** in Great Britain. Please see the section on strengths and weaknesses of the data for further details.

All accidents that were reported by the police and that occurred on a public highway involving at least one motor vehicle, horse rider or pedal cyclist, and where at least one person was injured are included. Accidents that happened on private land (including private drives) or car parks are not included in the statistics. Damage only accidents that do not result in personal injury are also excluded from these statistics.

Headline statistics

A total of **1,792 people were killed** in reported road traffic accidents in Great Britain in 2016. Although this represents an increase of 62 fatalities (or 4 per cent) from 2015, this change is not statistically significant and **it is likely that natural variation in the figures explains the change**. About half the increase in road deaths occurred in Scotland (162 in 2015 and 191 in 2016), with fatalities in England increasing from 1,463 in 2015 to 1,498 in 2016. It is the highest number of road deaths in Great Britain recorded since 2011. However, there were 44 per cent fewer fatalities in 2016 compared with 2006 and little change compared with the 2010-14 average.

The **trend in the number of fatalities has been broadly flat since 2010** (see front page chart). Previously, and particularly between 2006 and 2010, the general trend was for fatalities to fall. Since that point, though, most of the year on year changes are either explained by one-off causes (for instance, the snow in 2010) or natural variation. The evidence points towards Britain being in a period when the fatality numbers are fairly stable and most of the changes relate to random variation.

In 2016, there were **24,101 seriously injured casualties** in reported road traffic accidents. This figure is not comparable to 2015 due to severity reporting changes (**see changes in systems for severity reporting box**).

There was a total of **181,384 casualties of all severities** in reported road traffic accidents during 2016. This is around 3 per cent lower than in 2015 and is the lowest level on record.

A total of **136,621 personal-injury road traffic accidents** were reported by the police in 2016. Of these accidents, 1,695 resulted in at least one fatality.

2010-2014 average

The 2010-14 average is used as a comparison time frame in both this publication and the accompanying statistical tables.

Changes in systems for severity reporting

The 2016 figures have been affected by a large number of police forces changing their reporting systems during 2016. It is likely that the recording of injury severity is more accurate for forces using these new reporting systems; this has had a large impact on the number of serious injuries recorded in 2016 (24,101 compared with 22,144 in 2015). Some of these serious injuries may previously have been classified as slight injuries which means that the 2016 serious injury figures are not comparable to previous years. Consequently no comparisons of serious injuries with previous years are made in the commentary. Since the impact on slightly injured casualties data is relatively small, comparisons to earlier years for slight injuries have still been made.

Please see the changes in reporting systems section for more information.

Factors that affect road casualty numbers

There is **no single underlying factor that drives road casualties**. Instead, there are a number of influences. These include:

- The distance people travel (which is partly affected by economic externalities)
- The mix of transport modes used
- Behaviour of drivers, riders and pedestrians

- Mix of groups of people using the road (e.g. changes in the number of newly qualified or older drivers)
- External effects such as the weather, which can influence behaviour (for instance, encouraging / discouraging travel, or closing roads) or change the risk on the roads (by making the road surface more slippery)

It is very hard to isolate many of these factors between years. In particular, police-reported road casualty data only gives a limited amount of information about behaviour changes and it is very rare to be able to identify such changes between individual years.

A considerable amount of research has been carried out looking at the relationship between **economic activity** and **road casualties**. The Organisation for Economic Co-operation and Development (OECD) produced a comprehensive report on this topic in 2015[1]. The simplest message from the research is that accidents and casualties increase as economic development increases in a country. The main reason for this increase is that as the economy grows, so do traffic volumes. Greater traffic volumes then result in more incidents. This continues until a critical threshold in economic development is reached. At that point, better training, vehicle standards, enforcement and engineering all start to dominate to counteract the effect from traffic increases. As a result, the number of incidents and resulting casualties start to decrease, even if traffic volumes continue to grow.

In times of economic stagnation or recession three key mechanisms come into play:

- Lower traffic growth rates (or even decreases in traffic volumes – as happened in Britain in the 2008-09 recession)
- Disproportionate reductions in the exposure of high-risk groups (for instance, younger drivers)
- Reductions in more risky behaviour (for instance, people might drive more slowly to save fuel, or drink and drive less)

Chart 1 shows the rolling five year average for the year on year change in gross domestic product (GDP) for the UK along with traffic volumes and the number of road deaths for Great Britain.

Although **GDP** and **traffic** is not perfectly aligned, since the mid-1970s there is a clear relationship in that they move broadly in the same direction. For example, GDP grew strongly between 1993 and 2007. During this period, traffic also grew each year (albeit, not as strongly). The downturn and recession around 2007 to 2012 resulted in very low levels of GDP growth (with economic contraction for some of the years). Traffic growth halted entirely during this period and actually decreased for most of the period.

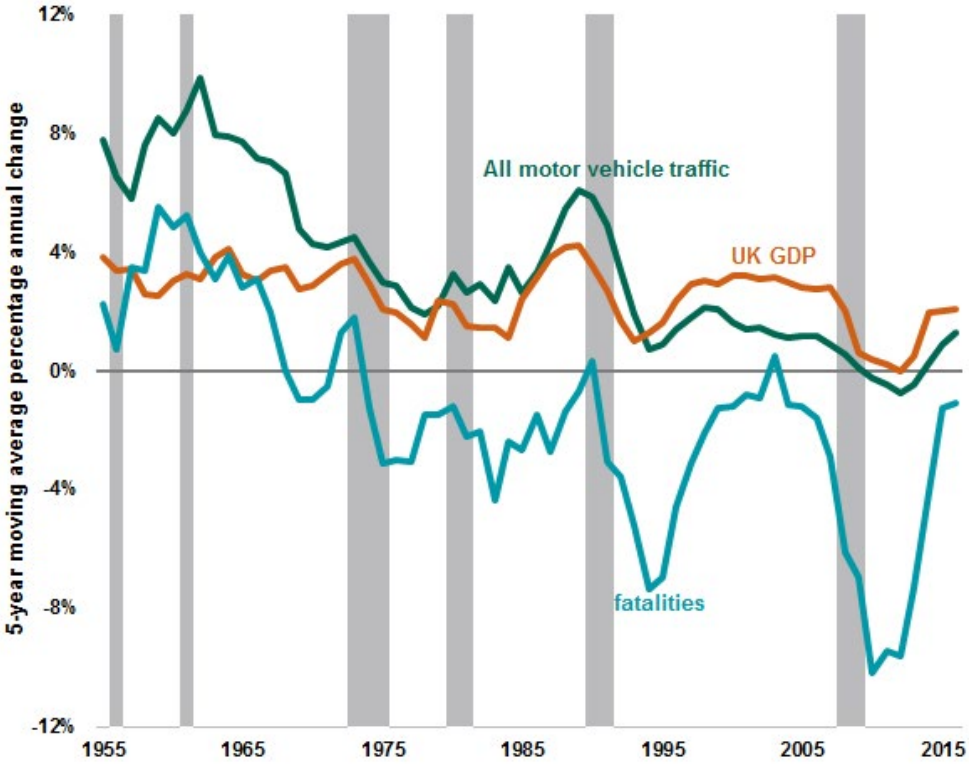
The relationship with **road deaths** is far more complex. In general, road deaths have fallen in most

[1] www.itf-oecd.org/why-does-road-safety-improve-when-economic-times-are-hard

years since the 1970s. However, the periods of greatest decreases have coincided with weaker GDP growth. This is particularly marked in the period 2007 to 2010 when road deaths dropped by between 7 and 17 per cent every year. By 2011, however, road deaths increased, and most subsequent decreases were of a much small magnitude than earlier.

Whilst not certain, all of this indicates that while Britain is in a period of stronger growth (in comparison with the recent recession) there is unlikely to be as large falls in casualties as there were earlier on without further significant interventions.

Chart 1: Five year rolling average of growth in traffic, GDP and road deaths



Further Information

ONS GDP data

Road traffic data

The chart shows periods of recession shaded grey.

An article which examined a number of factors which influence road casualty numbers was published with the 2015 Reported road casualties in Great Britain (RRCGB) annual report. It covers topics such as:

- **Population changes**, and particularly focussing on how the number of people in younger and older age groups have changed over time. In particular, it highlights that the population of Britain has grown by 15 per cent since 1986 whereas fatalities have fallen by 68 per cent in that time.

- The population of **older people (aged 70 and older)** has increased relatively rapidly over recent years. This carries implications for higher levels of casualties in this age group in the future.

Further information

The article **Factors affecting reported road casualties** from the 2015 annual report can be found here.

Weather and accidents

An article on modelling the impact of weather on road casualty statistics can be found here.

- The number of people taking **driving tests** has changed over time. After a number of years of falling numbers of younger people taking the test, there has been an increase over the last three years. This could suggest that the challenges from having more younger drivers on the roads could increase.

- **Fuel prices and the economy** which impact on traffic volumes and therefore casualties.

Weather also influences the number of road casualties. This has been reported on in an article in the 2014 annual report. A table giving weather-adjusted casualty numbers has been previously published (RAS300080) however this has not been updated for this year since the adjustments are impacted by the severity reporting changes mentioned previously. An assessment of how the weather has affected the 2016 fatalities can be found in the other topics section.

Casualties by road user type

There are two key ways of looking at casualty numbers. The first is in terms of **absolute counts**. On this basis, **car occupants** tend to come out as the worst road user group as they account for the greatest number of casualties each year (60 per cent of total casualties in 2016). However, this is unsurprising as cars account for around 80 per cent of the traffic on British roads.

Fatalities by road user type

In 2016, **car occupants** accounted for 46 per cent of road deaths, pedestrians 25 per cent, motorcyclists 18 per cent and pedal cyclists 6 per cent.

	Fatalities in 2016	% share in 2016	% change since '15	% change from '10 - '14 avg
	816	46%	∧8%	∨1%
	448	25%	∧10%	∧6%
	319	18%	∨13%	∨10%
	102	6%	∧2%	∨9%
Other	107	6%	∧4%	∧19%

The second approach is to look at **casualty rates** in terms of the number of casualties per mile travelled. In these terms, the road user groups are split into two clearly distinctive groups. The first, with much higher casualty rates, are typically referred to as **vulnerable road users** (usually defined as pedestrians, pedal cyclists, motorcyclists and, albeit with very low casualty numbers, horse riders). All of these groups have much higher casualty rates per mile travelled in comparison with the other road user groups, as shown in **Chart 2**.

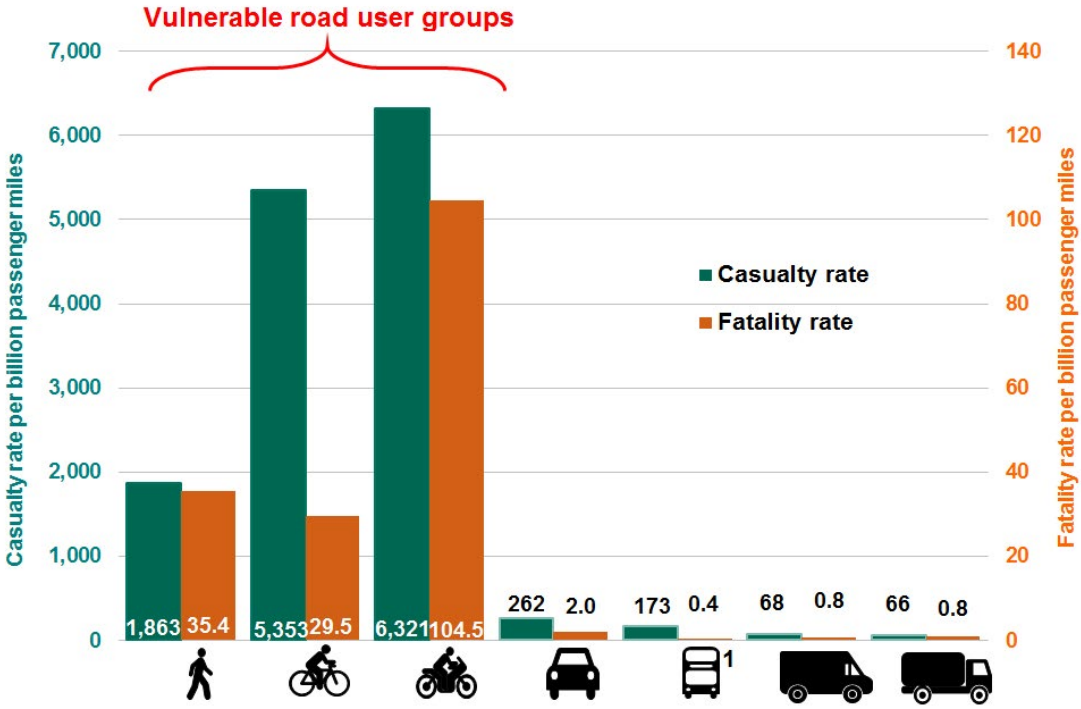
Useful links

National Travel Survey, 2016: www.gov.uk/government/statistics/national-travel-survey-2016

Annual bus statistics: year ending March 2016: www.gov.uk/government/statistics/annual-bus-statistics-year-ending-march-2016

Road traffic estimates in Great Britain: 2016: www.gov.uk/government/statistics/road-traffic-estimates-in-great-britain-2016

Chart 2: Casualty and fatality rates per billion passenger miles by road user type: GB, 2016



1. Bus passenger miles based on 2015 mileage figure as no 2016 figure available at the time of publication

The pattern for **pedal cycles** is an interesting one: the overall casualty rate of around 5,400 casualties per billion miles cycled is close to the motorcycling casualty rate, whereas the fatality rate of 29.5 per billion miles cycled is much closer to the pedestrian rate.

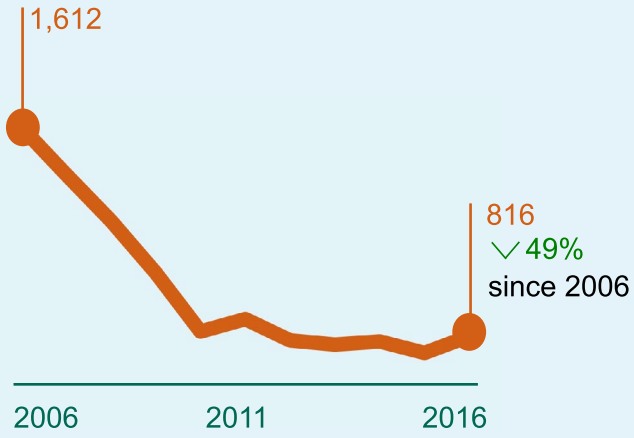
Car occupants

A total of 816 **car occupants** were killed in 2016, up 8 per cent (or 62 fatalities) from the 754 in 2015. Overall car occupant casualties decreased by 2 per cent between 2015 and 2016.

	% change since '15	% change from '10 - '14 avg
816 fatalities	⋀ 8%	⋁ 1%
8,975* seriously injured	⋀ 14%	⋀ 9%
99,255* slightly injured	⋁ 4%	⋁ 11%
252.6 billion vehicle miles (motor vehicle traffic)	⋀ 2%	⋀ 5%

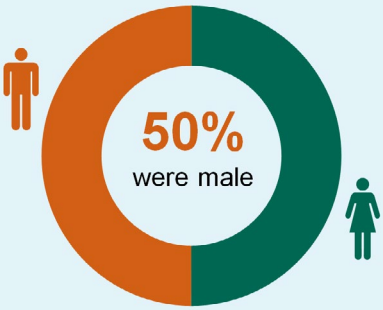
46% of road deaths were car occupants

Car occupant fatalities: 2006 - 2016



**2016 figures for seriously injured and slightly injured casualties compared to 2015 and the 2010-2014 average should be interpreted with caution due to changes in systems for severity reporting by some police forces. Please see the changes in reporting systems section for more information.*

109,046 car occupant casualties of which:



68% were drivers

of these drivers **19%** were aged 17-24

32% were passengers

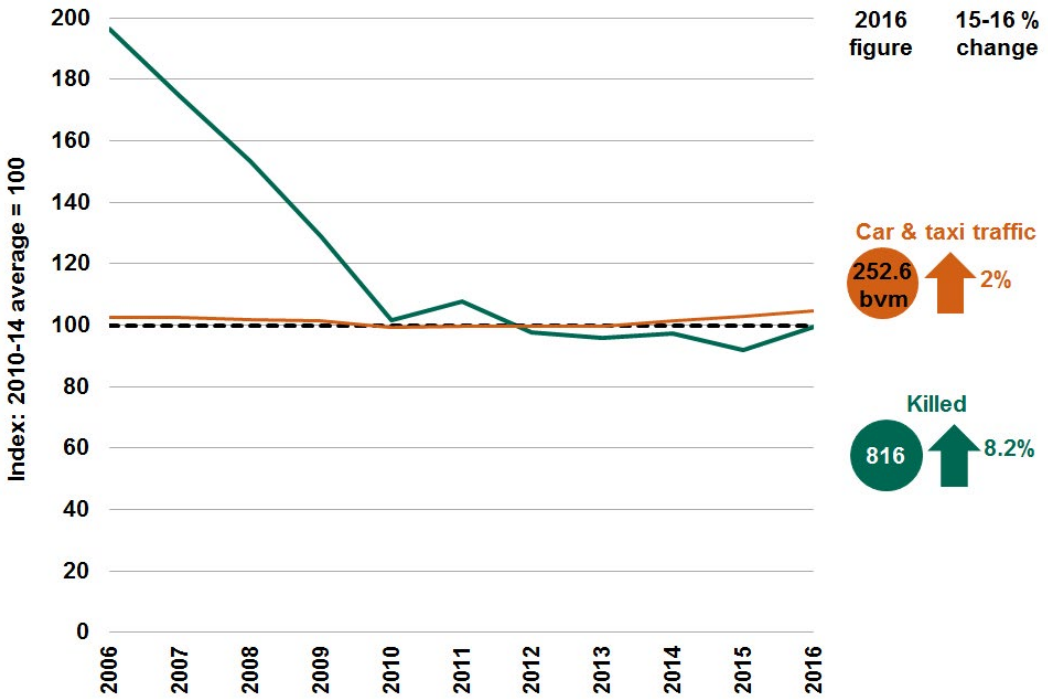
Car occupants continue to account for the **largest proportion of casualties** of all severities. A total of 816 car occupants were killed in 2016, up 8 per cent (or 62 fatalities) from the 754 in 2015. There were 8,975 seriously injured casualties and 9,791 KSI casualties in 2016. Slightly injured casualties fell by 4 per cent to 99,255 and overall casualties fell by 2 per cent to 109,046.

This was the largest number of car occupant fatalities recorded since 2011, but car occupant casualties of all severities in 2016 were the lowest on record.

Car occupant fatalities are now 1 per cent below the 2010-14 average and slightly injured casualties are 11 per cent below the average.

Car and taxi traffic in Great Britain increased by 2 per cent from 2015 to 2016, and is currently 4.8 per cent above the 2010-14 average. Although increases in car and taxi traffic can lead to an increase in accidents, other factors can have a stronger influence on road safety.

Chart 3: Number of killed car occupants compared with car and taxi traffic, GB: 2006 - 2016



2016 figures are shown in the circles with the 2015-2016 percentage change represented by the arrows.

bvm - billion vehicle miles.

Pedestrians

A total of 448 **pedestrians** were killed in 2016, up from 408 in 2015. Overall pedestrian casualties decreased by 2 per cent between 2015 and 2016.

	% change since '15	% change from '10 - '14 avg
448 fatalities	↑ 10%	↑ 6%
5,140* seriously injured	↑ 4%	↓ 2%
17,962* slightly injured	↓ 4%	↓ 8%
12.6 billion miles[1]	↑ 9%	↑ 11%

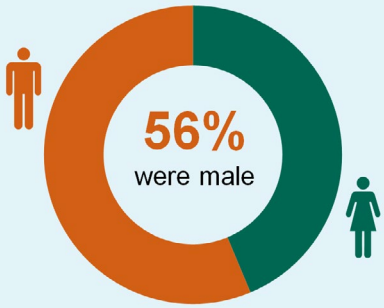
1. Estimated using survey data - see chart 4 below

25% of road deaths were pedestrians

Pedestrian fatalities: 2006 - 2016

**2016 figures for seriously injured and slightly injured casualties compared to 2015 and the 2010-2014 average should be interpreted with caution due to changes in systems for severity reporting by some police forces. Please see the changes in reporting systems section for more information.*

23,550 pedestrian casualties of which:



36% occurred between 3pm and 7pm

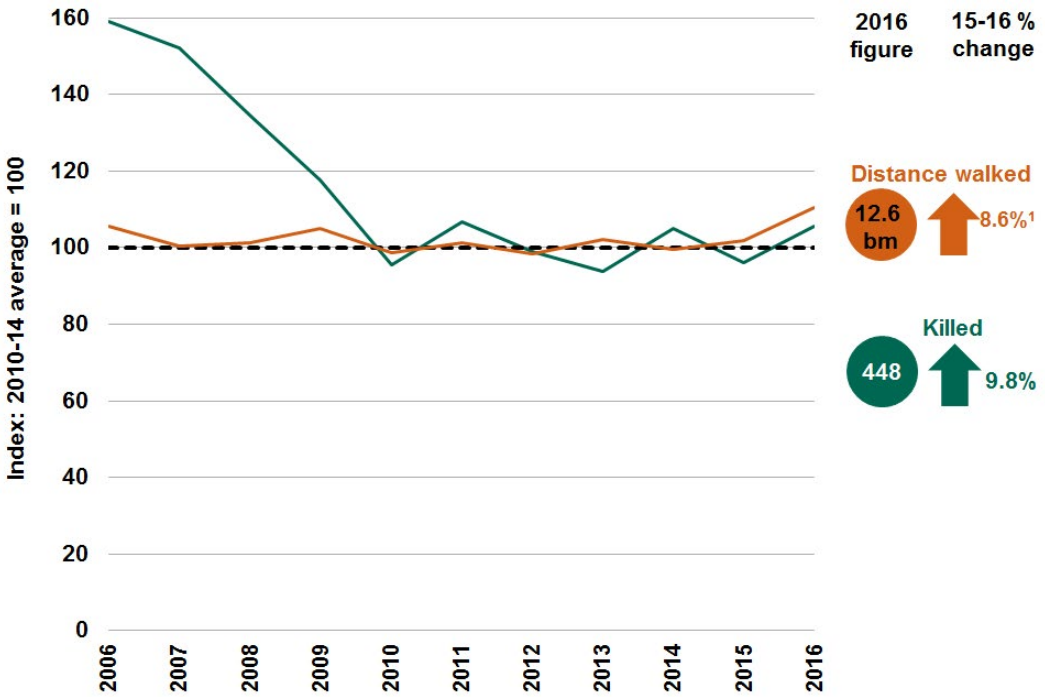
26% were aged 0-15

After a fall in pedestrian fatalities between 2014 and 2015, **pedestrian fatalities** have now risen back up to around the 2014 level. A total of 448 pedestrians were killed in reported road traffic accidents in 2016, up from 408 in 2015, and just above the 446 pedestrians killed in 2014.

There were 5,140 **seriously injured** pedestrians in 2016. The number of **slightly injured** casualties decreased by 4 per cent to 17,962, which is the lowest number on record.

Despite being 6 per cent above the 2010-14 average, the number of fatalities has remained much the same since 2010. Any changes since that point are most likely to be as a result of **natural variation** and cannot be attributed to underlying causes.

Chart 4: Number of killed pedestrians compared with the distance walked, GB: 2006 - 2016



Distance walked in 2016 estimated by using the 2016 National Travel Survey average distance multiplied by 2016 population.

bm - billion miles.

2016 figures are shown in the circles with the 2015-2016 percentage change represented by the arrows.

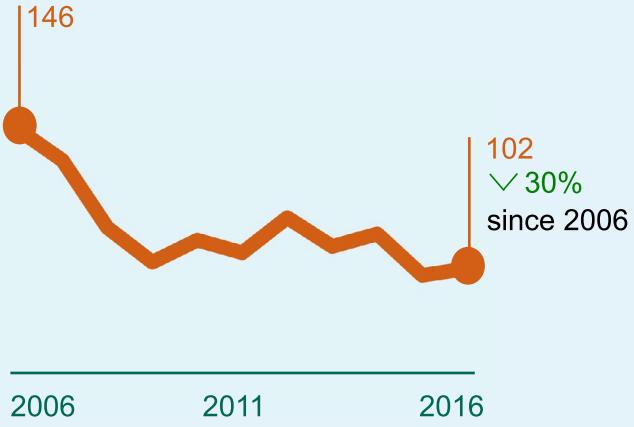
Pedal cyclists

Although the number of **pedal cyclists** killed on the roads in 2016 was slightly higher than in 2015, the 102 fatalities is very similar to the level seen since 2008. Overall pedal cyclist casualties decreased by 2 per cent between 2015 and 2016.

	% change since '15	% change from '10 - '14 avg
102 fatalities	∧ 2%	∨ 9%
3,397* seriously injured	∧ 5%	∧ 10%
14,978* slightly injured	∨ 3%	∨ 7%
3.5 billion vehicle miles	∧ 6%	∧ 9%

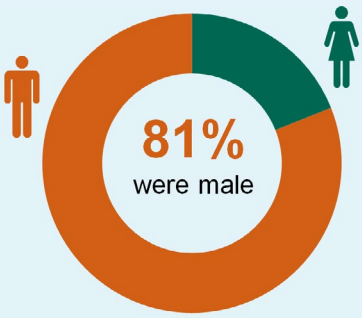
6% of road deaths were pedal cyclists

Pedal cyclist fatalities: 2006 - 2016



**2016 figures for seriously injured and slightly injured casualties compared to 2015 and the 2010-2014 average should be interpreted with caution due to changes in systems for severity reporting by some police forces. Please see the changes in reporting systems section for more information.*

18,477 pedal cyclist casualties of which:



44% occurred on a weekday at 7-9am or 3-7pm

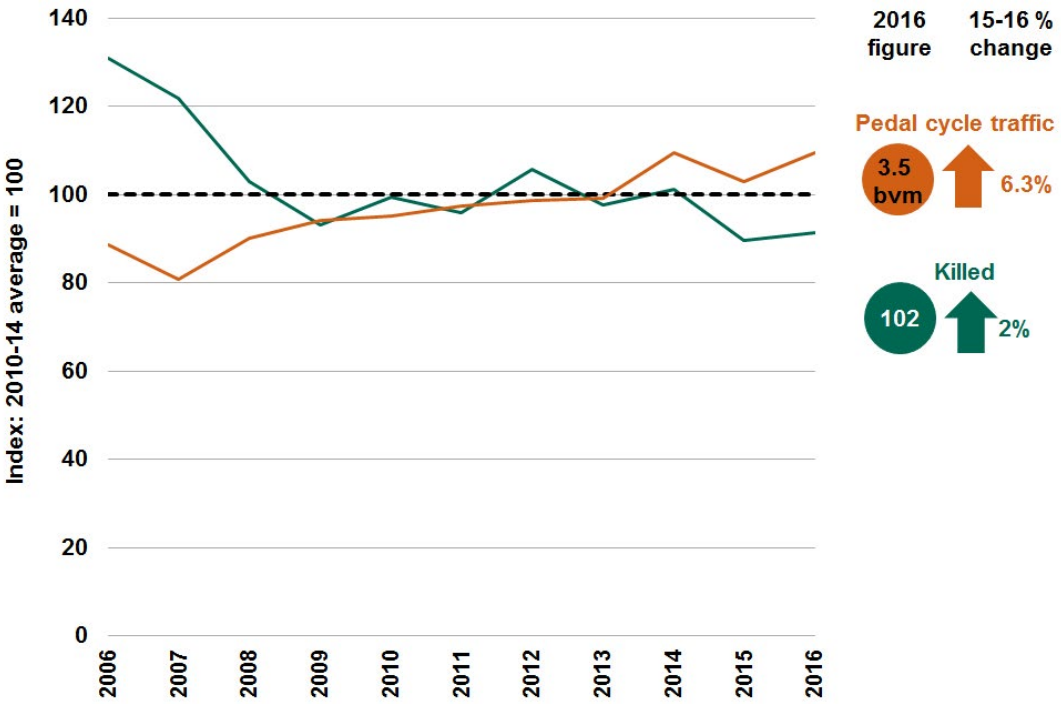
77% occurred on a 30 mph road

Although the number of **pedal cyclists killed** on the roads in 2016 was slightly higher than in 2015, the 102 fatalities is very similar to the figures for each year since 2008. Since that point, the number of deaths has been between 100 (2015) and 118 (2012). In statistical terms, there has been no change in the number of fatalities over this period.

In 2016 there were 3,397 pedal cyclists **seriously injured** in reported road traffic accidents.

Overall **pedal cyclist casualties** were lower in 2016 than any year since 2010. This comes despite an estimated 6 per cent increase in cycling traffic in 2016 in comparison with 2015.

Chart 5: Number of killed pedal cyclists compared with pedal cycle traffic, GB: 2006 - 2016



2016 figures are shown in the circles with the 2015-2016 percentage change represented by the arrows.

bvm - billion vehicle miles.

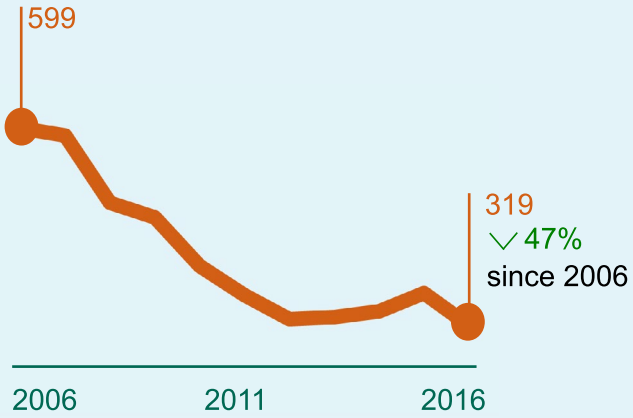
Motorcyclists

In total, 319 **motorcyclists** were killed during 2016, down 13 per cent from 365 in 2015. Overall motorcyclist casualties decreased by 3 per cent between 2015 and 2016.

	% change since '15	% change from '10 - '14 avg
319 fatalities	↓ 13%	↓ 10%
5,553* seriously injured	↑ 10%	↑ 10%
13,425* slightly injured	↓ 7%	↓ 5%
2.8 billion vehicle miles (motor vehicle traffic)	↑ 2%	↑ 1%

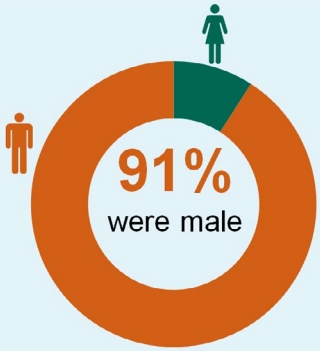
18% of road deaths were motorcyclists

Motorcyclist fatalities: 2006 - 2016



**2016 figures for seriously injured and slightly injured casualties compared to 2015 and the 2010-2014 average should be interpreted with caution due to changes in systems for severity reporting by some police forces. Please see the changes in reporting systems section for more information.*

19,297 motorcyclist casualties of which:



32% were aged 17-24

44% occurred in London and the South East

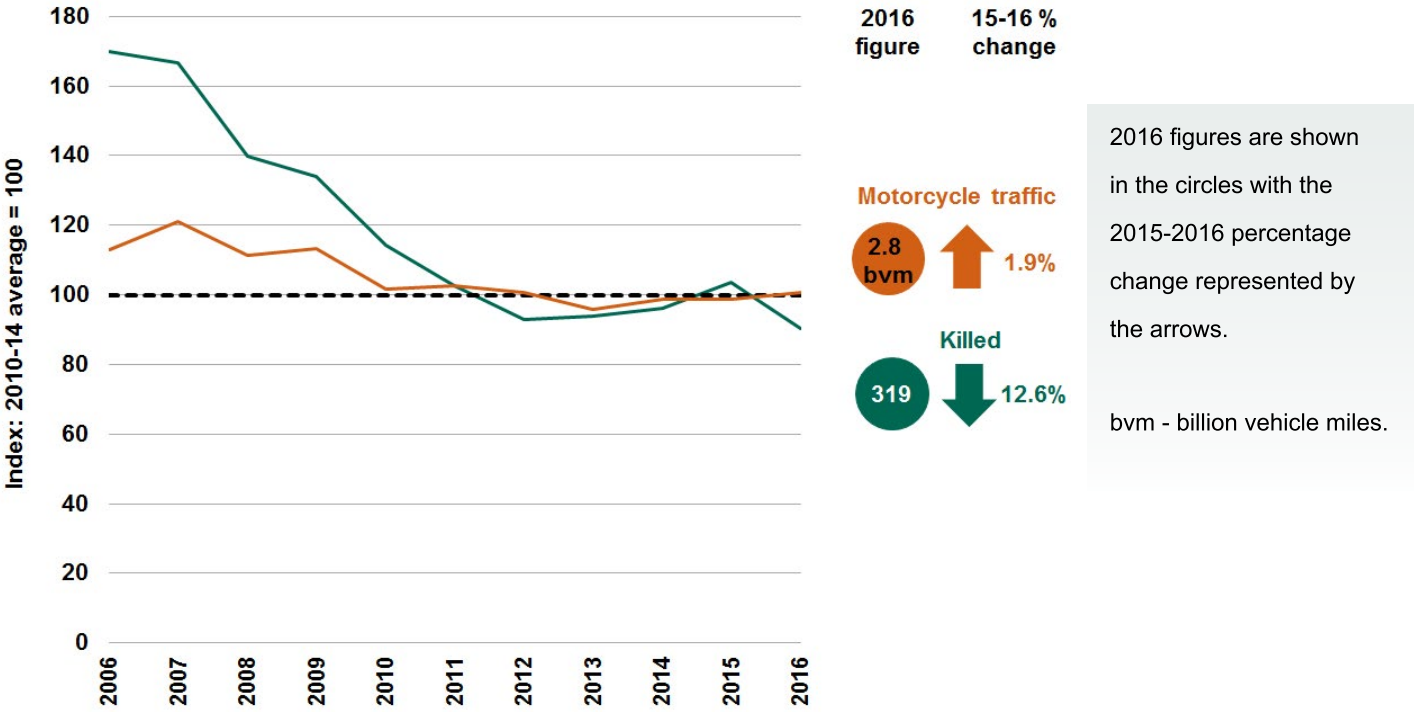
Motorcyclists were the only significant road user group to see a fall in fatalities in 2016 compared with 2015. In total, 319 motorcyclists were killed during 2016, down 13 per cent from 365 in 2015. This figure is the lowest number of motorcyclists killed on record. However, motorcyclist fatalities have fluctuated between 319 and 365 over 2011 to 2016 with no clear trend.

In 2016 there were 5,553 **seriously injured** motorcyclists in reported road traffic accidents.

Slightly injured motorcyclist casualties decreased by 7 per cent to 13,425 in 2016. Overall motorcyclist casualties of all severities in 2016 were just below the 2010-14 average.

Motorcycle traffic increased by 2 per cent to 2.8 billion vehicle miles in 2016.

Chart 6: Number of killed motorcycle users compared with motorcycle traffic, GB: 2006 - 2016



2016 figures are shown in the circles with the 2015-2016 percentage change represented by the arrows.

bvm - billion vehicle miles.

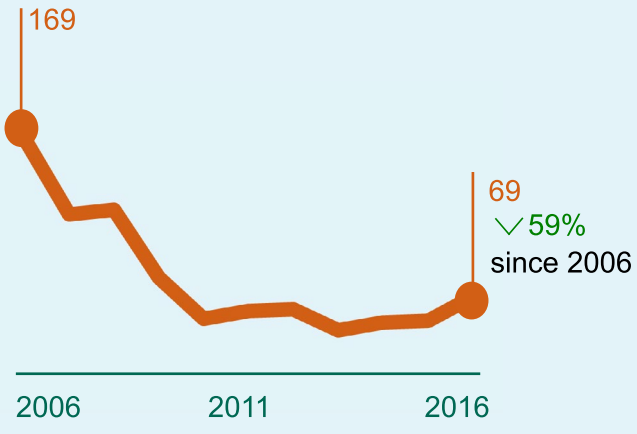
Children (aged 15 or under)

There were 69 **child** deaths in 2016, up from 54 deaths in 2015. Overall child casualties decreased by 1 per cent between 2015 and 2016.

	% change since '15	% change from '10 - '14 avg
69 fatalities	↑ 28%	↑ 25%
2,033* seriously injured	↑ 6%	↓ 7%
13,874* slightly injured	↓ 2%	↓ 11%
12m population	↑ 1%	↑ 3%

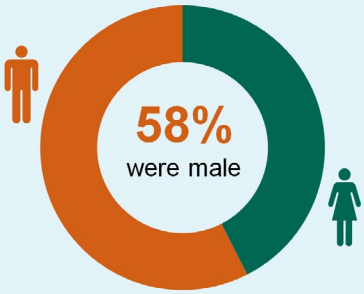
4% of road deaths were children

Child fatalities: 2006 - 2016



**2016 figures for seriously injured and slightly injured casualties compared to 2015 and the 2010-2014 average should be interpreted with caution due to changes in systems for severity reporting by some police forces. Please see the changes in reporting systems section for more information.*

15,976 child casualties of which:



38% were pedestrians

22% occurred between 3pm and 5pm on a weekday

14% occurred between 7am and 9am on a weekday

The number of **child deaths** in reported road traffic accidents in 2016 was 69. This is 15 more deaths than the 54 child deaths which occurred in 2015. The 2016 figure is the highest number of child deaths seen since 2009. However, child fatalities have fluctuated between 48 and 69 over 2010 to 2016 with no clear trend.

As has been the case historically, child fatalities occur mainly in the **pedestrian** (34 fatalities in 2016) and **car occupant** (26 fatalities) categories, with a smaller number of pedal cyclists (6 fatalities). This is because these are the forms of transport most commonly used by children.

In 2016 there were 2,033 children **seriously injured** in reported road traffic accidents. Overall child casualties of all severities decreased by 1 per cent to 15,976 which is the second lowest year on record after 2013.

The number of child **casualties of all severities** in 2016 was 10 per cent lower than the 2010-14 average.

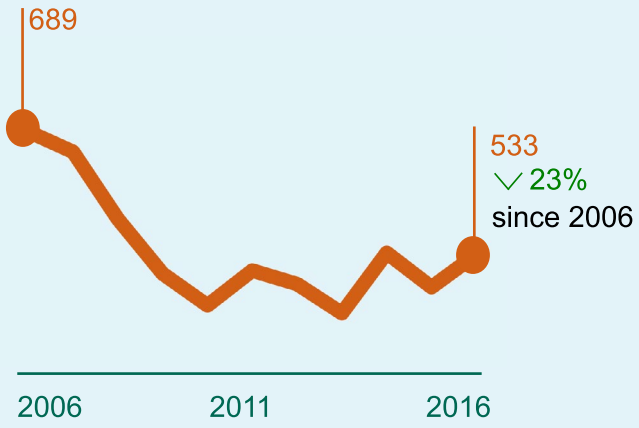
Older casualties (aged 60 and over)

There were 533 **older** deaths in 2016, up from 492 deaths in 2015. There were 23,409 older casualties of all severities, virtually unchanged from 2015.

	% change since '15	% change from '10 - '14 avg
533 fatalities	▲ 8%	▲ 8%
4,355* seriously injured	▲ 10%	▲ 17%
18,521* slightly injured	▼ 2%	▼ 4%
15m population	▲ 2%	▲ 6%

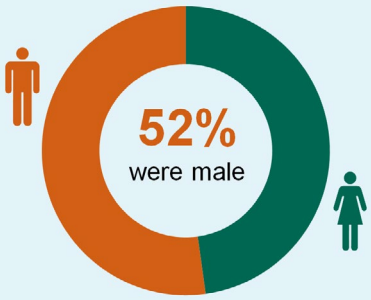
30% of road deaths were older people

Older fatalities: 2006 - 2016



**2016 figures for seriously injured and slightly injured casualties compared to 2015 and the 2010-2014 average should be interpreted with caution due to changes in systems for severity reporting by some police forces. Please see the changes in reporting systems section for more information.*

23,409 older casualties of which:



45% were car drivers

18% were car passengers

18% were pedestrians

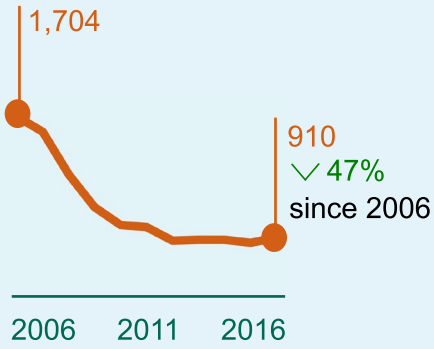
The number of fatalities aged 60 and over in reported road traffic accidents has increased from 492 in 2015 to 533 in 2016. The 2016 figure is similar to the 535 deaths recorded for this age group in 2014. This increase was driven by more older fatalities as car occupants in 2016 (232 fatalities in 2015 and 249 in 2016) and pedestrians (173 in 2015 and 186 in 2016). The population in this age group has increased by 6 per cent compared with the 2010-2014 average and by 19 per cent compared with 2006. This relatively rapidly growing population may partly explain the slight upturn in fatalities seen for this age group in the last few years.

There were 4,355 older people **seriously injured** in 2016. Overall casualties of all severities for this age group increased slightly to 23,409 in 2016.

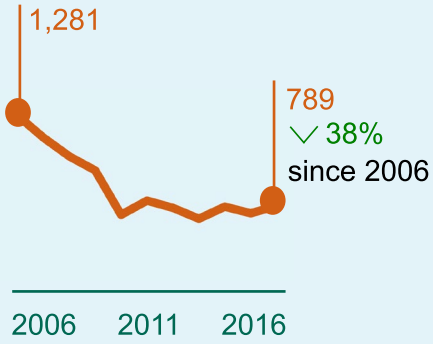
Casualties by road type

Of the 1,792 road deaths in 2016, the majority occurred on non built-up roads (910). A total of 789 deaths occurred on built-up roads with 93 on motorways.

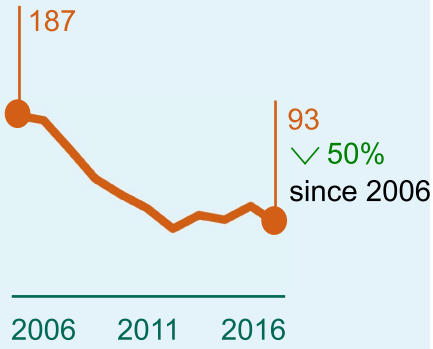
Non built-up fatalities: 2006 - 2016



Built-up fatalities: 2006 - 2016



Motorway fatalities: 2006 - 2016



129,837 casualties on built-up roads of which:

18% were pedestrians compared with 2% or less on other types of roads

13% were pedal cyclists compared with 4% or less on other types of roads

As has been the pattern over recent years, the greatest change in casualty and accident numbers is on **20 mph roads**. The number of people killed on 20 mph roads increased from 14 in 2015 to 30 in 2016 but is similar to the 28 deaths on 20 mph roads recorded in 2014. Overall the number of casualties on 20 mph roads rose by 53 per cent from 2015 to 2016.

In recent years local highway authorities have been introducing more 20 mph speed limits and zones. Unfortunately the Department does not have any comprehensive data to look at this evidence. However, last year we ran a voluntary survey with local highways authorities in England. Although only a quarter of authorities responded with data, the survey indicated that the number of miles of road with 20 mph speed limits increased by about a quarter between 2014 and 2015. This supports the hypothesis that the increases in accident numbers is not as a result of 20 mph roads being less safe, but as a result of roads having the speed limit reduced. The Department has commissioned an evaluation of the effectiveness of 20 mph speed limits (i.e. 20 mph limits with no physical traffic

Definitions

Built-up roads: Accidents on "built-up roads" are those which occur on roads with speed limits (ignoring temporary limits) of 40 mph or less.

Non built-up roads refer to speed limits over 40 mph.

Motorway accidents are shown separately and are excluded from the totals for built-up and non built-up roads.

calming measures). This will provide much more evidence relating changes in casualty numbers with the introduction of 20 mph limits.

Across the other **built-up roads**, there was a rise in fatalities of 9 per cent and a fall in slight injuries of 7 per cent on 30 mph roads. There were falls of 12 per cent and 5 per cent respectively for fatalities and slight injuries on 40 mph roads.

Across **non built-up roads**, fatalities increased on 50 mph, 60 mph and 70 mph roads but there was a decrease in slight injuries on all roads compared with 2015.

There was a fall in the number of **fatalities on motorways** from 108 deaths in 2015 to 93 in 2016. Motorway fatalities have moved from a minimum of 88 and maximum of 118 since 2010 with no clear trend. The latest decrease is likely to be caused by natural variation in the figures.

In 2016 there were 803 people **seriously injured on a motorway**. The number of people slightly injured fell by 5 per cent to 7,838.

Traffic volumes on all road types increased in 2016. Motorway traffic rose by 2 per cent, rural 'A' roads by 2.8 per cent, urban 'A' roads by 0.8 per cent, other rural roads by 2.4 per cent and other urban roads by 2.7 per cent.

Built-up roads

Casualties on **built-up roads** compared with the 2010-2014 average:

Killed	↑ 3%
Serious*	↑ 6%
KSI*	↑ 6%
All casualties	↓ 8%

**changes should be interpreted with caution. See here for more information.*

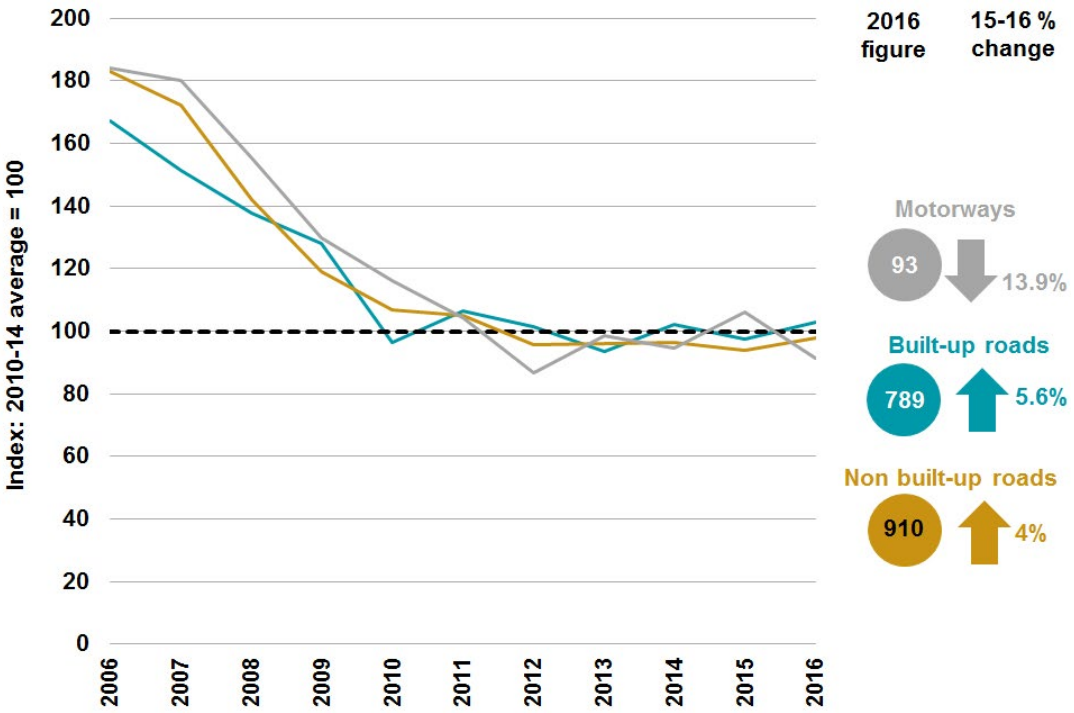
Non built-up roads

Casualties on **non built-up** roads compared with the 2010-2014 average:

Killed	↓ 2%
Serious*	↑ 6%
KSI*	↑ 5%
All casualties	↓ 10%

**changes should be interpreted with caution. See here for more information.*

Chart 7: Number of fatalities by road type, GB 2006 - 2016



2016 figures are shown in the circles with the 2015-2016 percentage change represented by the arrows.

The majority of seriously and slightly injured casualties occurred on **built-up roads** in 2016. However, the majority of fatalities occurred on **non-built-up roads** (just over a half). The reason for this is that non-built-up roads have higher average speeds which often result in more serious collisions. Although motorways carry around 21 per cent of traffic, they only account for 5 per cent of fatalities, 3 per cent of serious injuries and 5 per cent of slight injuries.

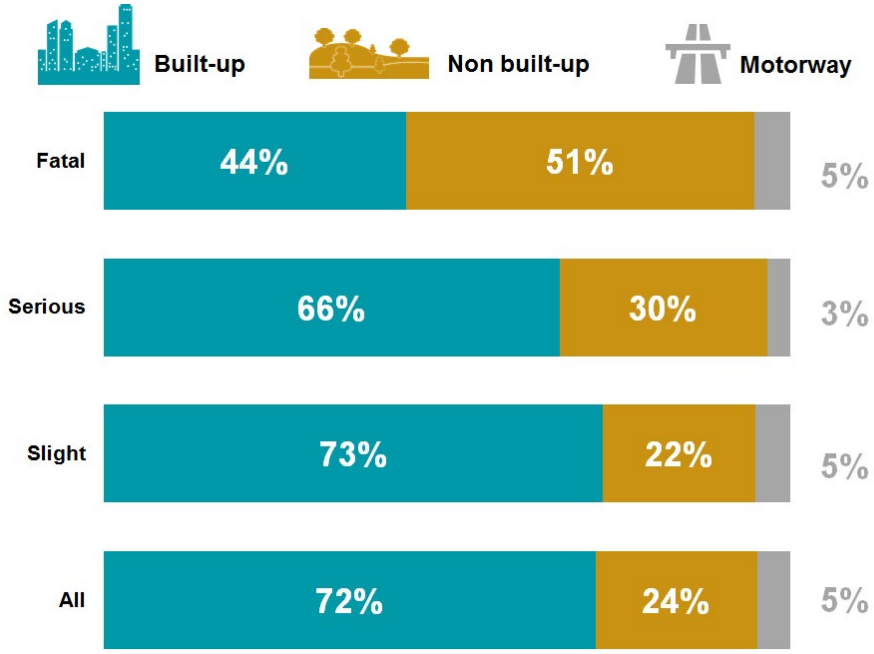
Motorways

Casualties on motorways compared with the 2010-2014 average:

Killed	↓ 8%
Serious*	↑ 12%
KSI*	↑ 10%
All casualties	↓ 8%

**changes should be interpreted with caution. See here for more information.*

Chart 8: Casualties by severity and road type, GB: 2016



International comparisons

The European Transport Safety Council's Performance Index (PIN) programme enables comparisons of road safety progress between **European countries** to be made. The latest PIN report was published by the European Transport Safety Council in June (see here).

Overall, the **total number of road deaths** in the 28 members of the European Union during 2016 was around 25,670, compared with around 26,200 in 2015 (a 2 per cent decrease). This has followed 1 per cent increase in road deaths in 2015 and stagnation in 2014.

Of the 32 countries covered, 15 had a decrease in the number of fatalities between 2015 and 2016, 16 had an increase, and one remained unchanged.

Chart 9: Number of road deaths per million inhabitants in 2016, PIN Programme countries

*Countries with provisional fatality figures.

Countries marked with an orange outline have fewer than 150 deaths per year and therefore the fatality rate can vary significantly between years.

A list of the country which each code represents can be found in the background section.

Other topics

This section summarises other topics which have not been reported on above.

Weather

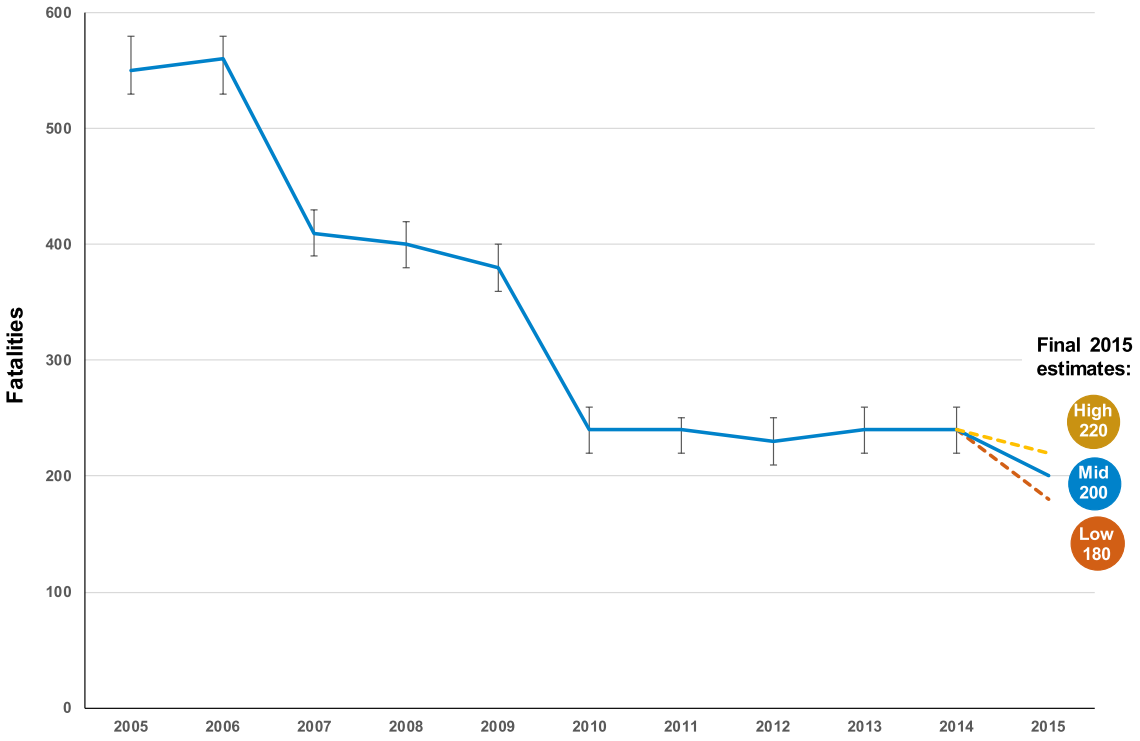
Due to the warmer and drier weather experienced in 2016, compared to the long term average, we estimate that there were approximately 20 more deaths observed than we would have expected if the weather had followed the long term average. Therefore the number of fatalities after weather adjustment is approximately 1,772, a 2 per cent increase from the 1,730 deaths observed in 2015. Motorcyclists alone account for almost two thirds of the weather adjustment. The motorcyclist casualties were strongly influenced by the warmer weather in September (2 degrees above the long term average) which is likely to have increased the number of them on the road.

Drinking and driving

- Final estimates for 2015 show that 200 people were **killed** in accidents in Great Britain where at least one driver was over the drink drive limit. Although the final estimate for 2015 shows that the number of fatalities has fallen by 40 since 2014, this change is **not statistically significant**.
- Around 12 per cent of all **deaths** in reported road traffic accidents in 2015 involved at least one driver **over the drink drive limit**.
- The number of **seriously injured casualties increased by 9 per cent** from 1,070 in 2014 to 1,170 in 2015. This is the first rise in serious casualties since 2011 and represents a **statistically significant change**. This rise is not related to the changes in systems for severity reporting by police forces which affects the 2016 figures (see here for more information).
- The total number of casualties in drink drive accidents for 2015 is 8,470, up 3 per cent on the

final 2014 figure. Although this is the first rise in the number of total casualties since 2011, it remains the **third lowest total** on record.

Killed casualties in reported drink drive accidents: GB 2005 to 2015; error bars show 95% confidence intervals



Value of the prevention of accidents

An estimate of unreported injuries has been included in the 'value of prevention of accidents', which can be found here. We estimate that the **total value of prevention of the unreported casualties at around £20bn a year**, the value of the reported injury accidents at around £5bn a year and the total value of prevention of the reported casualties at around £11bn a year. This gives a total estimate for **all reported and unreported accidents of around £36bn per year**.

The data used as the basis for these statistics are therefore not a complete record of all personal injury road accidents, and this should be borne in mind when using and analysing the figures. Furthermore, police data on road accidents, whilst not perfect, remain the most detailed, complete and reliable single source of information on road casualties covering the whole of Great Britain, in particular for monitoring trends over time.

Quarterly estimates

Provisional estimates for the first quarter of 2017 were due to be published in August 2017. Data availability issues meant that these were not published and both Q1 and Q2 2017 provisional estimates will now be released in October 2017.

Strengths and weaknesses of the data

Underreporting of casualties and accidents, and other sources of information

Comparisons of road accident reports with **death registrations** show that very few, if any, road accident fatalities are not reported by the police. However, it has long been known that a **considerable proportion of non-fatal casualties are not known to the police**, as hospital, survey and compensation claims data all indicate a higher number of casualties than police accident data would suggest.

The 2016 annual report contains two other key sets of information which help give an indication of how much underreporting of casualties there is. These are the National Travel Survey and hospital data.

Survey data

Our current best estimate, derived primarily from National Travel Survey (NTS) data and produced in 2016, is that the total number of road casualties in Great Britain each year, including those not reported by the police, is within the range 630 thousand to 800 thousand with a central estimate of 710 thousand.

National Travel Survey

Table RAS54004, available here, is based on questions asked about whether respondents to the National Travel Survey have been in a personal-injury accident in the last three years and, if so, was that accident reported by the police. The current figures can be found in **Table 1**, below.

Table 1: Estimated total number of reported and unreported casualties, average for 2012-2016, Great Britain

Number (thousands, estimates rounded to nearest 10 thousand)

		95% confidence limits			
	NTS Central estimate (reported and unreported)[1]	Lower	Upper	**Stats19 reported[2]**	**Estimated unreported**
Seriously injured	80	50	110	23	57
Slightly injured	590	510	670	164	426
Total casualties	670	590	760	187	483

1. Based on National Travel Survey data collected for 2012-2016
2. Based on police-reported Stats19 casualties for 2012-2016

The current best estimate is that around 670 thousand people are injured to some degree in

road traffic accidents each year. Of these, only around 187 thousand casualties are reported by the police and recorded in Stats19. This suggests that about **483 thousand casualties are unreported a year**, of which roughly **57 thousand probably had a serious injury**.

This estimate is based on the average from the last five NTS years in order to have a robust sample. There has been no discernible trend in the estimate over that time so there is **no evidence that underreporting is getting worse**.

Hospital data

The second alternative source about people injured in road traffic accidents comes from **hospital admissions** data. The 2015 annual report included an article discussing the first estimates for the total number of people admitted to hospital in the United Kingdom with a **clinically defined serious injury** following a road traffic accident. The formal name for these figures is casualties with MAIS3+, which means that it includes all casualties with a maximum score on the abbreviated injury scale of three or higher. More detail about the source of the data, the abbreviated injury scale and the correction factors used can be found in the article at: www.gov.uk/government/statistics/reported-road-casualties-great-britain-annual-report-2015. Table RAS55050 provides MAIS3+ figures for 1999 to 2011.

Changes in reporting systems used by police forces

Approximately half of English police forces adopted the CRASH (Collision Recording and Sharing) system for recording reported road traffic collisions at the end of 2015 or the first part of 2016, although Surrey has been using the system since November 2012. In addition, the Metropolitan Police Service (MPS) switched to a new reporting system called COPA (Case Overview Preparation Application) from September 2016.

Definitions

CRASH: Collision Recording and Sharing system. This is a centralised system used by some police forces to record road traffic collisions.

COPA: Case Overview Preparation Application. This is a system used by the Metropolitan Police Service to record road traffic collisions.

In CRASH and COPA, the police officer records the types of injuries suffered by the casualty rather than the severity (severity is measured simply as ‘slight’ or ‘serious’). Under other systems, to record severity directly, police officers need to determine themselves which injury type classifies into each of the two severity types. CRASH and COPA, in contrast, automatically converts the injury type to a severity classification which eliminates the uncertainty that arises from the officer having to make their own judgement. If this hypothesis is demonstrated to be correct then it means that the new severity level data from these systems are more accurate than the data from other systems.

Table 2 shows the link between injury and injury severity as used in the CRASH system.

Table 2: Classification of injury severity using the CRASH reporting system

Injury in CRASH	Detailed severity	Severity classification
Deceased	Killed	Killed
Broken neck or back	Very Serious	Serious
Severe head injury, unconscious	Very Serious	Serious
Severe chest injury, any difficulty breathing	Very Serious	Serious
Internal injuries	Very Serious	Serious
Multiple severe injuries, unconscious	Very Serious	Serious
Loss of arm or leg (or part)	Moderately Serious	Serious
Fractured pelvis or upper leg	Moderately Serious	Serious
Other chest injury (not bruising)	Moderately Serious	Serious
Deep penetrating wound	Moderately Serious	Serious
Multiple severe injuries, conscious	Moderately Serious	Serious
Fractured lower leg / ankle / foot	Less Serious	Serious
Fractured arm / collarbone / hand	Less Serious	Serious
Deep cuts / lacerations	Less Serious	Serious
Other head injury	Less Serious	Serious
Whiplash or neck pain	Slight	Slight
Shallow cuts / lacerations / abrasions	Slight	Slight
Sprains and strains	Slight	Slight
Bruising	Slight	Slight
Shock	Slight	Slight

Table 3 shows the police forces which used either CRASH or COPA for at least part of 2016. **Table 4** provides aggregated information on the number of accidents and casualties by severity observed year on year for forces which were using CRASH or COPA in 2016 compared to those which continued to use previous systems.

Tentatively, using forces which had no change in system as an indicator for the underlying change from 2015 to 2016, this would suggest that taking out the effects of moving to CRASH or COPA would show that both serious accidents and serious casualties would have been virtually unchanged compared with 2015. The effect on slight accidents would have been to show a marginally larger decline in the level shown in the statistics if there had been no changes in reporting systems.

Given that a number of forces were not using CRASH for the whole of 2016, further differences in reporting are going to be a feature of the 2017 data even if no more forces change reporting system.

Table 3: Adoption dates for CRASH or COPA by police force

Police Force	System Used	Adoption Date
Bedfordshire	CRASH	April 2016
Cambridgeshire	CRASH	May 2016
City of London	CRASH	November 2015
Cumbria	CRASH	January 2016
Devon and Cornwall	CRASH	December 2015
Durham	CRASH	March 2016
Essex	CRASH	November 2015
Gloucestershire	CRASH	November 2015
Hertfordshire	CRASH	April 2016
Humberside	CRASH	January 2016
Kent	CRASH	January 2016
Metropolitan Police Service	COPA	September 2016
Norfolk	CRASH	February 2016
Northumbria	CRASH	April 2016
South Yorkshire	CRASH	January to February 2013, then January 2016 onwards
Staffordshire	CRASH	May 2015
Suffolk	CRASH	February 2016
Surrey	CRASH	November 2012
Warwickshire	CRASH	November 2015
West Mercia	CRASH	December 2015
West Midlands	CRASH	November 2015

The early indications are that switching to CRASH / COPA has added between 5 and 15 per cent to the Great Britain total for serious injuries. This is still very much a preliminary estimate, and the Department, along with Transport for London, intends to publish more detailed research and analysis looking at the effects of switching to the CRASH and COPA systems in due course. As a starting point the Methodology Advisory Service in the Office for National Statistics has been commissioned to undertake some research to provide guidance to users in understanding these effects, but also to establish methods to produce adjusted back-estimates of already published severity based data. This will enable the Department for Transport (DfT) to produce consistent time series which are independent of the reporting system used.

Table 4: Comparison of reported accidents and casualties for forces using CRASH/COPA and forces not using CRASH/COPA

Accidents/Casualties	Forces using CRASH/COPA in 2016			Forces not using CRASH/COPA in 2016		
	2015	2016	% change	2015	2016	% change
Fatal accidents	733	750	2%	883	945	7%
Serious accidents	9,007	10,813	20%	11,031	10,912	-1%
Slight accidents	65,387	63,092	-4%	53,015	50,109	-5%
Fatal casualties	791	787	-1%	939	1,005	7%
Serious casualties	9,869	11,864	20%	12,275	12,237	0%
Slight casualties	87,898	85,351	-3%	74,417	70,140	-6%

Note that adoption dates are indicative as there can be phased introduction of new systems

Publication Delays

In order to produce the intended publication of 2016 main results for June, DfT set a cut-off date for 2016 data of 30 April 2017 with its data suppliers. It became apparent at that time that Transport for London (TfL) was not able to meet the deadline due to changes in the way the Metropolitan Police Service (MPS) provided it with data. These changes would create a significant delay in TfL providing the data for the last two months of 2016. As a result, DfT announced that the main results publication would be delayed until 28 September 2017 in order to allow TfL time to validate

the data. In the end, it was not until 7 September that DfT received final validated data from TfL.

Following the finalisation of 2016 data, DfT understands that TfL is now starting to prepare 2017 data from the MPS, which gives DfT cause for concern. Following the introduction of the COPA by the MPS it took TfL three months to process November and December 2016 data and if this situation continues there appears to be a risk that 2017 annual estimates will again be published late. For the purposes of our quarter 1 and 2 publication at the end of October, however, we understand that TfL should be in a position to supply unvalidated provisional data which should enable estimates for London to be included.

Detailed tables

The annual report also includes detailed tables based on data reported by the police. Areas covered are listed below, with relevant table numbers in brackets:

- Accidents (RAS10)
- Drivers and vehicles involved (RAS20)
- Casualties (RAS30)
- Combined accidents, casualties, vehicles (RAS40)
- Area comparisons (RAS30038-RAS30058, RAS10014-RAS10015, RAS41002-RAS41004)
- International comparisons (RAS52)
- Inter modal comparisons (RAS53)
- Former Strategic Framework for Road Safety outcome indicators (RAS41)
- Reported drink driving (RAS51)
- Contributory factors (RAS50)
- Survey data on road accidents (RAS54)
- Hospital admissions as a result of road accidents (RAS55)
- Accident and casualty costs (RAS60)

A full list of tables in the road safety series and an index linking 2009 RRCGB report table numbers with 2016 RRCGB web tables can be found here.

The following tables have not been updated for this year's release:

- **RAS30030**: gives reported child casualties in accidents occurring on a school day at given times but will now be discontinued.
- **RAS30035**: provides death registrations based on ONS data and will be updated in due course.

- **RAS30080**: provides weather-adjusted road casualty figures and will be updated in due course.
- **RAS51010**: estimates of accidents involving a car drink driver and will be updated in due course.
- **RAS51017-RAS51018**: provide roadside screening breath test results and will be updated in due course.
- **RAS55050**: provides estimates of clinically seriously injured MAIS3+ road casualties and will be updated in due course.
- **RAS51101-RAS51104**: provide information on self reported drink and drug driving from the ONS Crime Survey for England and Wales. These tables will be updated in due course.

Background information

Tables providing more details of accidents and casualties are available at: https://www.gov.uk/government/collections/road-accidents-and-safety-statistics.

Provisional quarterly reported road casualty statistics are published throughout the year. Provisional estimates for the first quarter of 2017 were due to be published in August 2017. Data availability issues meant that these were not published and both Q1 and Q2 2017 provisional estimates will now be released in October 2017. Quarterly statistical releases can be found at: www.gov.uk/government/organisations/department-for-transport/series/road-accidents-and-safety-statistics.

National Statistics are produced to high professional standards as set out in the Code of Practice for Official Statistics. They undergo quality assurance reviews to ensure that they meet customer needs. The first assessment report (report number 4) and letter confirming that the statistics have been designated as National Statistics are available at: www.statisticsauthority.gov.uk/assessment/assessment/assessment-reports/index.html. The statistics were reassessed during 2013 and the report, number 258, was published at the link above on the 25th July 2013.

Details of Ministers and officials who receive pre-release access to these statistics up to 24 hours before release can be found here: www.gov.uk/government/publications/road-accident-and-safety-statistics-pre-release-access-list.

Further information

A full list of the definitions used in this publication can be found here: www.gov.uk/government/uploads/system/uploads/attachment_data/file/462818/reported-road-casualties-gb-notes-definitions.pdf.

Further information on Reported Road Casualties Great Britain, including information about the variables collected on the STATS19 form, historical publications and factsheets, can be found at: www.gov.uk/government/publications/road-accidents-and-safety-statistics-guidance.

Feedback

We welcome further feedback on any aspects of the Department's road safety statistics including content, timing, and format via email to roadacc.stats@dft.gsi.gov.uk

International comparisons section

The country codes used in chart 9 can be found in the table below.

Country	Code
Austria	AT
Belgium	BE
Bulgaria	BG
Croatia	HR
Cyprus	CY
The Czech Republic	CZ
Denmark	DK
Estonia	EE
Finland	FI
France	FR
Germany	DE
Greece	EL
Hungary	HU
Ireland	IE

Country	Code
Italy	IT
Latvia	LV
Lithuania	LT
Luxembourg	LU
Malta	MT
The Netherlands	NL
Poland	PL
Portugal	PT
Romania	RO
Slovakia	SK
Slovenia	SI
Spain	ES
Sweden	SE
Great Britain	GB

Country	Code
Israel	IL
Norway	NO
Serbia	RS
Switzerland	CH

WIKIPEDIA

Reported Road Casualties Great Britain

Reported Road Casualties Great Britain (**RRCGB**), formerly *Road Casualties Great Britain* (RCGB) and before that *Road Accidents Great Britain* (RAGB), is the official statistical publication of the UK Department for Transport (DfT) on traffic casualties, fatalities and related road safety data. This publication, first produced in 1951, is the primary source for data on road casualties in Great Britain. It is based primarily on police **STATS19** data. Data have been collected since 1926.

The remainder of the UK casualty statistics, those from Northern Ireland, are reported separately by the PSNI[1]

Annual numbers of people killed on the roads of Great Britain between 1926 and 2010

Contents

Published data

Data have been collected since 1926, in which year there were 4,886 fatalities in some 124,000 crashes.[n 1] Between 1951 and 2006 a total of 309,144 people were killed and 17.6 million were injured in accidents on British roads.[n 2] The highest number of deaths in any one year was 9,169 people in 1941 during World War II. The highest figure during peacetime was 7,985 in 1966.[n 3]

Figures for reported deaths, serious injuries and slight injuries have generally decreased since 1966. Since 1992, the ten-year drop in killed or seriously injured casualty numbers reported to the police, compared with the previous five-year average, has been about 40%.[2]

In 1987, the government set the first national casualty reduction target. The target set was that road casualties should drop by one-third by the year 2000 in comparison to the average numbers for the years 1981 to 1985. The target was exceeded, with the number of fatalities dropping by 39% and the number of serious injuries dropping by 45% over that period.[3]

In 1999, when Great Britain had the safest roads in Europe apart from Sweden, the government set a new national casualty reduction target, to be met by the year 2010. The target for 2010, compared to the average for the years 1994 to 1998, was a reduction of 40% in the number of people Killed or Seriously Injured (KSI) casualties, a reduction of 50% the number of children KSI casualties and a reduction of 10% in the rate of people slightly injured per 100 million vehicle kilometres.[3] By 2009, the results were: killed or seriously injured 44% lower; children killed or seriously injured 61% lower and the slight casualty rate was 37% lower.[n 4]

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There is some concern about the completeness of the injury data and what can be concluded from them (see the Criticism section below). This table gives data for sample years:-

Annual summary

Year	Killed	Serious injury	Slight injury	Total injury	ref	Note
2017	1,793	24,831	144,369	170,993	[4]	
2016	1,792	24,101	155,491	179,592	[5]	4% rise in deaths to highest level since 2011.[6]
2015	1,732	22,137	162,340	186,209	[7]	Second lowest annual total on record after 2013.
2014	1,775	22,807	169,895	194,477	[8]	Death and KSI rate rise for a 2nd time since 2001.
2013	1,713	21,657	160,300	181,957	[9]	Lowest death rate since records began.
2012	1,754	23,039	170,930	193,969	[10]	10% increase in deaths of cyclists[11] and increasing serious injuries of pedestrians.
2011	1,901	23,122	178,927	203,950	[12]	First increase in fatalities since 2001. Pedestrian fatalities increased by 12%, car occupants by 6%. They were lower for all other groups.
2010	1,857	20,803	185,995	206,798	[13]	Traffic levels fell by 2%.
2009	2,222	24,690	195,234	222,146	[n 5]	
2008	2,538	26,000	202,333	228,000	[n 6]	
2007	2,946	28,000	217,060	245,000	[n 6]	
2006	3,172	29,000	226,559	255,000	[n 6]	
2005	3,201	29,000	238,862	268,000	[14]	
2004	3,221	31,000	245,000	278,000	[n 3][15]	
2003	3,508	34,000	253,000	287,000	[n 3][15]	
2002	3,431	36,000	263,000	299,000	[n 3][15]	
2001	3,450	37,000	273,000	310,000	[n 3][15]	
2000	3,409	38,000	279,000	317,000	[n 3][15]	
1999	3,423	39,000	278,000	317,000	[n 3][15]	
1998	3,421	41,000	281,000	322,000	[n 3][15]	
1997	3,599			324,000	[n 3]	
1990	5,217	60,000	275,000	336,000	[n 3][15]	
1980	5,953			323,000	[n 3]	
1970	7,499			356,000	[n 3]	
1966	7,985				[n 3]	Highest recorded peacetime fatality rate.
1960	6,970			341,000	[n 3]	
1950	5,012	49,000	148,000	196,000	[n 3][15]	
1941	9,169				[n 3]	Highest recorded fatality rate.
1940	8,609				[n 3]	No figures for injured during World War II.
1930	7,305			178,000	[n 3]	
1926	4,886				[n 1]	First year that national figures were published.

Casualties by road type in 2008

Casualties by severity, built-up, non built-up and on motorways.[n 7]

Road type	Killed	Serious injury	Slight injury	Total injury	Ref.	Note
Non built-up (excludes motorways)	1,323	8,342	48,810	58,475		52% of the total killed, 32% of total seriously injured, 25% of total with slight injuries
Built-up	1,057	16,823	143,079	160,959		42% of the total killed, 65% of total seriously injured, 70% of total with slight injuries
Motorway	158	869	10,444	11,471	[16]	"6% of the total killed, 3% of total seriously injured, 5% of total with slight injuries. Fatalities on motorways have decreased by 9% since 1994–98 in a period with traffic levels increased by 28%"[17]
All casualties	**2,538**	**26,034**	**202,333**	**230,905**	[18]	

STATS19 data collection system

The police collect details of all incidents which they attend or become aware of within 30 days which occur on the highway in which one or more person is killed or injured and involving one or more vehicles using the STATS19 data collection system.

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STATS19 is the reference number for the police form used to record incidents.[19] *STATS20* describes how to complete the form giving examples of how to correctly record different situations.[19] *STATS21* describes how the STATS19 data should be checked for accuracy.[19]

Additional information for RCGB is gathered from death registrations, coroners' reports and traffic and vehicle registrations.[20]

STATS19 data are used in European Union road safety studies[21].

Criticism

Reported reduction in injury levels

The accuracy of the police STATS19 statistics, and thus much of the data published in the RCGB, and therefore its suitability for measuring trends in road casualties was examined in two studies in 2006 and has subsequently been commented on by the Department for Transport who concluded that the figures for deaths were accurate, however the actual total injuries is likely considerably higher than the reported figure, possibly three times higher.

A report published in the British Medical Journal in 2006 by M.Gill *et al.* compared police and Hospital Episode Statistics between 1996 and 2004 and concluded that although the police statistics showed a reduction in KSIs from 85.9 to 59.4 per 100,000 for the period the statistics for hospital admissions related to traffic accidents requiring hospital admission for the period did not. It concluded that the overall fall in police figures represented a fall in completeness of reporting of these injuries rather than an actual reduction of casualties.[22]

Also in 2006 a report prepared for the DfT by H.Ward *et al.* noted that although the figures for fatalities were normally accurate, with no significant under-reporting there was more uncertainty in the statistics relating to injury. They recommended that it was insufficient to rely solely on the STATS19 data on any other single data source because different databases showed different elements of the story and that *"A system of data triangulation should be used to compare and understand trends in road casualties."* They noted that the definition of seriously injured in police reports was at least partially subjective, and there was some under-reporting (though less than is the case for lesser injuries). The report also noted that there were changes to the method used to estimate vehicle mileages in 1995 which would affect direct comparisons of figures spanning this year. [23]

The Department for Transport acknowledged in their report for the year 2008 that a considerable proportion of non-fatal casualties are not known to the police. Based on additional sources including hospital records, surveys and compensation claims they estimate that the total number of road casualties in Great Britain each year is nearer to 800,000 [although this figure itself may be influenced by the growth in the so-called 'compensation culture']. The UK government is not convinced however that the reductions in reported injury levels do not reflect an actual decline.[n 8] In 2008 the department changed the title of the report from 'Road Casualties Great Britain' to 'Reported Road Casualties Great Britain'.[24]

Suppression of activity by vulnerable road users

Another independent report challenged the government's claim that falling casualty rates meant that roads were becoming 'much safer'. Mayer Hillman, John Adams and John Whitelegg suggest that roads may actually be felt to be sufficiently dangerous as to deter pedestrians from using them. They compared rates for those whose transport options are most limited, the elderly and children and found that:[25]

- Britain's child pedestrian safety record is worse than the average for Europe, in contrast to the better than average all-ages figure.
- Children's independent mobility is increasingly curtailed, with fear of traffic being cited as a dominant cause
- Distances walked have declined more than in other European countries
- Similar (though less well-defined) observations can be made regarding the elderly

Notes

1. Department for Transport (2006), p. 92 'Road accident and casualty data was first collect on a national level in 1926. That year there were 4,886 recorded deaths in some 124,000 accidents'
2. Department for Transport (2006) p. 1 'Between 1951 and 2006, 309,144 people were killed and 17.6 million persons were injured in accidents on British roads'
3. Department for Transport (2008), p. 106 table 2
4. Department for Transport (2009) p. 8 Compared with the 1994 to 1998 average, in 2009: The number killed was 38% lower; The number of reported killed or seriously injured casualties was 44% lower; The number of children killed or seriously injured was 61% lower; and the slight casualty rate was 37% lower. In contrast, traffic rose by an estimated 15% over this period
5. Department for Transport (2009), p. 8 There were a total of 222,146 reported casualties of all severities, 4% lower than in 2008. 2,222 people were killed, 12% lower than in 2008, 24,690 were seriously injured (down 5%) and 195,234 were slightly injured (down 4%)
6. Department for Transport (2008), p. 6
7. Department for Transport (2008), p. 121 table 12 'Reported accidents, vehicles and casualties: casualties by severity: by road class, built-up and non built-up roads: 2008'
8. Department for Transport (2008),p. 62 "It has long been known that a considerable proportion of non-fatal casualties are not known to the police and hospital, survey and compensation claims data all indicate a higher number of casualties than are reported... Police data on road accidents (STATS19), whilst not perfect, remains the most detailed, complete and reliable single source of information on road casualties covering the whole of Great Britain, in particular for monitoring trends over time"

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3. Tomorrow's Roads: Safer for Everyone (Report). Department for Transport. 1999.
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11. More Or Less, BBC Radio 4
12. "Reported road casualties Great Britain: main results 2011" (http://www.dft.gov.uk/statistics/releases/reported-road-casualties-gb-main-results-2011/). Department for Transport. Retrieved 2012-06-28.
13. "Reported road casualties in Great Britain: main results 2010" (http://www2.dft.gov.uk/pgr/statistics/datatablespublications/accidents/rep road-casualties-gb-main-results-2010.html). "The number of people killed in road accidents reported to the police fell by 16% from 2,222 in 2009 to 1,857 in 2010. This the lowest figure since national records began in 1926. A total of 22,660 people were reported killed or seriously injured in 2010, 8% less than in 2009. There were 208,655 casualties (slight injuries, serious injuries and fatalities) in road accidents reported to the police in Great Britain in 2010, 6% less than in 2009. Motor vehicle traffic levels fell by 2% compared to 2009."
14. "Road Casualties Great Britain: 2005" (http://webarchive.nationalarchives.gov.uk/20100209123244/http://www.df Department for Transport. p. 6. Archived from the original (http://www.dft.gov.uk/adobepdf/162469/221412/221549/227755/roadcasualties on 2010-02-09. Retrieved 2010-01-09.
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21. https://dspace.lboro.ac.uk/dspace-jspui/bitstream/2134/23705/1/Study%20on%20Serious%20Road%20Traffic%20Injuries%20in%20the%20EU.pdf
22. Mike Gill; Michael J Goldacre; David G R Yeates (2006-06-23). "Changes in safety on England's roads: analysis of hospital statistics" (http://bmj.bmjjournals.com/cgi/rapidpdf/bmj.38883.593831.4Fv1.pdf) (PDF). BMJ.
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External links

- Road casualties in Great Britain: Annual reports (http://www.dft.gov.uk/pgr/statistics/datatablespublications/accidents/casualtiesgbar/)
- STATS 19 (http://www.statistics.gov.uk/STATBASE/Source.asp?vlnk=571&More=Y) defined at Office for National Statistics
- Department for Transport - Statistics (http://www.dft.gov.uk/pgr/statistics/)

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SETTING LOCAL SPEED LIMITS
Draft: July 2012

CONTENTS

SECTION 1: INTRODUCTION

Key points

Speed limits should be evidence-led and self-explaining and seek to reinforce people's assessment of what is a safe speed to travel. They should encourage self-compliance. Speed limits should be seen by drivers as the maximum rather than a target speed.

Traffic authorities set local speed limits in situations where local needs and conditions suggest a speed limit which is lower than the national speed limit.

This guidance is to be used for setting all local speed limits on single and dual carriageway roads in both urban and rural areas.

This guidance should also be used as the basis for assessments of local speed limits, for developing route management strategies and for developing the speed management strategies which can be included in Local Transport Plans.

1. The Department for Transport has a vision for a transport system that is an engine for economic growth, but one that is also more sustainable, safer, and improves quality of life in our communities.

2. It is clear how setting appropriate speed limits with the aim of achieving safe and appropriate driving speeds can play an important role in supporting this vision. This guidance sets out the framework that traffic authorities should follow when setting and reviewing local speed limits.

3. Effective speed management involves many components designed to work together to require, encourage and help road users to adopt appropriate and safe speeds below the speed limit. As well as being the legal limit, speed limits are a key source of information to road users, particularly as an indicator of the nature and risks posed by that road both to themselves and to all other road users. Speed limits should, therefore, be evidence-led, self-explaining and seek to reinforce people's assessment of what is a safe speed to travel and encourage self-compliance. They should be seen by drivers as the maximum speed rather than as a target speed at which to drive in all circumstances.

4. The overall speed limit framework, including the setting of national limits for different road types, and which exceptions to these general limits can be applied, is the responsibility of the government. The three national speed limits are:

    - the 30 mph speed limit on street lit roads (sometimes referred to as Restricted Roads)

- the national speed limit of 60 mph on single carriageway roads
- the national speed limit of 70 mph on dual carriageways and motorways.

These national limits are not, however, appropriate for all roads. The speed limit regime enables traffic authorities to set local speed limits in situations where local needs and conditions suggest a speed limit which is different from the respective national speed limit.

5. Local speed limits are determined by traffic authorities having regard to guidance issued by the Department for Transport. This guidance applies to England and supersedes that previously contained in DfT Circular 01/2006, which is now cancelled.[1]

6. The guidance retains and builds upon many of the underlying principles of DfT Circular 01/2006, but provides additional evidence of the safety and wider benefits of setting appropriate speed limits. It also builds on the responses received to a consultation held by the Department in 2009.

7. It is aimed primarily at traffic authorities responsible for setting local speed limits, but is also designed to help improve the wider understanding of why and how local speed limits are determined.

8. The guidance is to be used for setting all local speed limits on single and dual carriageway roads in both urban and rural areas. It brings together some of the main features of other published guidance on speed limit related issues, including speed-related road traffic regulation and signing, street lighting, traffic calming, speed limits in villages, and 20 mph speed limits and zones.

9. The guidance should not, however, be used in isolation, but read in conjunction with the more comprehensive advice on these matters set out in the appropriate Traffic Advisory Leaflets and with the relevant legislation, including the Traffic Signs Regulations and General Directions 2002 (TSRGD 2002)[2].

10. This guidance introduces, in section 5, the Speed Limit Appraisal Tool, a web-based tool currently (July 2012) under development. It is being designed to help local authorities assess the full costs and benefits, of any proposed schemes and make robust, evidence-based decisions about which limits they put in place.

Priorities for action

[1] In Wales, *Setting Local Speed Limits in Wales*, Welsh Assembly Government Circular No: 24/2009, issued by the Welsh Assembly Government in October 2009, is in use and in Scotland, *Setting Local Speed Limits: Guidance for Local Authorities*: ETLLD Circular 1/2006 applies.

[2] Please note that all references to legislation within this Circular are references to that legislation as amended.

11. The guidance in this Circular should be used as the basis for:

- assessments of local speed limits;
- developing route management strategies; and
- developing speed management strategies.

12. Traffic authorities are asked to:

- **keep their speed limits under review** with changing circumstances;
- consider the **introduction of more 20 mph limits and zones, over time, in urban areas,** to ensure greater safety for pedestrians and cyclists, using the criteria in Section 6.

SECTION 2: BACKGROUND AND OBJECTIVES OF THE CIRCULAR

Key points

Traffic authorities continue to have the flexibility to set local speed limits that are appropriate for the individual road, reflecting local needs and taking account of all local considerations.

Local speed limits should not be set in isolation, but as part of a package with other measures to manage vehicle speeds and improve road safety.

Background

13. Setting speed limits at the appropriate level for the road, and ensuring compliance with these limits, play a key part in ensuring greater safety for all road users. The relationship between speed and likelihood of collision as well as severity of injury is complex, but there is a strong correlation. As a general rule for every 1 mph reduction in average speed, collision frequency reduces by around 5% (Taylor, Lynam and Baruya, 2000). For typical types of road traffic collisions the risk of death for drivers and pedestrians involved reduces with reduced vehicle speeds and it is particularly important to consider those speeds where the balance tips in favour of survival.

14. Reported road casualty statistics also show the role of *exceeding the speed limit* and *travelling too fast for the conditions* as contributory factors in road traffic collisions. In 2010 these two factors were reported to have contributed to nearly 400 road deaths. Other reported contributory factors such as *loss of control* or *careless, reckless or in a hurry* can often be related to excess or inappropriate speed, and even where the contributory factors are unrelated to the vehicle speed, higher speeds will often aggravate the outcome of the collision and injuries.

15. This updated guidance provides part of the framework for speed limits, where local authorities can set speed limits on their roads below the national limit, in response to local risk factors and conditions. It will help ensure appropriate and consistent speed limits, which will contribute to reducing the number of road deaths, as well as casualties overall; tackling pedestrian and cyclist casualties in towns and cities; improving the safety on rural roads; and reducing variations in safety from area to area and road to road.

16. The objectives of this guidance also fit into the context of some wider transport and cross-government priorities, which those responsible for setting local speed limits should bear in mind:

- Our vision is for a transport system that is an engine for economic growth but one that is also greener and safer and improves quality of life in our communities.
- We also want our roads to become safer, less congested and less polluted.
- We want to encourage sustainable local travel and economic growth by making public transport and cycling and walking more attractive and effective, promoting lower carbon transport and tackling local road congestion.
- We want to contribute to wider public health and safety outcomes by contributing to a reduction in road casualties.

Objectives of the Circular

17. The key objectives of this guidance are:
    - the provision of up-to-date and consistent advice to traffic authorities;
    - improved clarity which will aid greater consistency of speed limits across the country;
    - enabling the setting of more appropriate local speed limits, including lower or higher limits where conditions dictate;
    - achieving local speed limits that better reflect the needs of all road users, not just motorised vehicles;
    - ensuring improved quality of life for local communities and a better balance between road safety, accessibility and environmental objectives, especially in rural communities;
    - improved recognition and understanding by road users of the risks involved on different types of road, the speed limits that apply, and the reasons why;
    - improved respect for speed limits, and in turn improved compliance; and
    - continued reductions in the number of road traffic collisions, injuries and deaths in which excessive or inappropriate speed is a contributory factor.

18. Speed limits are only one element of speed management. Local speed limits should not be set in isolation. They should be part of a package with other speed management measures including engineering and road geometry that respect the needs of all road users and raise the driver's awareness of their environment; education; driver information; training and publicity. Within their overall network management responsibilities, these measures should enable traffic authorities to deliver speed limits and, as importantly, actual vehicle speeds that are safe and appropriate for the road and its surroundings. The measures should also help drivers to be more readily aware of the road environment and to drive at an appropriate speed at all times.

19. Indeed, if a speed limit is set in isolation: for example,
    - without support from the local community, the police and other local services;

- without supporting education;
- or without consideration of engineering measures;
- or if it is set unrealistically low for the particular road function and condition,

it may be ineffective and lead to non-compliance with the speed limit. If substantial numbers of drivers continued to travel at unacceptable speeds, this would increase the risk of collisions and injuries, and would require significant and avoidable enforcement activity.

SECTION 3: THE UNDERLYING PRINCIPLES OF LOCAL SPEED LIMITS

Key points

The Highways Agency is responsible for determining speed limits on the trunk road network. Local traffic authorities are responsible for determining speed limits on the local road network.

It is important that traffic authorities and police forces work closely together in determining, or considering, any changes to speed limits.

The full range of speed management measures should always be considered before a new speed limit is introduced.

The underlying aim should be to achieve a 'safe' distribution of speeds. The **key factors that should be taken into account in any decisions** on local speed limits are:

- **history of collisions**, including frequency, severity, types and causes;
- **road geometry and engineering** (e.g. bends, junctions, barriers);
- presence of **vulnerable road users**;
- **road function;**
- **existing traffic speeds**; and
- **road environment**, including level of road-side development and possible impacts on residents (e.g. severance, noise, or air quality).

While these factors need to be considered for all road types, they may be weighted differently in urban or rural areas. The impact on community and environmental outcomes should also be considered.

The minimum length of a speed limit should generally be not less than 600 metres to avoid too many changes of speed limit along the route.

Speed limits should not be used to attempt to solve the problem of isolated hazards, such as a single road junction or reduced forward visibility, e.g. at a bend.

Responsibility for local speed limits

20. The Highways Agency is responsible for determining speed limits on the trunk road network, and local traffic authorities are responsible for determining speed limits on the local road network. In this Circular, the term 'traffic authority' is used to denote both the Highways Agency and local traffic authorities.

21. It is important that traffic authorities and police forces work together closely and from an early stage when considering or determining any changes to speed limits. This may be through the local road safety partnership

arrangements. It is also important that neighbouring traffic authorities work closely together, especially where roads cross boundaries, to ensure speed limits remain consistent. As part of the process of making a speed limit order, consultation of those affected is of key importance and, together with good information about planned changes, this will improve support for and compliance with new limits. The legislative requirements are summarised in Section 4.

Considerations in setting local speed limits

22. A study of types of crashes, their severity, causes and frequency, together with a survey of traffic speeds, should indicate whether an existing speed limit is appropriate for the type of road and mix of use by different groups of road users, including the presence or potential presence of vulnerable road users (including pedestrians, cyclists, equestrians or motorcyclists), or whether it needs to be changed. Local residents may also express their concerns or desire for a lower speed limit and these comments should be considered.

23. Where limits for air quality are in danger of being exceeded, compliance with those air quality limits could be an important factor in the choice of speed limit.

24. It may well be that a speed limit need not be changed if the collision rate can be improved or wider quality of life objectives can be achieved through other speed management measures, or other measures . These alternative measures should always be considered before proceeding with a new speed limit.

25. Where there is poor compliance with an existing speed limit on a road or stretch of road the reasons for the non-compliance should be examined before a solution is sought. If the speed limit is set too low for no clear reason and the risk of collisions is low, then it may be appropriate to increase the limit. If the existing limit is in place for a good reason, solutions may include engineering measures or changes to the road environment to ensure it better matches the speed limit, or local education and publicity. Enforcement may also be appropriate, but should be considered only after the other measures and jointly with the police force.

The underlying principles

26. The aim of speed management policies should be to achieve a safe distribution of speeds consistent with the speed limit that reflects the function of the road and the road environment. This should imply a mean speed appropriate to the prevailing conditions, and all vehicles moving at speeds below or as close as possible to the posted speed limit, in line with the conditions.

27. The estimated collision and injury savings should also be an important factor when considering changes to a local speed limit. Another key factor when setting a speed limit is what the road looks like to the road users. Drivers are likely to expect and respect lower limits, and be influenced when deciding on what is an appropriate speed, where they can see there are potential hazards, for example outside schools, in residential areas or villages and in shopping streets.

28. A principal aim in determining appropriate speed limits should, therefore, be to provide a consistent message between speed limit and what the road looks like, and for changes in speed limit to be reflective of changes in the road layout and characteristics.

29. The following will be important **factors when considering what is an appropriate speed limit**:

- **history of collisions**, including frequency, severity, types and causes;
- **road geometry and engineering** (width, sightlines, bends, junctions, accesses and safety barriers etc.),
- **road function** (strategic, through traffic, local access etc.)
- **composition of road users** (including existing and potential levels of vulnerable road users),
- existing **traffic speed**;
- **road environment** (rural, level of road-side development, shop frontages, schools etc., impacts on residents),

30. Before introducing or changing a local speed limit, traffic authorities will wish to satisfy themselves that the expected benefits exceed the costs. Many of the costs and benefits do not have monetary values associated with them, but traffic authorities should include an assessment of the following factors:
    - collision and casualty savings;
    - conditions and facilities for vulnerable road users;
    - impacts on walking and cycling and other mode shift;
    - congestion and journey time reliability;
    - environmental, community and quality of life impact, such as emissions, severance of local communities, visual impact, noise and vibration; and
    - costs, including of engineering and other physical measures including signing, maintenance and cost of enforcement.

    The speed limit appraisal toolkit, found at section 5, will help assess the full costs and benefits of any proposed schemes.

31. Different road users perceive risks and appropriate speeds differently, and drivers and riders of motor vehicles often do not have the same perception of the hazards of speed as do pedestrians, cyclists and equestrians. The needs of vulnerable road users must be fully taken into account in order to

further encourage these modes of travel and improve their safety. Speed management strategies should seek to protect local community life.

32. In order to ensure compliance with a new lower local limit, as well as make it legally enforceable, it is important that the limit is signed correctly and consistently. Any new limit should also be accompanied by education and publicity and, where appropriate, effective engineering changes to the road itself. Without these measures, the new limit is unlikely to be fully complied with.

33. On rural roads there is often a difference of opinion as to what constitutes a reasonable balance between the risk of a collision, journey efficiency and environmental impact. Higher speed is often perceived to bring benefits in terms of shorter travel times for people and goods. However, evidence suggests that when traffic is travelling at constant speeds, even at a lower level, it may result in shorter and more reliable overall journey times, and that journey time savings from higher speed are often overestimated (Stradling *et al.*, 2008). The objective should be to seek an acceptable balance between costs and benefits, so that speed-management policies take account of environmental, economic and social effects as well as the reduction in casualties they are aiming to achieve.

34. Mean speed and 85th percentile speed (the speed at or below which 85% of vehicles are travelling) are the most commonly used measures of actual traffic speed. Traffic authorities should continue to routinely collect and assess both, but mean speeds should be used as the basis for determining local speed limits.

35. For the majority of roads there is a consistent relationship between mean speed and 85th percentile speed. Where this is not the case, it will usually indicate that drivers have difficulty in deciding the appropriate speed for the road, suggesting that a better match between road design and speed limit is required. It may be necessary to consider additional measures to reduce the larger than normal difference between mean and 85th percentile speeds or to bring the speed distribution more in line with typical distributions. The aim for local speed limits should be to align the speed limit to the conditions of the road and road environment.

36. The minimum length of a speed limit should generally be not less than 600 metres to avoid too many changes of speed limit along the route. In exceptional circumstances this can be reduced to 400 metres for lower speed limits, or even 300 metres on roads with a purely local access function, or where a variable 20 mph limit is introduced, for example outside a school. Anything shorter is not recommended. The length adopted for a limit will depend on the limit applied and also on the conditions at or beyond the end points. The terminal points of speed limits need to take account of the particular local circumstances, such as steep gradients, sharp bends, junctions, access roads, humpbacked bridges or other hazards, and also good visibility of the signs and an extension of the speed limit may be needed to ensure this.

37. For consistency within routes, separate assessments should be made for each length of road of 600 metres or more for which a different speed limit might be considered appropriate. When this is completed, the final choice of appropriate speed limit for individual sections might need to be adjusted to provide reasonable consistency over the route as a whole.

38. Occasionally it may be appropriate to use a short length of 40 mph or 50 mph speed limit as a transition between a length of road subject to a national limit and another length on which a lower limit is in force, for example on the outskirts of villages or urban areas with adjoining intermittent development. However, the use of such transitional limits should be restricted to sections of road where immediate speed reduction would cause risks or is likely to be less effective.

39. Speed limits should not be used to attempt to solve the problem of isolated hazards, for example a single road junction or reduced forward visibility such as at a bend, since speed limits are difficult to enforce over such a short length. Other measures, such as warning signs including vehicle activated signs, carriageway markings, junction improvements, superelevation of bends and new or improved street lighting, are likely to be more effective in addressing such hazards. Similarly, the provision of adequate footways can be a more effective means of improving pedestrian safety than lowering a speed limit over a short distance.

40. Where several roads with different speed limits enter a roundabout, the roundabout should be restricted at the same level as the majority of the approach roads. If there is an equal division, for example where a 30 mph road crosses one with a limit of 40 mph, the roundabout itself should take the lower limit.

SECTION 4: THE LEGISLATIVE FRAMEWORK

Key points

All speed limits, other than those on restricted roads, should be made by order under Section 84 of the Road Traffic Regulation Act 1984.

Any speed limits below 30 mph, other than 20 mph limits or 20 mph zones, require individual consent from the Secretary of State.

Unless an order has been made and the road is signed to the contrary, a 30 mph speed limit applies where there is a system of street lighting furnished by means of lamps placed not more than 200 yards apart.

Traffic authorities have a duty to erect and maintain prescribed speed limit signs on their roads in accordance with the Traffic Signs Regulations and General Directions 2002 (TSRGD 2002).

If traffic authorities wish to deviate from what is prescribed in signing regulations, they must first gain the Secretary of State's authorisation.

Traffic authorities are not permitted to erect different speed limit signs relating to different classes of vehicle.

Vehicle-activated signs must not be used as an alternative to standard static signing, but as an additional measure to warn drivers of a potential hazard or to remind them of the speed limit in force.

Main speed limit legislation

41. Most road traffic law pertaining to speed limits is contained in the Road Traffic Regulation Act 1984 (RTRA 1984). Other relevant legislation includes the Highways Act 1980, in particular Sections 90A-F concerning the construction and maintenance of road humps and Sections 90G-I concerning other traffic-calming works.

42. Part VI of the RTRA 1984 deals specifically with speed limits, with Sections 81-84 dealing with different speed limits and the speed limit order-making process. Section 82(1)(a) defines a restricted road in England and Wales as a road on which there is provided "a system of street lighting furnished by means of lamps placed not more than 200 yards apart". Section 81 makes it an offence for a person to drive a motor vehicle at a speed of more than 30 mph on a restricted road.

43. The establishment of speed limits is also a method through which legal sanctions can be brought to bear on those who exceed the limit set on a

particular road. It is therefore important to preserve carefully all records relating to the making and validity of a speed limit and speed limit signs.

44. All speed limits, other than those on restricted roads, should be made by order under Section 84 of the RTRA 1984. This includes the making of a 30 mph speed limit on an unlit road.

45. All speed limits other than the national limits are made by speed limit order. Traffic authorities should comply with their own consultation procedures and must, as a minimum, follow the full consultation procedure set out in legislation, before any new speed limit is introduced. More detail about these requirements is in Appendix A.

Restricted roads

46. Section 82(2) RTRA 1984 (as amended) gives traffic authorities powers to remove restricted road status, and give restricted road status to roads which are not restricted. However, the Department's policy on the use of this power is that it should be used only to reinstate restricted road status in those cases where a road which has a system of street lighting has previously had its restricted road status removed.

47. If a road with street lighting has a 40 mph limit and this is to be reduced to 30 mph, the 40 mph order under Section 84 should be revoked. Assuming the street lamps are no more than 200 yards apart, the road will be a restricted road by virtue of section 82(1)(a) RTRA. Similarly, where a speed limit of 30 mph is imposed by order under Section 84 because there is no street lighting, that order should be revoked if street lighting is subsequently provided. The Department considers that it is best practice for traffic authorities to make an order under section 84 RTRA to create a 30mph speed limit on an unlit stretch of road.

48. Any speed limits below 30 mph, other than 20 mph limits or 20 mph zones, require individual consent from the Secretary of State.

Street lighting

49. Direction 11 of the Traffic Signs Regulations and General Directions 2002 (TSRGD 2002), as amended, defines the requirements for the placing of speed-limit repeater signs. This states that speed-limit repeater signs cannot be placed along a road on which there is carriageway lighting not more than 183 metres apart and which is subject to a 30 mph speed limit. This direction applies regardless of how the speed limit has been imposed.

50. The Department will not make exceptions to this rule. This means it should be assumed that, unless an order has been made and the road is signed to the contrary, a 30 mph speed limit applies where there are three or more lamps throwing light on the carriageway and placed not more than 183 metres apart.

Speed limit signing

51. While increased understanding and acceptance of why a speed limit applies on a certain road will help compliance, drivers are aided by clear, visible and regular signing which enables them unhesitatingly to know what speed limit is in force.

52. Under Section 85 of the RTRA 1984 it is the duty of the traffic authority to erect and maintain prescribed speed limit signs on their roads in accordance with the Secretary of State's directions. The Traffic Signs Regulations and General Directions 2002 prescribe the designs and conditions of use for traffic signs, including speed limit signing, in England, Scotland and Wales.

53. Traffic authorities should generally follow these Regulations when signing speed limits. If a traffic authority wishes to deviate from what is prescribed, it must first obtain the Secretary of State's authorisation, and signing that is not in line with the Regulations must not be installed without such authorisation. Authorisation applications should be sent to the Department for Transport.

54. Speed limit signs which do not comply with the Regulations or which have not been authorised by the Secretary of State are not lawfully placed. Where the sign is not lawfully placed, no offence is committed by a person exceeding the signed speed limit and any prosecutions are likely to fail accordingly. Traffic authorities should therefore remove any unlawful signs, bring them into compliance with the Regulations or obtain authorisation to make them lawful.

55. Lower maximum speed limits apply on certain roads to certain traffic classes of vehicles. These are set out in Schedule 6 of the RTRA 1984 and in the Highway Code. Drivers of these vehicles are expected to be aware of this and follow these special limitations without having to be reminded by specific speed limit signs for particular vehicles. Traffic authorities are not permitted to erect different speed limit signs relating to different classes of vehicle.

56. Vehicle-activated signs (VAS), triggered by an approaching vehicle, have been developed to help address the problem of inappropriate speed. They must not be used as an alternative to standard static signing, but as an additional measure to warn drivers of a potential hazard or to remind them of the speed limit in force. VAS have proved particularly effective in rural areas, including at the approaches to junctions and bends. The Department has provided guidance in the form of Traffic Advisory Leaflet 1/03 (DfT, 2003).

57. The legislation does not prescribe the use of countdown markers on the approach to speed limit terminal signs, and research has shown that they generally have little or no effect on vehicle speeds and can add to sign clutter.

58. Chapter 3 of the Traffic Signs Manual (Department for Transport, 2008) provides guidance to local traffic authorities on best practice when signing speed limits. It includes tables and pictures to illustrate where speed limit signs should be placed. This complements TSRGD 2002, which sets out the mandatory requirements for signing.

Traffic Regulation Orders

59. Traffic Orders are required to legally implement speed limits and make them enforceable. Part VI of the Road Traffic Regulation Act (RTRA) 1984 deals specifically with speed limits and includes the powers under which Traffic Authorities may make speed limit orders.

60. The Local Authorities' Traffic Orders (Procedure) (England and Wales) Regulations 1996 sets out the procedure to be followed when making these (and other) orders. Traffic Authorities will need to comply with the consultation and publicity requirements before making an order, and with the publicity and traffic signing requirements once an order has been made.

61. Traffic Authorities may find it more efficient to produce speed limit orders for 20 mph zones or limits, or to introduce speed limit changes as a result of rural speed limit reviews where these cover a number of roads, through one order covering all those roads covered by the new speed limit. If they decide to proceed in this manner it is particularly important to ensure that the order is comprehensive and correct, and that the consultation and publicity is directed at those likely to be affected.

62. Further key pieces of legislation and regulations relating to speed limit, traffic-calming, camera and related signing are referred to in Appendix A.

SECTION 5: THE SPEED LIMIT APPRAISAL TOOL

This section will contain a description of the speed limit appraisal tool which will be launched later in 2012 and will be available on the DfT website.

The Tool is being designed to help local authorities assess the full costs and benefits of any proposed schemes and make robust, evidence-based decisions about which limits they put in place. It will include effects which cannot be monetised such as quality of life, as well as casualty and other traffic effects.

Local authority representatives and other interested parties are involved in its development and we issued a Call for Evidence, which closed on 30 April, to provide an opportunity for interested parties, including Local Authorities, road safety interest groups and academics, to submit relevant evidence on speed limit changes to assist in developing the tool.

Text on the Tool will be added to this section when its development has progressed further.

SECTION 6: URBAN SPEED LIMITS

Key points

Speed limits in urban areas affect everyone, not only as motorists, but as pedestrians, cyclists and residents. As well as influencing safety they can influence quality of life, the environment and the local economy.

Traffic authorities are encouraged to adopt the Institution of Highways and Transportation's[3] urban safety management guidelines (see IHT, 2003), in which road hierarchies are adopted that reflect a road's function and the mix of traffic that it carries.

The national speed limit on street lit roads is 30 mph.

Traffic authorities can, over time, introduce 20 mph zones or limits into:

- Major streets where business on foot is more important than slowing down road traffic and
- Lesser residential roads in cities, towns and villages, particularly where this would be reasonable for the road environment, there is community support and streets are being used by pedestrians and cyclists.

Where they do so, general compliance should be achievable without an excessive reliance on enforcement.

Roads suitable for a 40 mph limit are generally higher quality suburban roads or those on the outskirts of urban areas where there is little development. Usually, the movement of vehicles is the primary function.

In exceptional circumstances, 50 mph limits can be implemented on special roads and dual carriageways, radial routes or bypasses where the road environment and characteristics allow this speed to be achieved safely.

63. Urban roads by their nature are complex as they need to provide for safe travel on foot, bicycle and by motorised traffic. Lower speeds benefit all urban road users, and setting appropriate speed limits is therefore an important factor in improving urban safety. Traffic authorities are encouraged to adopt the urban safety management guidelines published by the Institution of Highways and Transportation (IHT, 2003), in which road hierarchies are adopted that reflect a road's function and the mix of traffic that it carries. Within this approach the principle should be to ensure that the appropriate traffic travels on the appropriate roads, and at an appropriate speed. This can help balance what can be competing demands for higher or lower speed limits.

[3] IHT are now called Chartered Institution of Highways and Transportation, CIHT.

64. It is on urban roads that the majority of road casualties occur, including 87% of all pedestrian and 83% of all pedal cyclists casualties (DfT, 2010). Collisions typically involve pedestrians and cyclists, including children, and knowledge of the relationship between vehicle speed and injury severity in any collision must inform decisions on speed limits. Research has shown that the risk of a pedestrian dying in a collision with a car increases slowly up to an impact speed of around 30mph, but at speeds above 30 mph the risk of death increases rapidly (Rosén and Sander, 2009).

65. The standard speed limit in urban areas is 30 mph, which represents a balance between mobility and safety factors. However, for residential streets and other town and city streets with high pedestrian and cyclist movement, local traffic authorities should consider the use of 20 mph schemes. On dual carriageways where the road environment and characteristics allow, traffic authorities can also implement 40 mph and, in exceptional circumstances, 50 mph limits. Generally, efforts should be made to promote the use of suitable routes for urban through traffic and to manage the speed of traffic requiring access to residential streets using traffic calming and associated techniques.

66. In many urban centres, main traffic routes often have a mixture of shopping, commercial and/or residential functions. These mixed priority routes are complex and difficult to treat, but the most successful measures have included speed management to keep speed at appropriate levels in the context of both 20 and 30 mph limits and a reassignment of space to the different functions, taking into account the needs of pedestrians, cyclists or equestrians. Sometimes a decision about a road's primary or most important function needs to be taken.

6.1 20 MPH SPEED LIMITS AND ZONES

67. 20 mph zones and limits are now relatively wide-spread, with an estimated over 2,000 schemes in operation in England, the majority of which are 20 mph zones.

68. **20 mph zones** require traffic calming measures (e.g. speed humps, chicanes) or repeater speed limit signing and/or roundel road markings at regular intervals, so that no point within a zone is more than 50 m from such a feature. In addition, the beginning and end of a zone is indicated by a terminal sign. Zones usually cover a number of roads.

69. **20 mph limits** are signed with terminal and at least one repeater sign, and do not require traffic calming. 20 mph limits are similar to other local speed limits and normally apply to individual or small numbers of roads but are increasingly being applied to larger areas.

70. There is clear evidence of the effect of reducing traffic speeds on the reduction of collisions and casualties, as collision frequency is lower at lower speeds; and where collisions do occur, there is a lower risk of fatal

injury at lower speeds. Research shows that on urban roads with low average traffic speeds any 1 mph reduction in average speed can reduce the collision frequency by around 6% (Taylor, Lynam and Baruya, 2000). There is also clear evidence confirming the greater chance of survival of pedestrians in collisions at lower speeds.

71. Important benefits of 20 mph schemes include quality of life and community benefits, and encouragement of healthier and more sustainable transport modes such as walking and cycling (Kirkby, 2002). There may also be environmental benefits as, generally, driving more slowly at a steady pace will save fuel and reduce pollution, unless an unnecessarily low gear is used. Walking and cycling can make a very positive contribution to improving health and tackling obesity, improving accessibility and tackling congestion, and reducing carbon emissions and improving the local environment.

72. Based on this positive effect on road safety, and a generally favourable reception from local residents, traffic authorities can, over time, introduce 20 mph zones or limits into:
    - Major streets where business on foot is more important then slowing down road and
    - Lesser residential roads in cities, towns and villages, particularly where this would be reasonable for the road environment, there is community support and streets are being used by pedestrians and cyclists.

73. Successful 20 mph zones and 20 mph speed limits are generally self-enforcing, i.e. the existing conditions of the road together with measures such as traffic calming or signing, publicity and information as part of the scheme, lead to a mean traffic speed compliant with the speed limit. To achieve compliance there should be no expectation on the police to provide additional enforcement beyond their routine activity, unless this has been explicitly agreed.

74. Evidence from successful 20 mph schemes shows that the introduction of 20 mph zones generally reduces mean traffic speed by more than is the case when a signed-only 20 mph limit is introduced. Historically, more zones than limits have been introduced.

75. A comprehensive and early consultation of all those who may be affected by the introduction of a 20 mph scheme is an essential part of the implementation process. This needs to include local residents, all tiers of local government, the police and emergency services and any other relevant local groups (including for example, groups representing pedestrians, cyclists, drivers, or equestrians). Further details about consultations are set out in Appendix A.

76. It is important to consider the full range of options and their benefits, both road safety and wider community and environmental benefits and costs, before making a decision as to the most appropriate method of introducing a 20 mph scheme to meet the local objectives and the road conditions.

20 mph zones

77. 20 mph zones are very effective at reducing collisions and injuries. Research has shown that overall average annual collision frequency may fall by around 60%, and the number of collisions involving injury to children may be reduced by up to two-thirds. Zones may also bring further benefits, such as a modal shift towards more walking and cycling and overall reductions in traffic flow, where research has shown a reduction by over a quarter (Webster and Mackie, 1996). There is no evidence of migration of collisions and casualties to streets outside the zone. (Grundy et al, 2008; Grundy et al, 2009).

78. 20 mph zones are predominantly used in urban areas, both town centres and residential areas, and in the vicinity of schools. They should also be used around shops, markets, playgrounds and other areas with high pedestrian or cyclist traffic, though they should not include roads where vehicle movement is the primary function. It is generally recommended that they are imposed over an area consisting of several roads.

79. A 20 mph zone is indicated by 20 mph zone entry and exit signs (TSRGD, diagrams 674 and 675). The statutory provisions (direction 16(1) TSRGD) require that no point within the zone must be further than 50 metres from a traffic calming feature (unless in a cul-de-sac less than 80 metres long).

80. The Department has recently made significant changes to facilitate and reduce the cost for providing 20 mph zones in England. Traffic authorities can now place any of the following:

    a) repeater speed sign (TSRGD diagram 670)
    b) a speed roundel road marking (TSRGD diagram 1065)
    c) or a combination of both of these signs
    d) traffic calming features

81. At least one traffic calming feature as defined in direction 16(2) TSRGD must be placed in a 20 mph zone and the features and signing must still be placed at intervals not greater than 100 metres: it is not the intention to remove physical features, but to ensure that the most appropriate measure is used to ensure the continuity of the zone. Local authorities should only consider placing the speed limit sign or a roundel marking, in addition to physical features within a zone, where speeds are already constrained to near the limit.

82. These new arrangements should significantly reduce the requirement for signing and traffic calming features. Traffic authorities can now incorporate wider areas within a 20 mph zone, by effectively signing 20mph speed limits on distributor roads where traffic calming features are not suitable, or for small individual roads or stretches of road, where mean speeds are already at or below 24 mph. Where a 20 mph zone leads into a 20 mph limit, it is important to use the correct signing to

indicate this. It is not appropriate to use the sign that indicates the end of a 20 mph zone and the start of a different, higher speed limit. Instead, a standard 20 mph terminal sign (TSRGD 2002, diagram 670) must be used.

20 mph speed limits

83. Research into signed-only 20 mph speed limits shows that they generally lead to only small reductions in traffic speeds. Signed-only 20 mph speed limits are therefore most appropriate for areas where vehicle speeds are already low. This may, for example, be on roads that are very narrow, through engineering or on-road car parking. If the mean speed is already at or below 24 mph on a road, introducing a 20 mph speed limit through signing alone is likely to lead to general compliance with the new speed limit.

84. 20 mph limits covering most streets in Portsmouth have demonstrated that it is possible to introduce large-scale 20 mph limits in some built-up environments. Traffic speeds in most of the streets treated were relatively low (less than 20 mph) to start with. The early evidence suggests that it is likely that some speed and casualty reductions have taken place and this is consistent with previous research that has indicated that 20 mph limits without traffic calming reduce mean speeds by about 1 mph on average. A minority of streets in Portsmouth had average speeds of 25 mph or higher before the 20 mph speed limits were introduced and here the reductions in average speed tended to be greater, but insufficient to make the resulting speeds generally compliant with the new 20 mph limits. City-wide schemes may also contribute to changing travel and driving behaviour positively in the longer run, and the objectives of the Portsmouth speed limits spread well beyond improving road safety. Schemes need to aim for compliance with the new speed limit.

85. The implementation of 20 mph limits over a larger number of roads, which the previous Speed Limit Circular (01/2006) advised against, should be considered where mean speeds at or below 24 mph are already achieved over a number of roads. Traffic authorities are already free to use additional measures in 20 mph limits to achieve compliance, such as some traffic calming measures and vehicle activated signs, or safety cameras. Average speed cameras may provide a useful tool for enforcing compliance with urban speed limits. Further work is required to ensure the technology is suitable for the specific conditions of urban roads with shorter distances between side streets and access roads.

86. A 20 mph speed limit is indicated by terminal speed limit signs, and amendments to TSRGD (January 2012) require at least one upright repeater speed limit sign to be placed. Traffic authorities should ensure sufficient repeater signs are placed to inform road users of the speed limit in force. Chapter 3 of the Traffic Signs Manual provides guidance on the placing of repeater signs.

87. Every English authority has a traffic sign authorisation which permits them to place a speed roundel road marking, without the requirement for an upright sign, to reduce unnecessary signing. These roundels can only be placed in addition to at least one upright speed limit repeater sign.

88. The amendments regulations to TSRGD (January 2012) have also provided thresholds below which speed repeater signs are no longer required by Direction 11 of TSRGD, but may still be placed if considered necessary. These thresholds are determined by carriageway length and the applicable speed limit.

89. Where traffic calming measures are placed, they should be signed in line with regulations (TSRGD 2002, diagram 557.1–4 and 883).

Variable 20 mph limits

90. Traffic authorities have powers to introduce 20 mph speed limits that apply only at certain times of day. These variable limits may be particularly relevant where for example a school is located on a road that is not suitable for a full-time 20 mph zone or limit, for example a major through road. To indicate these limits, variable message signs are available (TSRGD, Regulation 58). To reduce costs and sign clutter, the Department will consider authorising the placing of a single variable message sign on the approaching traffic lane (rather than signs on both sides of the road) on a case by case basis.

91. The Secretary of State has provided a special authorisation for every English traffic authority to place an advisory part-time 20mph limit sign, with flashing school warning lights. This can be a more cost-effective solution, where appropriate, and reduces the requirement for signing.

6.2 TRAFFIC CALMING MEASURES

92. Traffic calming involves the installation of specific physical measures to encourage lower traffic speeds. There are many measures available to traffic authorities to help reduce vehicle speeds and ensure compliance with the speed limit in force. These are required at regular intervals in 20 mph zones and may be used in 20 mph limits. As set out above, speed limit traffic signs and/or speed roundel markings can now also be used by traffic authorities in England.

93. The Highways (Road Humps) Regulations 1999, The Highways (Traffic Calming) Regulations 1999, and Direction 16 of TSRGD 2002 (as amended) give details of the traffic calming measures that meet the requirements for a 20 mph zone.

94. These calming measures range from more substantive engineering measures to lighter touch road surface treatments and include, for example:

- road humps;
- road narrowing measures, including e.g. chicanes, pinch-points or overrun areas;
- gateways;
- road markings; and
- rumble devices.

95. A recent review of 20 mph zone and limit implementation (Atkins, 2009) shows that the vast majority of traffic calming measures in use are speed humps, tables, cushions or rumble devices, so called vertical deflections, but traffic authorities will want to consider the full set of available measures.

6.3 40 MPH AND 50 MPH SPEED LIMITS

96. 30 mph is the standard speed limit for urban areas, but a 40 mph limit may be used where appropriate and, in exceptional circumstances, a 50 mph limit may be considered.

97. Roads suitable for 40 mph are generally higher-quality suburban roads or those on the outskirts of urban areas where there is little development. They should have good width and layout, parking and waiting restrictions in operation, and buildings set back from the road. These roads should, wherever possible, cater for the needs of non-motorised road users through segregation of road space. Alternatively, traffic authorities should consider whether there are convenient alternative routes available and ensure that any roads with a 40 mph limit have adequate footways and crossing places as necessary for pedestrians, cyclists or equestrians.

98. In exceptional circumstances a 50 mph limit may also be used on higher-quality roads where there is little or no roadside development and such speeds can be achieved safely. The roads most suited to these higher urban limits are special roads or those with segregated junctions and pedestrian facilities, such as primary distributors. They are usually dual carriageway ring or radial routes or bypasses that have become partially built up. Traffic authorities should, however, always assess the potential impact upon the local community and non-motorised road users before considering such a limit.

Table 1 Speed limits in urban areas – summary

Speed limit (mph)	Where limit should apply
20 (including 20 mph zone)	In streets that are primarily residential and in other town or city streets where pedestrian and cyclist movements are high, such as around schools, shops, markets, playgrounds and other areas, where vehicle movement is not the primary function.
30	In other built-up areas (where vehicle movement is

	deemed more important), with development on both sides of the road.
40	On higher quality suburban roads or those on the outskirts of urban areas where there is little development, with few cyclists, pedestrians or equestrians. On roads with good width and layout, parking and waiting restrictions in operation, and buildings set back from the road. On roads that, wherever possible, cater for the needs of non-motorised users through segregation of road space, and have adequate footways and crossing places.
50	On dual carriageway ring or radial routes or bypasses that have become partially built up, with little or no roadside development.

SECTION 7: RURAL SPEED MANAGEMENT

Key points

The national speed limit on the rural road network is 60 mph on single carriageway roads and 70 mph on dual carriageways.

Rural dual carriageways with segregated junctions and facilities for vulnerable road users would generally be suitable for 70 mph limits. However, a lower limit may be appropriate if, for example, a collision history indicates that this cannot be achieved safely.

In 2010, 68% of road deaths in Britain occurred on rural roads, and 49% of road deaths occurred on single rural carriageway roads subject to the National Speed Limit of 60 mph limit.

The speed limit on single carriageway rural roads should take into account the history of collisions, the road's function, existing mean traffic speed, use by vulnerable road users, the road's geometry and engineering, and the road environment including level of road-side development.

It is government policy that a 30 mph speed limit should be the norm in villages. It may also be appropriate to consider 20 mph zones and limits in built-up village streets.

It is recommended that the minimum length of a village speed limit should be 600 metres. However, traffic authorities may lower this to 400 metres, and in exceptional circumstances to 300 metres.

99. The vast majority of the rural road network is subject to the national speed limit of 60 mph on single carriageway roads, and 70 mph on dual carriageways. On many of these roads, the majority of drivers are travelling below – sometimes significantly below – the speed limit because of the characteristics of the roads. This is especially evident on the C and Unclassified roads where the geometric characteristics include many narrow roads, bends, junctions and accesses.

100. Rural roads account for 68% of all road deaths, and 82% of car occupant deaths in particular, but only around 42% of the distance travelled. Of all road deaths in Britain in 2010, 49% occurred on National Speed Limit rural single carriageway roads (DfT, 2010). The reduction in road casualties and especially deaths on rural roads is one of the key road safety challenges. Research has assessed the risk of death in collisions at various impact speeds for typical collision types on rural roads. This research suggests that the risk of a driver dying in a head on collision involving two cars travelling at 60 mph is around 90%, but that this drops

rapidly with speed, so that it is around 50% at 48 mph (Richards and Cuerden, 2009).

101. Inappropriate speed, at levels below the legal limit but above those appropriate for the road at the time (e.g. resulting from weather conditions or presence of vulnerable road users), is a particular problem for rural roads. *Exceeding the speed limit* or *travelling too fast for the conditions* are reported as contributory factors in 16% of collisions on rural roads. Specifically, inappropriate speed is recorded as a contributory factor in 20% of crashes on minor rural roads with a 60 mph limit.

102. Speed limit changes are therefore unlikely to fully address this problem and should therefore be considered only as one part of rural safety management. Where collision and casualty rates are high, traffic authorities should first seek to understand the particular types of crashes taking place and their causes, to allow them to choose effective solutions to reduce the risk.

103. To help in this process the *Accident Analysis on Rural Roads: A Technical Guide* (TRL, 2004) has been developed, which provides information on typical collision rates and typical proportions of different collision types on different types of rural road. This can be used to assess where there are above-average collision rates and provides help to traffic authorities in identifying the types of site or route specific intervention measures that might be appropriate to manage speeds and reduce collisions along the route.

104. Traffic authorities may wish to note the Road Safety Foundation's risk ratings for A roads in Britain. This rates the risk, based on frequency of death and serious injury in relation to amount of traffic on the particular road, into five categories ranging from low-risk, safe roads to high-risk roads.[4]

105. The Road Safety Foundation has assessed the safety of the trunk road network, assessing the protection levels that the design and engineering features of roadsides, medians and junctions on these roads offer in case of a crash. This assessment uses a star-based European Road Assessment Programme (EuroRAP) Road Protection Score, and has found that two-thirds of single carriageway trunk roads achieve only a 2-star (out of 4) rating. Even though this assessment has only been applied to trunk roads it suggests that engineering measures may often be more appropriate to manage speed and reduce collisions on rural single carriageway roads.

106. If high collision rates persist despite these measures, then lower speed limits may also be considered. Again, to achieve a change in motorists' behaviour and compliance with the limit, supporting physical measures, driver information and publicity or other measures are likely to be required.

[4] Please see www.eurorap.org for detailed maps.

Such measures could include, for example, the use of vehicle-activated signs (VAS), which have proved particularly effective at the approaches to isolated hazards, junctions and bends in rural areas (Winnett and Wheeler, 2003). There should be no expectation on the police to provide additional enforcement to ensure compliance with a new limit beyond their routine activity, unless this has been explicitly agreed.

107. The aim of speed management actions is to deliver a balance between safety objectives for all road users and mobility objectives to ensure efficient travel, as well as environmental and community outcomes. So every effort should be made to achieve an appropriate balance between actual vehicle speeds, speed limits, road design and other measures. This balance may be delivered by introducing one or more speed management measures in conjunction with the new speed limits, and/or as part of an overall route safety strategy.

108. While routine enforcement should normally only be considered after other speed management measures have been considered, there may be occasions where the use of average speed cameras may offer a solution through calming traffic speed over a stretch of road. The Department has received a small sample of evaluation data of average speed cameras at non-roadworks sites from some local partnerships, and this data suggests a reduction in the percentage of motorists exceeding the speed limit from 55% before installation of cameras, to 18% afterwards, and an average reduction of killed and seriously injured casualties (KSI) per km of around 69%, and of personal injury collisions (PIC) of around 38%, (not adjusted for national trends and regression to mean effect).[5]

7.1 DUAL CARRIAGEWAY RURAL ROADS

109. Dual carriageway roads with segregated junctions and separate facilities for vulnerable road users are generally subject to and suitable for the National Speed Limit of 70 mph. However, a lower limit may be appropriate if, for example, a collision history indicates that this speed cannot be achieved safely and this risk of collisions cannot be addressed through other engineering measures.

7.2 SINGLE CARRIAGEWAY RURAL ROADS

110. In most instances, consideration of collision history, road function, mix of road users including presence of vulnerable road users, road geometry, engineering and environment, and actual traffic speed should enable traffic authorities to determine the appropriate limit on single carriageway rural roads.

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[5] Comprehensive before and after data were obtained for 11 permanent average speed camera sites on A roads with speed limits of 40, 50, 60, and 70 mph, where safety cameras were installed between 2000 and 2006, based on an informal data request. It should be noted that this is not a representative sample, has not been centrally and independently validated and should therefore only be seen as indicative of possible effects of average speed cameras.

111. Roads may have primarily either a through traffic function or a local access function. Both need to be provided safely. Mobility benefits will be more important for roads with a through-traffic function, while environmental and community benefits are likely to be of greater importance for the local access roads.

112. There may be many roads below A and B classification that serve a mixed through-traffic and access function. Where that traffic function is currently being achieved without a high collision rate, these roads should be judged as through-traffic roads. If, however, for all or parts of these roads there is a substantial potential risk to vulnerable road users, these sections should be assessed as roads with a local access function.

113. Within routes, separate assessments should be made for each section of road of 600 metres or more for which a separate speed limit might be considered appropriate. When this is completed, the final choice of appropriate speed limit for individual sections might need to be adjusted to provide consistency over the route as a whole.

114. The choice of speed limits should take account of whether there is substantial roadside development and whether the road forms part of a recognised route for vulnerable road users.

115. Table 2 sets out recommended speed limits for roads with a predominant traffic flow function. If walking, cycling, horse riding, community or environmental factors are particularly important on any road section, consideration should be given to using the lower limit.

Table 2 Speed limits for single carriageway roads[6] with a predominant traffic flow function

Speed limit (mph)	Where limit should apply:
60	Recommended for most high quality strategic A and B roads with few bends, junctions or accesses.
50	Should be considered for lower quality A and B roads that may have a relatively high number of bends, junctions or accesses. Can also be considered where mean speeds are below 50 mph, so lower limit does not interfere with traffic flow.
40	Should be considered where there are many bends, junctions or accesses, substantial development, a strong environmental or landscape reason, or where there are considerable numbers of vulnerable road

[6] For speed limits in villages, please refer to Section 7.3.

	users.

116. For C and Unclassified roads with important access and recreational function, the following speed limits are deemed appropriate and traffic authorities should use these as guidance when reviewing the speed limits on these roads:

- The national speed limit of 60 mph is only appropriate for the best quality C and Unclassified roads with a mixed (i.e. partial traffic flow) function with few bends, junctions or accesses. In the longer term, these roads should be assessed against through-traffic criteria. For lower quality C and Unclassified roads with a mixed function and high numbers of bends, junctions or accesses 50 mph may be appropriate.
- A speed limit of 40 mph may be considered for roads with a predominantly local, access or recreational function, for example in national parks or areas of outstanding natural beauty (AONB), or if it forms part of a recommended route for vulnerable road users. It may also be appropriate if there is a particular collision problem.

117. It is important to note that the above does not imply that speed limits should automatically be reduced. Indeed, in some cases the assessment may suggest that the existing speed limit may be too low, and a higher speed limit should be considered, as it is likely to be achievable safely.

118. We would welcome applications for zonal rural speed limits, usually 40 mph zones, for example in national parks or AONBs or on other networks of minor rural roads where speeds are already in line with such a limit. Such zones would include entry treatment and painted repeater roundels. The Department is keen to consider the effectiveness of such zones in reducing speeds and signing requirements.

7.3 VILLAGES

119. Fear of traffic can affect people's quality of life in villages and it is self-evident that villages should have comparable speed limits to similar roads in urban areas. It is therefore government policy that a 30 mph speed limit should be the norm in villages.

120. Traffic Advisory Leaflet 01/04 (DfT, 2004) sets out policy on achieving lower speed limits in villages, including a broad definition of what constitutes a village. For the purpose of applying a village speed limit of 30 mph, a definition of a village can be based on the following simple criteria relating to frontage development and distance:

- 20 or more houses (on one or both sides of the road); and
- a minimum length of 600 metres.

121. If there are just fewer than 20 houses, traffic authorities should make extra allowance for any other key buildings, such as a church, shop or school.

122. The above criteria should give adequate visual message to drivers to reduce their speed. It is recommended that the minimum length for the new limit is at least 600 metres to avoid too many changes in speed limits along a route, and to aid compliance. Traffic authorities may, however, lower this to 400 metres when the level of development density over this shorter length exceeds the 20 or more houses criterion and, in exceptional circumstances, to 300 metres.

123. In some circumstances it might be appropriate to consider an intermediate speed limit of 40 mph prior to the 30 mph terminal speed limit signs at the entrance to a village, in particular where there are outlying houses beyond the village boundary or roads with high approach speeds. For the latter, traffic authorities might also need to consider other speed management measures to support the message of the speed limit and help encourage compliance so that no enforcement difficulties are created for the local police force. Where appropriate, such measures might include a vehicle-activated sign, centre hatching or other measures that would have the effect of narrowing or changing the nature and appearance of the road.

124. Where the speed limit commences at the village boundary, the village nameplate sign (prescribed in diagram 2402.1 of TSRGD 2002) and speed limit roundel may be mounted together. The combined sign should be located at the point where the speed limit starts, and it may be helpful if drivers can see housing at the same time as the signs, reinforcing the visual message for reduced speed.

125. If there are high approach speeds to a village, or the start of the village is not obvious, village gateway treatments can also be an effective way to slow drivers down. Advice can be found in Traffic Advisory Leaflets 13/93 *Gateways* (DoT, 1993a), 01/94 *VISP – A Summary* (DoT, 1994a) and 01/04 *Village Speed Limits* (DfT, 2004).

126. It may also be appropriate to consider 20 mph limits or zones in built-up village streets which are primarily residential in nature, or where pedestrian and cyclist movements are high. Such limits should not, however, be considered on roads with a strategic function or where the movement of vehicles is the primary function.

127. In situations where the above criteria for a village are not met and there is a lesser degree of development, or where engineering measures are not practicable or cost-effective to achieve a 30 mph limit, but a reduction from the national 60 mph speed limit is considered appropriate, traffic authorities should consider alternative lower limits of 40 or 50 mph.

128. A recommendation to use the framework for the assessment of speed limit options on rural single carriageway roads, in place since the publication of the previous Speed Limit Circular (01/2006), is withdrawn.

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APPENDIX A: KEY PIECES OF SPEED LIMIT, SIGNING AND RELATED LEGISLATION AND REGULATIONS

1. Key speed limit, safety camera, and traffic calming signs diagrams in Traffic Signs Regulations and General Directions, (TSRGD) 2002 include:

    - diagram 670 – 'Maximum speed limit' sign
    - diagram 671 – 'National speed limits apply'
    - diagrams 674 and 675 – 20 mph 'Speed limit zone' signs
    - diagrams 878, 879 and 880 – 'Camera warning' signs
    - diagram 883 – 'Traffic calmed area' sign
    - diagram 1062 – 'Road hump' marking
    - diagram 1065 – Carriageway roundel road marking
    - diagram 2402.1 and 2403.1 – Town or village gateway sign (boundary sign) (may be combined on the same post or backing board with a speed limit sign)
    - diagram 7032 – Temporary 'New 30 mph speed limit' sign
    - diagrams 557.1 to 557.4 – 'Road hump' signing

2. The main directions for the use and placing of speed limit restrictions in TSRDG 2002 are:
    - directions 8 and 9 – Beginning of speed limit restrictions
    - direction 10 – Ending of speed limit restrictions
    - direction 11 – Placement of speed limit repeater signs
    - direction 16 – Speed limits of 20 mph
    - directions 41 and 42 – Mounting and backing of signs.

3. Further detailed advice on the form and siting of speed limit signs is given in Chapter 3 of the Traffic Signs Manual (DfT, 2008).

<u>Speed Limit Orders</u>

4. Part IV of the Road Traffic Regulation Act (RTRA) 1984 deals specifically with speed limits and sections 81-84 deal with different speed limits and the speed limit order-making process. Local Authorities' Traffic Orders (Procedure) (England and Wales) Regulations 1996 sets out the process of making traffic orders, which includes speed limit orders. Traffic authorities will need to refer to these Regulations in full. They set out the persons and organisations to be consulted before traffic orders are made, listed in the table below.

> **"Consultation**
> **6.**—(1) An order making authority shall, before making an order in a case specified in column (2) of an item in the table below, consult the persons specified in column (3) of the item.

TABLE

(1) *Item*	(2) *Case*	(3) *Consultee*
1.	Where the order relates to, or appears to the order making authority to be likely to affect traffic on, a road for which another authority is the highway authority or the traffic authority	The other authority
2.	Where the order relates to, or appears to the order making authority to be likely to affect traffic on, a Crown road	The appropriate Crown authority
3.	Where the order relates to, or appears to the order making authority to be likely to affect traffic on, a road subject to a concession	The concessionaire
4.	Where the order relates to, or appears to the order making authority to be likely to affect traffic on, a road on which a tramcar or trolley vehicle service is provided	The operator of the service
5.	Where the order relates to, or appears to the order making authority to be likely to affect traffic on,- (a) a road outside Greater London which is included in the route of a local service; or (b) a road in Greater London which is included in the route of a London bus service	In case (a) the operator of the service In case (b) the operator of the service and Transport for London
6.	Where it appears to the authority that the order is likely to affect the passage on any road of- (a) ambulances; or (b) fire-fighting vehicles	In case (a) the chief officer of the appropriate NHS trust or NHS Foundation Trust In case (b) the fire and rescue authority
7.	All cases	(a) The Freight Transport Association (b) The Road Haulage Association (c) Such other organisations (if any) representing persons likely to be affected by any provision in the order as the order making authority thinks it appropriate to consult

5. The regulation also sets out the requirements for publication of the proposal before making an order through a notice and further adequate publicity.

Consultation for traffic calming measures

6. Full consultation must take place before any traffic calming measures are installed. For road humps, the process is outlined in The Highways (Road Humps) Regulations 1999 (SI 1999 No. 1025) as follows (Regulation 3):

   "Where the Secretary of State or a local traffic authority proposes to construct a road hump, he or they shall, as well as consulting the chief officer of police as required by section 90C(1) of the Act, also consult -
   (a) where the proposal is by the local traffic authority in England which is the council of a County, any district council in whose district the highway is situated;
   (b) in all cases, the chief officer of the fire brigade for the area in which the highway concerned is situated and the chief officer of any body providing ambulance services under the National Health Service Act 1977**(a)** and operating in that area;
   (c) in all cases, organisations appearing to him or them to represent persons who use the highway to which the proposal related, or to represent persons who are otherwise likely to be affected by the road hump."

Section 90C re requirements re consultation periods, dealing with objections and the publication of notices

7. For all other traffic calming, the consultation process is outlined in The Highways (Traffic Calming) Regulations 1999 as follows (Regulation 4):

   "Where a traffic authority proposes to construct a traffic calming work in a highway they shall –
   (a) consult the chief officer of police for the area in which the highway is situated; and
   (b) consult such persons or organisations representing persons who use the highway or who are otherwise likely to be affected by the traffic calming work as the traffic authority thinks fit."

8. It should be noted that, despite there being no requirement to consult all the emergency services for traffic calming measures other than road humps, it is strongly recommended that both the ambulance service and the Fire and Rescue Service are included in any consultation for all traffic calming as a matter of course.

Report on 20mph Guidelines

1. Purpose

To update members as requested on the draft '20mph Guidelines' produced by the Road Safety Partnership, in consultation with Gloucestershire Highways.

The aim of the Guidelines is to establish a robust framework for determining the selection of potential 20 mph zones, to feed into the Priority Assessment System.

2. Context

In April 2009 the Government published a consultation document on its road safety strategy beyond 2010; this proposed changing guidance to local authorities, recommending the introduction of 20mph limits within built up areas and around schools, shops, markets, playgrounds and other areas where pedestrian and cyclist movements are high.

3. Methodology & Progress

Existing national and local research was used as a source for these Guidelines and the approach to setting criteria for selecting possible sites is fully detailed in the Guidelines.

The draft Guidelines have been taken to the Lead Cabinet Member for comment and initial amendments made. The next step is review by Environment Scrutiny.

4. Summary

These guidelines will provide officers with a framework to determine whether the introduction of a 20mph zone is the appropriate solution to casualty reduction on a stretch of road or wider area, taking into consideration the type and number of casualties, the surrounding environment and existing vehicle speeds. Schemes successfully identified using the guidelines would then go forward to be priority assessed against other schemes within the overall capital budget constraints.

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Attachment
20mph Guidelines document

20 mph Zone Guidelines

Gloucestershire County Council guidance for the prioritisation and implementation of 20 mph Zones

189-725

Section 1 -Purpose and Background

1.1 Purpose

The purpose of this document is to provide guidance to Officers on the appropriate selection of areas for implementation of 20 mph zones. These zones can be an effective way of reducing vulnerable road user casualties; however it should be noted that they are highly dependent upon their suitability using the criteria outlined on page 7. The selection process will be led by priority assessment and subject to capital funding.

To summarise, the priority sites for 20 mph zones will have:

- An existing speed limit of 30 mph
- Current speeds of around 24 mph or less
- A high number of accidents
- A ranking in the latest priority list
- A high percentage of accidents involving vulnerable road users particularly children
- Local amenities and well used crossing points

If the above criteria are met the scheme will score well in priority assessment increasing the likelihood that funding will be made available, therefore contributing to casualty reduction targets.

This selection process does not replace the priority assessment system, but will act as a filter to ascertain which schemes are likely to be successful in obtaining funding.

1.2 Background

The use of 20 mph speed limit zones was initially intended to address the serious problem of child pedestrian accidents occurring in and around residential areas. 20 mph zones are now no longer confined to residential areas, they are used widely in town centres and their application can sometimes find benefits in rural areas. Research has shown that the risk of a child being involved in an accident has reduced by around two-thirds where 20 mph zones have been installed. The Department for Transport will be amending their guidance on speed limits, recommending that highway authorities, over time, introduce 20 mph zones or limits into streets that are primarily residential in nature and which are not part of any major through route.

Section 2 - Research Findings

The following documents have been studied:

2.1 DfT - A Safer Way

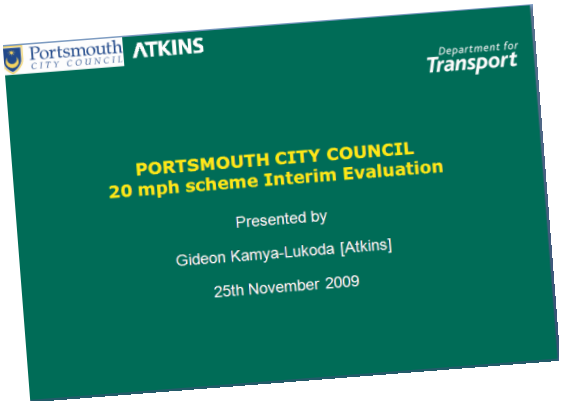
In April 2009 the Government published a consultation document on its road safety strategy beyond 2010; this proposed changing its guidance to local authorities, recommending the introduction of 20 mph limits within built up areas and around schools, shops, markets, playgrounds and other areas where pedestrian and cyclist movements are high. Research suggests that a pedestrian struck at 30 mph will have about a 1 in 5 chance of being killed. At 20 mph the chance of a pedestrian dying is 1 in 40.

From 'A Safer Way', it was demonstrated that there is a link between climate change and obesity. Both these issues are at the heart of Gloucestershire County Council aims. The provision of more 20mph speed limits will lead to more cycling, resulting in a healthier population and reduced deaths linked to obesity. The health benefits of cycling outweigh the risk of death by 20:1 as demonstrated by comparison between UK and Netherlands. In addition, this guidance supports the 'Children's Plan', released Dec 2007 by Department for Children, Schools and Families which included a recommendation to encourage local authorities to create 20 mph zones, where appropriate, because they can reduce child pedestrian deaths by 70% (Building Brighter Futures).

2.2 The Portsmouth Model

Portsmouth City Council (PCC) was the first local authority in England to implement an extensive area-wide 20 mph speed limit scheme, covering the majority of its residential roads using just speed limit signing alone. PCC has now introduced 20 mph speed limits on 410km of its 438km road network (94% of the length of its city roads).

The new speed limit, designed to protect pedestrians and cyclists in residential roads, became city-wide at the end of March 2008.



This was achieved following extensive public consultation and partnership working with the police, fire and Portsmouth's PFI contractors Colas, and the provision of gateways (terminal signing and 20 mph roundels) marked on the carriageway and repeater signs.

On most of the roads where the speed limit signs and road markings were installed, the average

speeds before installation were less than or equal to 24 mph. The relatively low speeds on these roads before the scheme implementation were mainly attributable to narrow carriageways and on-street parking which reduce the effective width.

20 mph signs were also provided on roads within the sectors with median speeds greater than 24 mph in order to avoid inconsistency in the signed speed limits.

The aim was to ensure that the scheme was self-enforcing so as to avoid the need for extra police enforcement. The cost of implementing the scheme was £0.57million which came from the LTP capital expenditure programme. The 1 year post completion data compared to the average of three years before found that;

- On average all traffic speeds decreased by 0.9 mph.
- In areas where the average speed before was greater than 24 mph the speeds reduced by 7 mph. (This is the collective average)
- There was a total accident reduction of 13% and a reduction in casualties of 15%.

An evaluation study that takes account of 3 years of “after” data (2011/2012) to monitor the long-term impacts of the 20 mph scheme in PCC will offer stronger evidence of outcomes.

2.3 Manual for Streets

The manual was published in 2007 and aimed to radically change the designers' and local authorities' approach to residential street design for the better. It emphasised that streets should be places in which people want to live and spend time in, and are not just transport corridors. In particular, it aims to reduce the impact of vehicles on residential streets by asking practitioners to plan street design intelligently and proactively, and gives a high priority to the needs of pedestrians, cyclists and users of public transport.

'Manual For Streets' recommends designing a layout that keep speeds at or below 20 mph i.e. reduced stopping sight distances, tight corners and the provision of traffic calming. Where average speeds within the area considered are above 24 mph speed controlling features will be required, at intervals no greater than 70m to achieve a reduction in speeds. Engineering measures contribute considerably in the reduction of average speeds and reduction in accidents through traffic calming interventions. The absence of centre lines can encourage lower speeds although the effective life of this measure is unknown (local residents/frequent users of the route will become familiar and it is likely speeds will return to original).

2.4 Behave Yourself-Road Safety Policy

The Parliamentary Advisory Council for Transport Safety has found that a 1 mph reduction in average speed leads to a 5% reduction in injury accidents.

Section 3 Local Evidence and Research

3.1 Gloucestershire's 20 mph Zones - Results

A study was carried out on a sample (27) of existing 20 mph zones in Gloucestershire to assess what level of casualty reduction had been achieved (this has taken into account the County wide impact of other safety measures). The key findings are as follows:

- The average casualty saving for a 20 mph zone in the sample is 13%.
- A large number of zones have been introduced in rural areas where there were no recorded injuries within 3-years pre-scheme. Half of these zones have since seen casualties go up in the 3 years following installation.
- The average saving for a 20mph zone which, in the 3-year pre-scheme period had recorded casualties is, 41.1%.
- The greatest casualty saving for a 20 mph zone is 83%.

Summary: If introduced at the appropriate location this study shows that a 20 mph zone can be an effective way of reducing the number of casualties in Gloucestershire.

3.2 Linking 20mph Guidance to the Priority Lists (formally Hotspot Lists)

The new priority list for areas/wards will lead the way in identifying where our priority sites are and therefore where our resources should be focussed. The priority list incorporates many data sets to demonstrate where a road user is exposed to a higher level of risk, and where potentially a 20 mph zone is best suited. The data sets include:

- Number of accidents
- Severity of injury
- Population
- Size of Area

These can be prioritised in order of:

- Number of accidents
- Severity Ratio
- Accidents per year per 10,000 population (exposure to risk)

Each year the top 20 wards will be investigated to see if any accident patterns or trends exist, and what interventions can be introduced to reduce the number of accidents. As these areas will be predominantly made up of low speed, built up catchments, area based treatments will steer towards 20 mph zones.

The new priority list for areas/wards as well as ranking by accidents and severity, links the number of accidents with the population of each ward by showing the accidents per year per 10,000 population and ranking accordingly. This data can be used as a starting point for research into which wards would benefit from a lower speed limit in conjunction with the types of accidents and patterns identified.

3.3 Linking with the Speed Limit Review

In accordance with DfT requirements a review of existing speed limits has been undertaken on the County's A and B road network. The results have shown that the vast majority are set at appropriate limits. Whilst simply replacing one limit with a slightly lower limit may, in a very few instances, result in a minor speed reduction this is not normally the case. This is why, for any level of Police support and enforcement, it should be clear to the average driver why they are being instructed to reduce speeds.

The review has highlighted the need for consistency when setting speed limits. Whilst there maybe isolated sections or individual hazards of route that may benefit from a lower limit, it is the overall route that needs to be considered in order to avoid constantly changing limits.

The speed limit review looks at single lengths along the principal network, whereas the 20 mph zone guidelines focus on areas which are predominantly off the principal network.

The road safety audit team is happy to advise project managers on the appropriateness of a road safety audit on any proposed 20 mph zone.

Section 4 - Criteria

20 mph zones are most appropriate in areas where an urban safety strategy has been developed and in areas where there is no through route. The road network within the zone should generally consist of access roads, but the inclusion of some local distributor roads may be acceptable. They are most suited to residential areas and shopping streets however the following criteria will assist an Officer in identifying its appropriateness at any location.

The greatest benefits are likely to be achieved in areas where there are accidents involving pedestrians particularly children. These areas should be given a higher priority than others in safety strategy plans. The existing traffic speeds need to be fairly low to start with (24 mph or less), any greater than this and the 20 mph speed limit may have little or no effect, without additional measures.

4.1 Accidents

The site should have an accident score of at least 6 within the proposed zone area, using the most recent 3 years of accident data (taken from injury accident database). The weighted score should be applied to accident injury severity as detailed below:

Injury Severity:	Score
Fatal	5
Serious	3
Child (<24) ped/cycle - Slight	2
Slight	1

For example, a site with three recorded slight injuries and one serious over the preceding 3-years would meet this particular criterion. A weighted score of 6 would ensure that the location has a real accident risk associated with it and not a perceived one.

It should be noted that when it comes to assessing accident type, officer discretion should be used in relation to the specifics of the why the accident happened (i.e. was it speeding / drunk driver etc) and what impact this has on the assessment. For a 20 mph zone to score as a priority, you must demonstrate its ability to reduce the number of casualties.

This information and its analysis should be requested from the Road Safety Partnership Research and Evaluation Team.

4.2 Speeds

The Department for Transport - Circular Roads 1/93 advises that if the observed 85th percentile speed is within 7 mph or 20% of the proposed limit, the new limit may be introduced. For 20 mph speed limits it is recommended that the 20% figure is applied.

The Portsmouth model revealed that in some areas where the 85th%ile speed of vehicles was greater than 24mph, speeds reduced by 7mph without the provision of traffic calming measures.

Different roads will inevitably have different vehicle speeds, therefore thought should be given to implementing a range of measures within a zone area. If however any particular roads have an 85th%ile speed of greater than 30 mph, speed reducing measures must be considered at the early stages of scheme development.

Measured speeds	**Early considerations**	**Score**
Existing 85th%ile speeds 24 mph or less.	20 mph gateways.	5
Existing 85th%ile speeds between 25 mph and 30 mph.	20 mph gateways, coloured surfacing and 20 mph repeater signs. Consider the appropriateness of traffic calming.	3
Existing 85th%ile speeds between 30 mph and 35 mph.	Phase 1 - Traffic calming prior to the introduction of a 20 mph zone. Phase 2 - 20 mph zone	1
Existing 85%ile speed over 35 mph.	Consider traffic calming scheme.	0

4.3 Environment

The site should have an environmental weighted score of at least 4 within the zone. The weighting policy is detailed below:

Environmental concern:	Score
School/College/Nursery(s) / Nursing Homes	2
Community facility(s) (local shop/church/village hall etc)	2
High levels of cycling/walking	2
Well used formal / informal crossing point(s)	1
Vulnerable users / insufficient footway	1
Parks	1

For example, a village with a school and a well-used crossing point would score 4 and meet this particular criterion (4 points).

4.4 Population

For priority assessment purposes it would not be feasible to include population statistics in the process due to the varied nature and extent of the schemes assessed, but the scoring does take into account the number of child pedestrian and cycle casualties, safer routes to school, whether the scheme will improve accessibility for vulnerable groups and the effect on cycle journeys. All these factors are linked favourably to slower speeds.

4.5 Forecasting Priority Assessment

The following guide gives you an indication as to how well a proposed scheme will score in priority assessment. Note: The final score is largely dependent upon its cost/benefit ratio.

Score	Priority
30 >	High
21-30	Medium
11-20	Low - Medium
0-10	Low

Section 5 – Prioritisation, Funding and Enforcement

5.1 Priority Assessment

The purpose of the guidelines is to give officers and early indication of how much of a priority a zone would be in line with our priority assessment system. The criteria mean that only accident reduction schemes will score well and this is true to priority assessment.

The priority assessment process is an independent evaluation co-ordinated by The Works Programme Manager with some input by the Research and Evaluation Team. All schemes are scored on the number of accidents, accessibility, quality of life, congestion and the effect on public transport.

All proposed schemes will be submitted through the County Council's priority assessment system. The priority assessment form should be filled in by the scheme manager and must have all the required fields completed as accurately as possible. The essential fields for ensuring the 20 mph zone will have the best chance of scoring well are:

- Scheme costs including any contributions
- Scheme description/detail with area plan
- The level of support for the scheme
- Proposed accident savings (these will be calculated by the Road Safety Partnership)
- The number of users who will benefit from the improvements
- Any added value

Only schemes which are considered a priority will receive Capital funding, and each year the proposed scheme programme is submitted to Members for final approval. Normal timescales for identification and installation of a 20 mph zone would most likely be based on a 2-year programme.

Note: the highest scoring and therefore greatest priority schemes will have good or significant casualty savings.

5.2 The Financial Implications of Road Accidents

Highways Economics Note 1 or HEN 1 gives us values for calculating the total accident costs.

This approach encompasses all aspects of the valuation of casualties including the human costs and the direct economic costs i.e. an amount to reflect the pain, grief and suffering and the lost output and medical costs associated with road accident injuries.

The values for the prevention of fatal, serious and slight casualties include the following elements of cost:

- Loss of output due to injury. This is calculated as the present value of the expected loss of earnings plus any non-wage payments (national insurance contributions, etc.) paid by the employer.
- Ambulance costs and the costs of hospital treatment.
- Human costs, based on willingness to pay values, which represent pain, grief and suffering to the casualty, relatives and friends, and, for fatal casualties, the intrinsic loss of enjoyment of life over and above the consumption of goods and services.

The latest figures from the Department of Transport based on June 2007 costs (issued April 2009) state the average value of prevention per casualty is:

- Fatal £1,638,390
- Serious £185,220
- Slight £14,280

These costs are reflected in the weighting within the injury severity score.

5.3 Enforcement and Safety Audit

20 mph speed limits without self-enforcing features have the attraction of being relatively inexpensive to implement. However, regard must be given to the 'before' speeds, because the higher they are the less likely speeds will be reduced to 20 mph. It will be important that the local police are consulted at the outset, to obtain an understanding of the level of enforcement that could be applied. Due to the criteria (see section 3) that should be met before a 20 mph zone or limit is introduced it should be self enforcing, therefore requiring no additional enforcement outside the norm.

Traffic Regulation Orders (TRO's), the legal document which authorises speed limits, are held at Gloucestershire Highways within the Asset Management Team.

Section 6 - Design Guidelines

The zone should consist of a gateway at the entrances including signing, coloured entry panel and narrowings. Within the zone, if existing features count as traffic calming, such as tight radii, mini roundabouts, narrowings etc and recorded 85th%ile speeds are or can be brought down to 24 mph or below, no further signing or features will be required.

Thorough consultation with local residents, schools and shop owners should be carried out to ensure that everyone is happy with the design. The final design may be of the traditional style with features every 50-60m and signs only at the gateway or a combination of signing and traffic calming features.

Once it is established that the proposed 20 mph zone meets the aforementioned criteria, scores well through priority assessment and receives Capital funding, a 20 mph speed limit can be progressed (Note: a high score achieved using the guidelines does not guarantee Capital funding).

6.1 Design Guidelines

Toolbox

Variables: size of zone, speed of traffic, level presence required, rural areas etc.

Scenario	Measured Speeds	Engineering Measures Required	Engineering Measures Optional
A	Existing 85th%ile speeds 20 mph or less.	• 20 mph zone signs • Gateway panel	• Planters or gateway structures • Countdown Markers • Name Plate • Removal of Centre Lines
B	Existing 85th%ile speeds 24 mph or less.	• 20 mph zone signs • Gateway panel • Road Narrowing	• Planters or gateway structures • Countdown Markings • Name Plate • Removal of Centre Lines
C	Existing 85th%ile speeds between 25 mph and 30 mph.	• 20 mph zone signs • Gateway panel • Road Narrowing • Countdown Markings	• Traffic Calming • Coloured road surfacing with roundels • Planters or gateway structures • Name Plate • Removal of Centre Lines
D	Existing 85th%ile speeds between 30 mph and 35 mph.	• 20 mph zone signs • Gateway panel • Road Narrowing • Countdown Markings • Traffic Claming	• Raised platform gateway • Planters or gateway structures • Name Plate • Removal of Centre Lines
E	Existing 85%ile speed over 35 mph.	• Speeds too high	

6.2 Traffic Calming Features

Traffic calming features include mini-roundabouts, road closures, horizontal deflections such as narrowings, build-outs, traffic islands and chicanes, vertical deflection such as road humps, speed cushions, raised junctions and speed tables, staggered parking, central reservations, coloured road surfacing, priority working system, planting, and cycle lanes.

6.3 Urban and Rural Environments

It should be noted that urban and rural environments can present different challenges and opportunities when considering a 20 mph zone. In most cases, zones will be suited to urban environments where the cross over from one speed limit to another will be gradual, appropriate and at no major inconvenience to the road user.

6.4 Branding and Colour Psychology

Coloured road surface treatment is a familiar sight on our highway network. It has been used to make drivers aware of a change in environment or to highlight other traffic management measures. Traditionally engineers rely heavily on coloured red surfacing to symbolise and highlight warnings and dangers in the highway.

The concept behind installing 20 mph zones is to install one where it is safe to do so, and where it will improve the level of safety for all users. Colour is a meaningful constant for all sighted people and it is a powerful psychological tool. By using colour psychology, you can send a positive or negative message. For example, many pharmaceutical and nutritional companies use green in their logos and materials to advertise safe natural products. It is often used to represent anything having to do with health, and green surfacing has been used by many authorities across the UK to promote sustainable transport such as cycling.

The colour green should be used for all entry panels, roundel panels and sign posts to brand the zones in a positive way. This will become recognisable across the County and road users will associate the colour green with all 20 mph zones. Red can be used in some places to highlight specific areas of concern, but an engineer should first consider removing the risk before highlighting one.

6.5 Maintenance

Consideration must be made regarding scheme maintenance, particularly road markings and coloured surfacing. For example, coloured panels should avoid the wheel tracks of turning/manoeuvring vehicles.

6.6 Other Considerations

Planting can add to the impression that a street is not predominantly for the use of motorists, but care should be taken that acceptable sight distances are maintained. Using significantly restricted visibility to try to influence vehicle speeds is not recommended. Vegetation and planting can be used to limit forward visibility and help reduce traffic speeds as well as increasing the ecological value of the area.

Design junctions to promote slow motor vehicle speeds and reduce conflicts with cyclists, tight radii and junction tables are most effective at this. Block paving reduces traffic speed by between 2.5 and 4.5 mph.

Aesthetically it is preferable that a range of measures are used rather than relying on one type of device within a zone. A change of material and colour of the road surface can be attractive, but unless provided in conjunction with a hump, sign or chicane will seldom influence vehicle speeds.

Getting local communities/schools involved to design the panel of the gateway sign can often give residents a feeling of pride and ownership of the scheme.

Impression 1 - Narrowed gateway using buildouts.

Impression 2 - Countdown gateway with planters

Impression 3 - City Centre gateway feature

Impression 4 - Road name plate (idea)

The Royal Society for the Prevention of Accidents

20mph Zones and Limits

Overview

This page is an overview of the different types of 20mph zones and limits, the evidence for them, and RoSPA's policy statements. The full factsheet is available to download: 20mph Zones and Limits

There are still a high number of casualties on urban roads in the UK. In 2016, 789 people were killed, 15,993 were seriously injured and 113,055 slightly injured in reported road collisions on built up roads in Great Britain. A large proportion of these accidents occurred on residential roads, with 90 deaths on B roads in built-up areas and 309 deaths on other minor roads in built-up areas.

The majority of pedestrian casualties occur in built up areas: 29 of the 34 child pedestrians and 302 of the 413 adult pedestrians who were killed in 2016, died on built-up roads. Pedal cyclists are also vulnerable in built up areas, with over half of cyclist deaths (58 of 102) and most cyclist casualties (16,934 of 18,477) occurring on these roads.

The Department for Transport's current guidance is set out in DfT Circular 01/2013, which encourages traffic authorities to consider the introduction of more 20mph limits and zones, over time, in urban areas and built-up village streets that are primarily residential to ensure greater safety for cyclists and pedestrians.

There are two distinct types of 20mph areas possible:

20mph zone

20mph zones, are designed to be "self-enforcing" due to traffic calming measures which are introduced along with the change in the speed limit. Speed humps, chicanes, road narrowing, planting and other measures are typically used to both physically and visually reinforce the shared nature of the road.

20mph limits

20mph limits, which consist of just a speed limit change but no physical measures to reduce vehicle speeds within the areas. Drivers are alerted to the speed limit with 20mph speed limit repeater signs.

189-741

20mph limits are most appropriate for roads where average speeds are already low, and the guidance suggests below 24mph. The layout and use of the road must also give the clear impression that a 20mph speed or below is the most appropriate.

Effectiveness of 20mph speed limits and zones

A large number of evaluation studies have demonstrated a link between the introduction of 20mph zones and a subsequent reduction in casualties. The size of the reductions and the consistency of results over a wide number of areas are further evidence for this link.

There is similarly strong evidence showing the benefits of traffic calming measures, which are used in 20mph zones.

20mph limits without traffic calming also reduces traffic speed, although this effect is smaller than when they are introduced with traffic calming or other measures. Their lower cost means that wider areas can be covered.

As well as road safety benefits, it is important to highlight the contribution that 20mph zones can have in encouraging more physical activity, such as walking and cycling, by contributing towards a safer environment. The money spent on the schemes can also greatly improve the character of a residential area and quality of life of the residents.

RoSPA's Policy Position on 20mph Speed Limits

20mph zones are very effective at preventing injuries and RoSPA would like to see their wider use in residential areas.

20mph zones significantly decrease the risk of being injured in a collision and their greater use, especially in residential areas, would help to reduce the number of traffic injuries in the UK.

Local Authorities are responsible for determining where 20mph zones and limits should be introduced but should take advantage of opportunities to introduce them where they are needed.

Consultation and engagement with local communities and other stakeholders is of vital importance, to make sure that safer roads are prioritised where needed and that local communities have input into the schemes development.

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☐ Urgent ☐ Return receipt ☐ Sign ☐ Encrypt ☐ Mark Subject Restricted ☐ Expand personal&public groups

Re: Hearing on 27 September for Mr Weston - Supplementary Report (seeking opinions and further information)

14/11/2018 02:46

From: mike weston [redacted]

To: "peter_chan@irc-bus.gov.hk" <peter_chan@irc-bus.gov.hk>,

Cc: "annaau@irc-bus.gov.hk" <annaau@irc-bus.gov.hk>, "haddy_lee@irc-bus.gov.hk" <haddy_lee@irc-bus.gov.hk>, "iris_yu@irc-bus.gov.hk" <iris_yu@irc-bus.gov.hk>, "lawrence_chung@irc-bus.gov.hk" <lawrence_chung@irc-bus.gov.hk>, [redacted], "yt_to@irc-bus.gov.hk" <yt_to@irc-bus.gov.hk>

Please respond to [redacted]

2 attachments

Buses SPI DRAFT (11).pptx

Bus Safety Standard - Overview in brief of CBA approach (5).pdf

Peter,

I have now received some additional information from TfL regarding the Safety Performance Indicator (SPI) and the cost benefit approach used by TRL.

Safety Performance Indicator

TfL have provided the attached presentation which gives an overview of the SPI and how the score for each operator is calculated. The details of each score and their weighting has been redacted by TfL as this detail has not yet been finalised or made public. TfL are comfortable that the attached presentation is placed onto the IRC's website.

The SPI is made up of eight "baskets" of measures which represent the common controls as follows:

- Customer safety
- Staff safety
- Network safety
- Bus engineering
- Driving standards
- Issue management & assurance system
- Infrastructure safety
- Bus station safety.

The attached presentation explains the SPI methodology in more detail. Slide 5 explains how the overall score, which is measured on a periodic basis, is calculated. A 1-5 weighting is agreed for each measure and then multiplied by the number of incidents which have occurred under each measure. The overall score is then calculated using the formula on slide 5 of the presentation. My understanding is that each operator is benchmarked at 80 and the aim is that an operator's improvement in performance leads to a higher score. The system is not designed to allow the performance of operators to be compared with each other.

Cost Benefit Approach

As already indicated TfL have adopted a rigorous cost benefit analysis.

Adopting a robust cost benefit analysis will ensure that available funding is targeted at the safety features which will deliver the best results for each $ spent.

Some examples of the cost benefit ratios calculated so far are as follows:

Interiors Level 2

CBR = 1:7.99-20.2 (excluding insurance claims)

Vulnerable Road User (VRU) Frontal Collision - minimum geometric requirements

CBR = 1:9.98-28.15 (excluding insurance claims)

Indirect Visi on Standard requirements (1* performance rating)

CBR = 1:1.69-7.39 (excluding insurance claims)

As detailed in the TRL presentation the benefit calculations above include the monetised casualty benefits but exclude any potential reduction in insurance claims to the bus operators. Including these would improve the cost benefit ratio but at present a cautious approach is being adopted.

So, for example, it is estimated that the Vulnerable Road User (VRU) Frontal Collision design improvements will delivery between £9.98-£28.15 of benefit for every £ spent.

If you have any further queries, please do not hesitate to contact me.

Regards

Mike

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THE FUTURE OF TRANSPORT

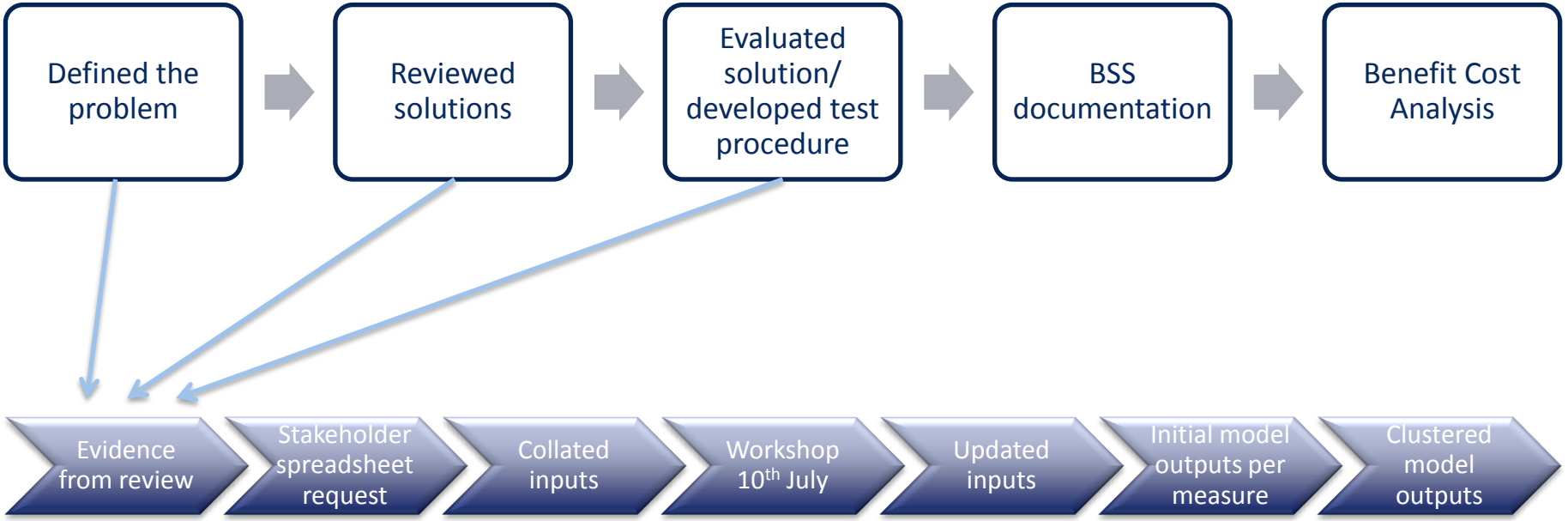
Bus Safety Standard: Overview in Brief of CBA approach

November 2018

189-744

Overview of Cost-Benefit Analysis Approach

The work so far



189-745

Overview of Cost-Benefit Analysis Approach

Process and targets for today

Measure	• Problem • Description of solution
Target Population	• What are the relevant casualties?
Fleet Penetration	• How long to enter the fleet? • New build & retrofit
Effectiveness	• How well will it work on the target population?
Costs	• How much will it cost? • Manufacturing & operational costs
Timeline	• When is the solution feasible to implement?
Overlaps	• What other safety measures does it overlap with?

- Next steps:
  - Refine BCA model
  - Clustered model

189-746

Overview of Cost-Benefit Analysis Approach

The Safety Measures

- Thirteen safety measures considered during the course of the BSS project:
  - Intelligent Speed Assist [ISA]
  - Visual Conspicuity [VCO]
  - Acoustic Conspicuity [ACO]
  - Autonomous Emergency Braking [AEB]
  - Pedal Application Error [PAE]
  - Direct/Indirect Vision [DIV]
  - VRU Frontal Crashworthiness [VCW]
  - Visual Inspections [VIN]
  - Grab Poles/Handles [GPH]
  - Seat Back Design [SBD]
  - Slip Protection [SLP]
  - Runaway Buses [RUN]
  - Bus Fires [FIR]
- Each safety measure has multiple solutions
  - Total of 40+ safety measure solutions

189-747

Overview of Cost-Benefit Analysis Approach

Cost-Effectiveness Analysis

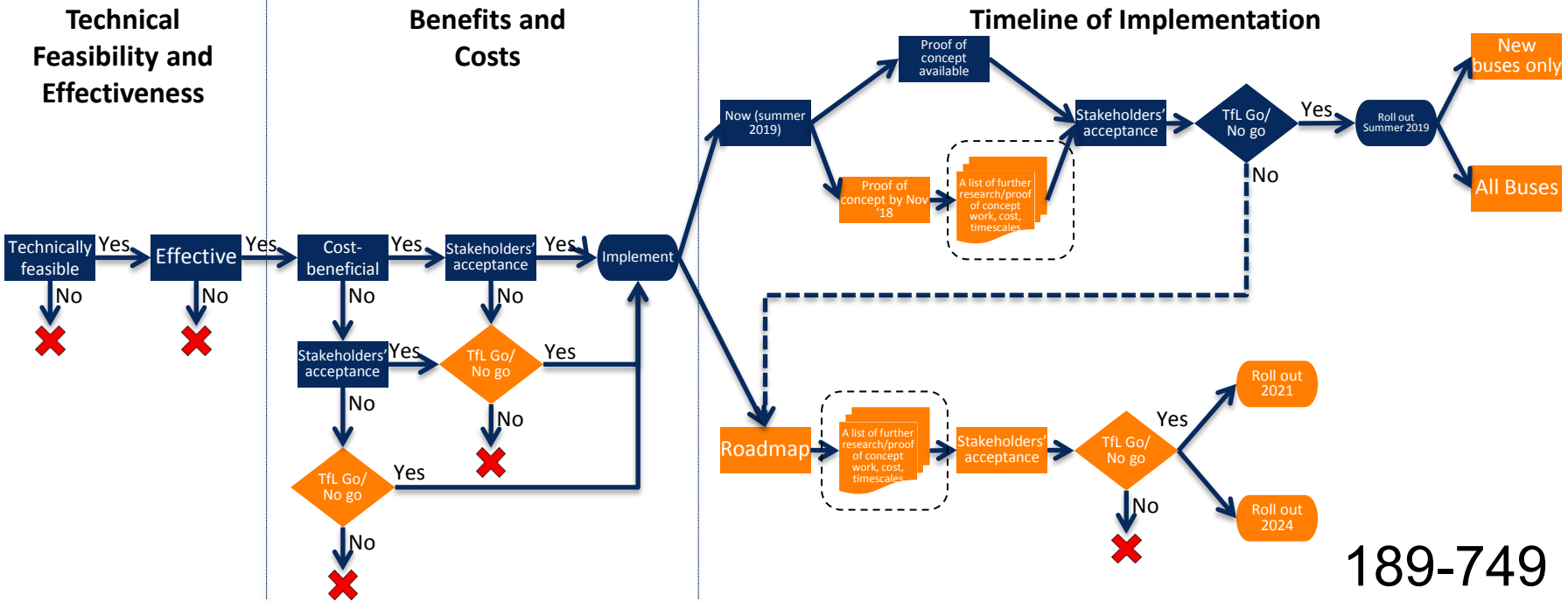
- Cost-benefit modelling approach
  - Implementation and fleet penetration timelines
    - Assumes implementation in 2019, 2021 or 2024 in line with proposed timelines
    - Considers differences between retrofit and new build fleet penetration timelines
  - Assumptions and Indexing Factors:
    - Fleet size
    - Modal share
    - Fleet fitment rates
    - Population/passenger trends
    - Inflation
    - Nominal discount rate
    - Analysis period and residual value
    - Insurance claims costs
    - Societal costs of casualties

- Evaluation of outcomes
  - Target population
  - Effectiveness
  - Casualty reduction benefits
  - Monetised casualty benefits
  - Costs/bus
  - Insurance claims reductions
  - Total fleet costs
  - Break-even costs/bus
  - Benefit-cost ratios

189-748

Cost-Effectiveness of Potential Safety Measures

Decision Process

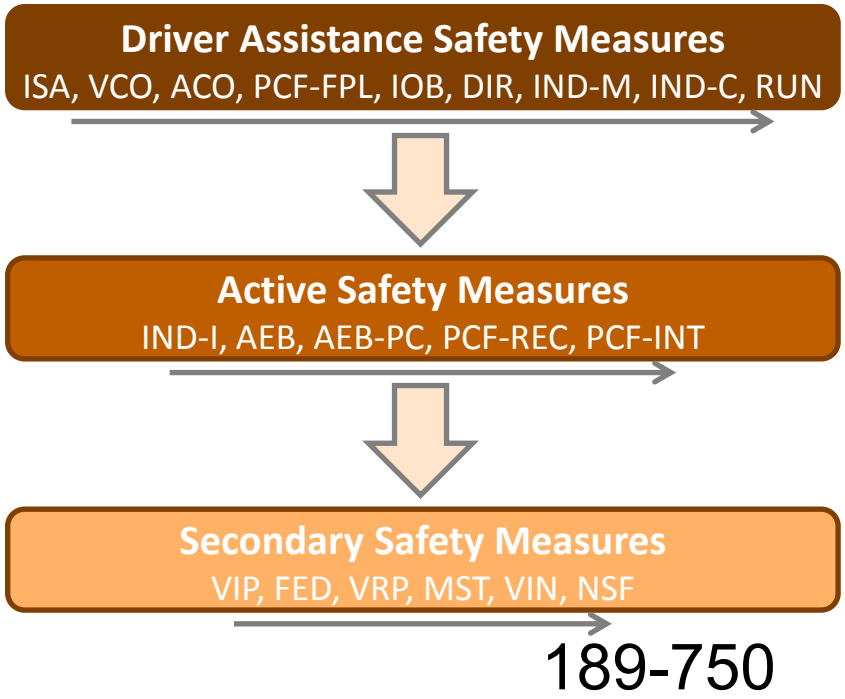


189-749

Overview of Cost-Benefit Analysis Approach

Safety Measure Clustering

- Clustering based on GSR2 proposed approach
- Each cluster organised into three ‘layers’
  - Driver assistance
    - Permanent/continuous collision prevention
  - Active safety
    - Prevention/mitigation immediately pre-collision
  - Passive safety
    - Mitigation during collision phase
- Interactions between safety measures
  - Interactions expected between and within layers
  - Interactions include:
    - Target Populations
    - Solution Development/Implementation Costs
    - Ongoing Operational Costs

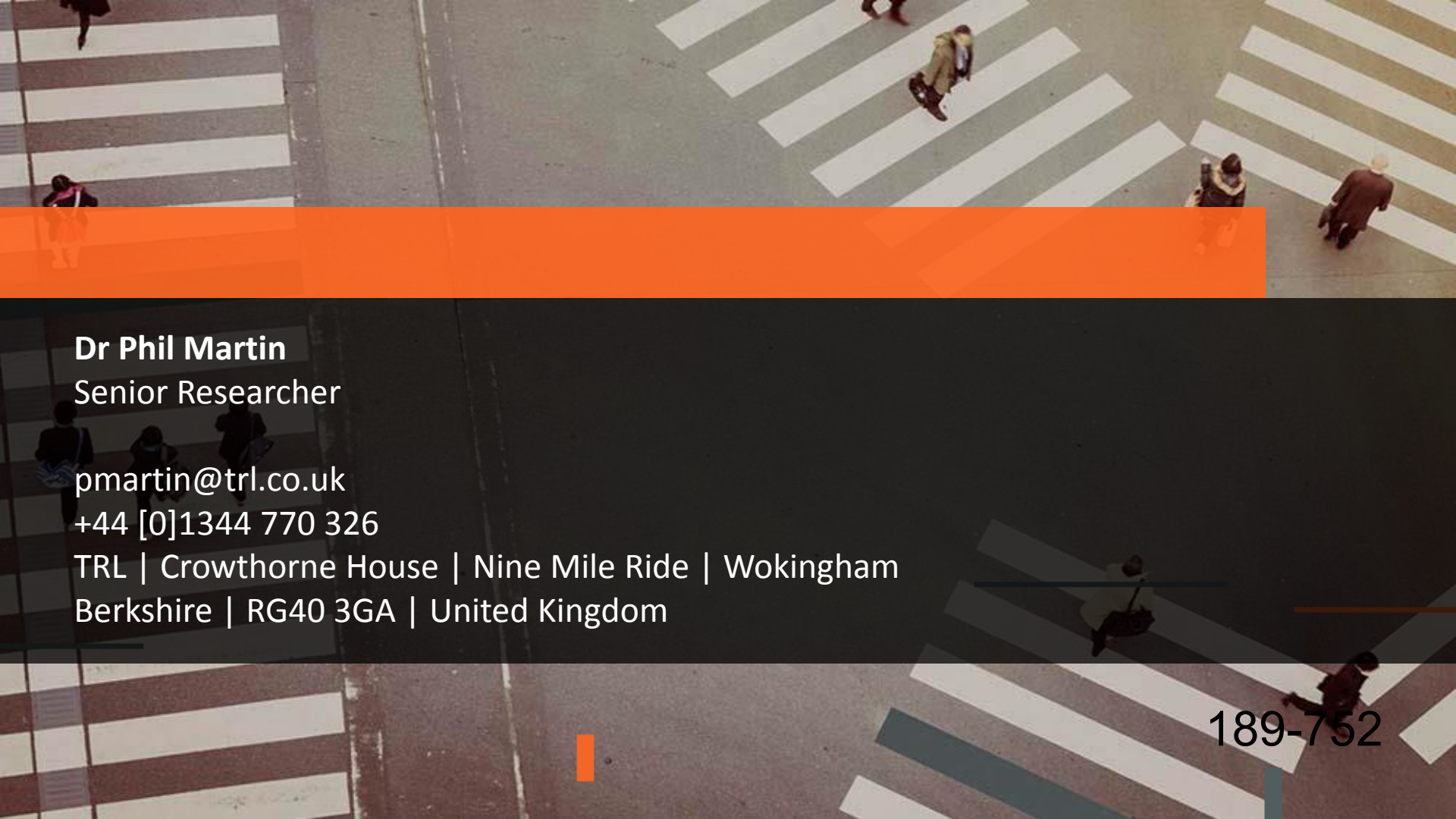


Overview of Cost-Benefit Analysis Approach

Safety Measure Clustering

- Clustering of target populations/casualty saving benefits
  - Safety measure interactions prioritised based on intervention during the collision phase
  - Clustering approach:
    - Determine initial target population
    - Estimate casualty saving benefits for highest priority safety measure in cluster
    - Remove prevented casualties from target population for second highest priority safety measure
    - Estimate casualty saving benefits for second highest priority safety measure in cluster
    - Repeat until all safety measures assessed and sum all prevented casualties
  - Approach performed for each relevant target population and injury severity level
- Clustering of costs
  - Based on potential for sharing of critical components or significant amounts of design/manufacture time
  - Clustering approach:
    - For each cluster determine which safety measures can be clustered for costs
    - If no cost clusters can be established: no cost saving benefit possible

189-751



Dr Phil Martin
Senior Researcher

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+44 [0]1344 770 326
TRL | Crowthorne House | Nine Mile Ride | Wokingham
Berkshire | RG40 3GA | United Kingdom

Buses Safety Performance Index (SPI) Project

Monitoring bus safety

What it is

A metric for self comparative performance monitoring through the use of a composite basket of indicators.

The Buses SPI

- A new approach to monitoring Buses safety improvement holistically.
- The SPI builds on the lessons learned in the 7 years of use within Rail.
- Buses SPI done from three perspectives:
  - **The whole system** – performance aspects which are the responsibility of and influenced by Buses and its supply chain
  - **The Supply Chain** – performance aspects which are predominant the responsibility of bus companies
  - **Inward Looking** – performance aspects which are the sole responsibility of Buses

Overview of Buses SPI

- The Buses SPI will be in force from April 2017
- The SPI comprises 8 "baskets" which represent areas with common control measures.
- The SPI offers a balanced approach to safety performance monitoring.
- Each "basket" has an owner, this being the individual with highest share of responsibility for the area being controlled.
- The 8 "baskets" have a total of 81 indicators subject to final approval.

Calculating the Periodic SPI Score

Score

The score is a simple function of multiplying a weight from 1 to 5 where 5 is the most serious with the total number of incidents for any given period.

$$Score = weight\ x \sum Incidents$$

Note:
Higher weighted indicators have greater impact on the score to generally represent their severity and potential to cause harm.

SPI

The score is a key input for calculating the SPI.

$$SPI = score \cdot m + 100$$

Where m is the gradient unique to the business area on the degree to reach the target of 80 with a constant of 100 (best performance).

For the purposes of SPI all values of m satisfy $m < 0$

Note:
As m reduces the harder the SPI is to achieve as SPI becomes more sensitive to the number of incidents.

It's important to note that m or the target are changed infrequently to ensure consistent results.

Although higher scores are undesirable, a higher SPI is good! Consequently, lowering scores will see SPI increase.

Key Characteristics of the Buses SPI

A Buses SPI basket represents a collection of performance indicators relevant to risks controlled within the specified work area.

Occasionally, a performance indicator will be a subset of another indicator. This means the basket is a true reflection of risks controlled by its owner.

A performance item scoring multiple times does not affect the overall SPI score as demonstrated in the calculation slide. It ensures the meaningfulness of individual baskets.

The 81 Indicators

Customer Safety: 1/2

Note 1: *(Remarks from Secretariat to IRC)* RIDDOR refers to Reporting of Injuries, Diseases and Dangerous Occurrences Regulations, which are national regulations in the United Kingdom that require an employer, a person who is self-employed, or someone in control of work premises to report and record specified work-related accidents as soon as possible.

Performance Indicator				
Customer fatalities				
Specified Injuries (RIDDORs)[Note 1]				
Customer major injuries				
Customer minor injuries				
Passenger assaults				
Customer Complaints - Safety related				

Customer Safety: 2/2

Note 2: *(Remarks from Secretariat to IRC)* VRU refers to Vulnerable Road, which is generally classified in the United Kingdom as pedestrians, pedal cyclists and motorcycle riders although can include other users such a horse-riders for example.

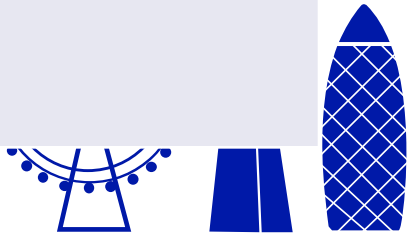
Performance Indicator				
Fatal Collisions				
All VRU[Note 2] Major Injury Collisions				
All VRU Minor Injury Collisions				
All Non-VRU Major Injury Collisions				
All Non-VRU Minor Injury Collisions				

Staff Safety: Employees

Performance Indicator				
Fatalities Staff (RIDDOR)				
Specified Injuries (RIDDOR)				
Employee Lost Time Injuries				
Minor Employee Injuries				
Employee Physical Assault				
Employee Verbal Abuse/Threat				
Working days lost to sickness absence				

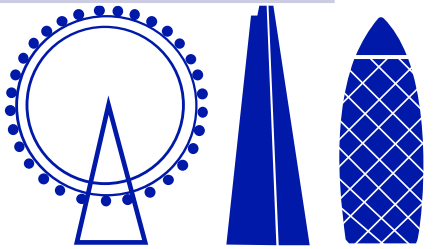
Staff Safety: Supplier Staff

Performance Indicator				
Fatalities Supplier Staff (RIDDOR)				
Specified Injuries - Supplier staff (RIDDOR)				
Major Injuries - Supplier staff				
Minor injuries - Supplier staff				
Supplier Staff Physical Assault				
Supplier Staff Verbal Abuse/Threat				



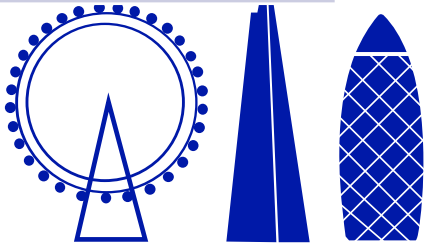
Network Safety: 1/3

Performance Indicator				
Bus collision with pedestrian				
Bus collision with cyclist				
Bus collision with motorcyclist				
Bus Collision with Another Vehicle				
Bus Collision with Another Bus				



Network Safety: 2/3

Performance Indicator				
Bus Collision with a Tree				
Bus collision with a Bridge (height restricted)				
Bus Collision with a Building				
Bus Collision with Street Furniture				
Unintended Bus Acceleration				



Network Safety: 3/3

Performance Indicator				
Uncontrolled Bus Movement (Rolling)				
All Injuries Arising from Falls on Buses				
All Falls on Buses				
Boarding & Alighting Incidents Leading to Injuries				
All Boarding & Alighting Incidents				

Bus Engineering: 1/2

Note 3: *(Remarks from Secretariat to IRC)* PG9 notices are prohibition notices issued in the United Kingdom by a police officer or an officer from the Driver and Vehicle Standards Agency (DVSA) in connection to road worthiness. Information on PG9 and PG9-S is available at: www.gov.uk/roadside-vehicle-checks-for-commercial-drivers/roadside-prohibitions.

Performance Indicator				
Engineering Quality Score				
Topside Inspection Score				
PG9[Note 3] Issued				
PG9 - S				

Bus Engineering:2/2

Performance Indicator				
Bus Wheel Loss				
Bus Fires				
Safety Critical Mechanical Failures				
Failed On-Bus Fire Detection System				
Failed Fire Suppression System Deployments				

Driving Standard

Note 4: *(Remarks from Secretariat to IRC)* CES refers to Customer Experience Survey.
Note 5: *(Remarks from Secretariat to IRC)* DQM refers to Driver Quality Monitoring.
Note 6: *(Remarks from Secretariat to IRC)* D&A Tests refer to Drugs and Alcohol Tests.

Performance Indicator				
CES[Note 4] Score - Driving Standards				
CES Score - Serving the Stop				
DQM[Note 5] Score				
Bus Drivers Arrested for Failing D&A Tests [Note 6]				

Issue Management & Assurance Systems: 1/4

Note 7: *(Remarks from Secretariat to IRC)* H&S refers to Health & Safety.

Performance Indicator				
Significant Incidents				
Assurance activities completed late				
Audit actions overdue				
H&S [Note 7] improvement action late				
Senior manager safety tours missed				

Issue Management & Assurance Systems: 2/4

Performance Indicator				
SM3[Note 8] action overdue				
Bus Miles Lost Due to Safety Related Incidents				
Bus Miles Lost to Mechanical Defects				
Risk Assessment Review Overdue				
High Priority Incident Investigation Actions Overdoes				

Note 8: *(Remarks from Secretariat to IRC)* SM3 refers to a type of annual safety assurance process undertaken by the Transport for London (TfL) of each bus operator.

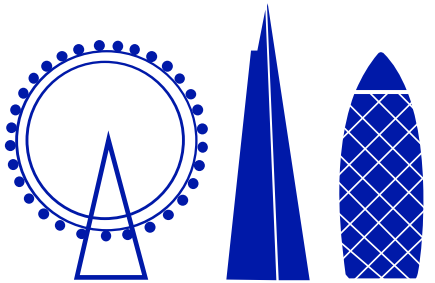
Note 9: *(Remarks from Secretariat to IRC)* DSE Assessments refer to Display Screen Equipment Assessments, which is a statutory requirement in the United Kingdom on workplace safety.

Issue Management & Assurance Systems: 3/4

Performance Indicator				
Incident investigations overdue				
Drugs & Alcohol failures - Operational employees				
DSE Assessments Review Overdue [Note 9]				
Unanswered CentreComm Code Red Calls				
Uncompleted H&S Training Courses				

Issue Management & Assurance Systems: 4/4

Performance Indicator				
Bus in contact with trees branches				
Prosecutions				
Regulatory enforcement actions				
Regulatory investigations				



Infrastructure Safety

Note 10: *(Remarks from Secretariat to IRC)* PGI refers to Planned General Inspection, which is a type of safety inspection of office, factory, depot, etc. in the United Kingdom.

Performance Indicator				
Overdue PGI [Note 10] actions				
Injuries attributed to defective bus infrastructure				
Building fires				
Failed CCTV system				

Bus Station Safety

Performance Indicator				
All Injuries within the Bus Station				
Slips/trips/falls within the Bus Station				
All VRU Collisions within Bus Stations				
All Collisions within Bus Stations				
All Bus on Bus Collisions within Bus Stations				
Overdue Bus Station Risk Assessments				

香港專營巴士服務
獨立檢討委員會

香港金鐘道66號
金鐘道政府合署21樓

Independent Review Committee on Hong Kong's Franchised Bus Service

21/F, Queensway Government Offices,
66 Queensway, Hong Kong

本函檔號 Our Ref.: CSO/IRC-BUS/CR/7-45/15
來函檔號 Your Ref.:

電話號碼 Tel No.: (852) 2867 5324
傳真號碼 Fax No.: (852) 3104 0254

11 September 2018

BY EMAIL (Jeremy_yap@lta.gov.sg) & BY AIRMAIL

Mr Jeremy YAP
Deputy Chief Executive
Public Transport Policy and Planning
Land Transport Authority
1 Hampshire Road
Singapore 219428

Dear Mr YAP,

Independent Review Committee on Hong Kong's Franchised Bus Service ("Committee")

I am the Chairman of the Independent Review Committee on Hong Kong's Franchised Bus Service ("Committee") appointed on 12 March 2018 by the Chief Executive of the Hong Kong Special Administrative Region, in light of the fatal accident on 10 February 2018, which resulted in the death of 19 passengers travelling on a franchised double-decker bus, to examine the operation and management of franchised buses and the related regulatory monitoring system to make recommendations to the Chief Executive on safety-related measures so as to sustain a safe and reliable franchised bus service in Hong Kong.

Having commenced work at the end of March 2018, the Committee has received written submissions and oral evidence from many parties. For further information on the Committee, including the written submissions and oral evidence received by the Committee, please refer to the Committee's website (www.irc-bus.gov.hk).

In July 2018, the Committee engaged Mr Mike Weston, formerly the Director of Buses of Transport for London but now a Transport Consultant, to provide a written expert report and to give oral evidence before the Committee in Hong Kong. Mr Weston has been asked to describe the operation and management of franchised buses in London and the related regulatory monitoring system and, having regard to the regime obtaining in Hong Kong, to note the differences in the two regimes and to express opinions as to any inadequacies in the system in Hong Kong and how that

system might be improved. Another expert, Professor John Stanley, an Adjunct Professor of the Institute of Transport and Logistics Studies at the University of Sydney has been engaged by the Committee in a similar role in respect of the franchised buses in Melbourne.

I understand that Mr Weston is known to you and it is at his suggestion that I write to you directly to ask for the assistance of the Land Transport Authority of Singapore. In meetings I had with Mr Weston in London on 28 to 30 August 2018, we met staff of Transport for London and staff of three of the franchised bus companies operating in London, including Mr John Trayner, the managing director of Go-Ahead, who also provides franchised bus service in Singapore. He was able to give me some insight into the operation of franchised bus service in Singapore and the role of the Land Transport Authority.

In a letter, dated 1 June 2018, to Mr Chua Chong Kheng, the Deputy Chief Executive, Infrastructure and Development, of the Land Transport Authority, the Secretary of the Committee sought the assistance of the Land Transport Authority in respect of various matters set out in that letter, a copy of which is attached. Unfortunately, we have received no reply to that enquiry. However, we remain anxious to obtain information in respect of the operation and management of the franchised bus system in Singapore, including: the means by which safety is enhanced on buses; the safety-related technological devices installed on your buses; the priority afforded to buses on the roads and the enforcement of that priority; the system of training and fatigue-monitoring of bus drivers; and the role of the Land Transport Authority.

We would be delighted if, in the first instance, you felt able to indicate that you would assist us. In that event, we could then establish how best to go about obtaining the information that we seek.

Kind regards,

(Mr Justice Michael Lunn)
Chairman, Independent Review Committee
on Hong Kong's Franchised Bus Service

cc Hong Kong Economic and Trade Office, Singapore
Messrs. Wilkinson & Grist (Attn: Ms Rebecca Lau), Solicitors to the Committee

Encl

香港專營巴士服務
獨立檢討委員會

香港金鐘道66號
金鐘道政府合署21樓

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21/F, Queensway Government Offices,
66 Queensway, Hong Kong

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來函檔號 Your Ref.:

電話號碼 Tel No.: (852) 2867 2551
傳真號碼 Fax No.: (852) 3104 0254

1 June 2018

BY EMAIL (*chua_chong_kheng@lta.gov.sg*) & BY AIRMAIL

Mr CHUA Chong Kheng
Deputy Chief Executive
Infrastructure and Development
Land Transport Authority
1 Hampshire Road
Singapore 219428

Dear Mr CHUA,

Independent Review Committee on Hong Kong's Franchised Bus Service ("Committee")

I write to seek your assistance in respect of the matter set out in this letter.

In common with the government of Singapore, the government of the Hong Kong Special Administrative Region ("HKSAR") attaches great importance to the safety of our respective franchised bus service. Following a fatal incident involving a franchised bus in Hong Kong on 10 February 2018, which resulted in the death of 19 passengers, the Chief Executive of HKSAR announced the setting up of the Committee to comprehensively review the operation and monitoring of franchised buses so as to ensure that public bus services of Hong Kong are safe and reliable. The Chairman of the Committee is the Honourable Mr Justice Michael Lunn, and Members are Mr Rex Auyeung Pak-kuen and Professor Lo Hong-kam, while the Terms of Reference of the Committee are set out in the **Annex** to this letter.

The Committee has commenced its work and is examining a range of technological devices and traffic management measures that might improve the safety of franchised bus services in Hong Kong. These include, inter alia, the installation of cameras capable of detecting drowsiness in bus drivers (also known as "anti-fatigue systems" or "anti-dozing devices") as well as giving buses priority for using roads, including bus lanes and existing bus stops. For further information on the Committee, including the information that the Committee has gathered and the records of the hearings it has had held, please refer to the website of the Committee (www.irc-bus.gov.hk).

We note from your website that the Land Transport Authority (LTA) has required that new buses operating under the LTA's contracts be equipped with anti-fatigue systems for detecting drowsiness of drivers. Further, we note from online sources, as well as a research report prepared by the Legislative Council of Hong Kong on franchised bus services in Singapore[1], that Singapore has introduced a system of bus lanes and gives priority to buses operating under LTA's contracts when such buses exit many bus stops to rejoin the road. It would assist us greatly if you were to share with us in general terms the research that the LTA conducted in advance of introducing the above measures and describe how the systems have been deployed in Singapore, indicating whether or not any difficulties have been encountered (e.g. impacts to traffic flow on roads with high traffic volumes) and how they have been overcome.

In addition to technological devices and traffic management measures, the Committee is also looking into the training regime of bus drivers in Hong Kong. We note that the LTA also has relevant and valuable experience in this regard as the authority responsible for providing training for public bus drivers in Singapore. Relevant to that is the fact that some of the double-decker bus models used in Singapore are also used in Hong Kong. In order that the Committee is better informed as to the adequacy of the training provided in Hong Kong by the franchised bus operators to their bus drivers, it would assist us if you were to describe the content and length of the training provided to public bus drivers in Singapore. Moreover, the Committee would like to know if bus simulators are used in the training of drivers in Singapore. If so, a description of the models that are used, how they are used in training and its effectiveness in enhancing the skills of bus drivers and driving safety would be highly appreciated.

Finally, we note that all public bus operators are required to comply with Quality of Service (QoS) Standards, including an accident rate (QoS Standard 2.1), non-compliance with which incurs a financial penalty for the public bus operators. Please describe how those standards were determined and advise if any financial penalties have been imposed under the Bus Contracting Model.

Since the Committee is tasked to complete its work by the end of 2018, the Committee would be most grateful if LTA could share with us the abovementioned information at the earliest possible juncture. On a related note, the Committee has learnt from the Transport Department (TD) of Hong Kong that the TD has been maintaining contact with the LTA and that an attachment programme between LTA and TD has been arranged, with a senior engineer from the LTA sent to the TD for a two-week attachment in June 2018. If the LTA considers it appropriate, the Committee would be pleased to make contact with the LTA engineer.

[1] The research report is available at the website of the Legislative Council: www.legco.gov.hk/research-publications/english/1415in05-franchised-bus-services-in-seoul-and-singapore-20150203-e.pdf

Your assistance is much appreciated. Should you have any queries, please feel free to contact the undersigned at (852) 2867 2551 (e-mail: peter_chan@irc-bus.gov.hk) or Mr Justin TO at (852) 2867 4612 (e-mail: yt_to@irc-bus.gov.hk).

Yours sincerely,

(CHAN Ping-fai, Peter)
Secretary, Independent Review Committee on
Hong Kong's Franchised Bus Service

cc Hong Kong Economic and Trade Office, Singapore
Messrs. Wilkinson & Grist (Attn: Ms Rebecca Lau)

Encl

Annex

Independent Review Committee on Hong Kong's Franchised Bus Service Terms of Reference

From the point of view of safety, in the light of the fatal accident on 10 February and other recent serious incidents involving franchised buses in Hong Kong:

(a) to examine the operation and management of bus franchises under the current legislative, franchise and other contractual requirements;

(b) to examine the present regulatory and monitoring system for franchised buses; and

(c) in relation to the above, to make recommendations to the Chief Executive on safety-related measures with a view to sustaining a safe and reliable franchised bus service in Hong Kong.

Note:
Issues relating to the causes and liability of persons involved in the fatal accident on 10 February 2018 will be investigated by the Police and fall outside the Committee's terms of reference.

☐ Urgent ☐ Return receipt ☐ Sign ☐ Encrypt ☐ Mark Subject Restricted ☐ Expand personal&public groups

RE: Independent Review Committee on Hong Kong 's Franchised Bus Service

18.09.2018 00:45

From: "Jeremy YAP (LTA)" <Jeremy_YAP@lta.gov.sg>
Sent by prvs=791bcba5a=Jeremy_YAP@lta.gov.sg

To: "secretariat@irc-bus.gov.hk" <secretariat@irc-bus.gov.hk>,

Cc: HKETO Singapore <hketo_sin@hketosin.gov.hk>, "rebeccalau@wilgrist.com" <rebeccalau@wilgrist.com>, "Teck Guan YEO (LTA)" <YEO_Teck_Guan@lta.gov.sg>, "Alison SWEE (LTA)" <Alison_SWEE@lta.gov.sg>

Message Classification: ***Restricted***

Dear Michael,

Thank you for your letter dated 11 September 2018, requesting for information on the operation and management of the bus services under our Bus Contracting Model (BCM) with emphasis on the safety measures in place.

To share in brief, all public buses are currently equipped with cameras and speed limiters so as to improve the safety of the buses in Singapore. The newer buses have enhanced safety features with almost half the fleet installed with telematics, and some buses have anti-collision warning systems as well. We plan to progressively install these safety features on all public buses. In addition, the LTA is exploring more advance safety features, such as blind spot warning systems.

Beyond what the LTA is doing, some of the public bus operators are also trialling the fatigue monitoring system for their bus captains. The bus captains also have to attend safety driving lessons as part of their continual training and skills deepening on safe driving.

We are happy to provide more details on the safety measures that we have put in place. The Secretariat may wish to contact Ms Alison Swee, Director for Bus Contract Management, who is copied in this email, on more information required or any other queries you may have.

In addition, we would like to enquire whether you would be able to share the findings of the Committee with us, once completed.

Thank you.

Regards,

Jeremy

☐ Urgent ☐ Return receipt ☐ Sign ☐ Encrypt ☐ Mark Subject Restricted ☐ Expand personal&public groups

RE: Independent Review Committee on Hong Kong 's Franchised Bus Service

19.09.2018 18:43

From: Secretariat/IRC-BUS/HKSARG
To: "Jeremy YAP (LTA)" <Jeremy_YAP@lta.gov.sg>, "Alison SWEE (LTA)" <Alison_SWEE@lta.gov.sg>,
Cc: HKETO Singapore <hketo_sin@hketosin.gov.hk>, "rebeccalau@wilgrist.com" <rebeccalau@wilgrist.com>, "Teck Guan YEO (LTA)" <YEO_Teck_Guan@lta.gov.sg>
Bcc: Lawrence KT CHUNG/IRC-BUS/HKSARG

Dear Jeremy and Alison,

Thank you for your reply to my enquiries, in which you were kind enough to describe some of the safety measures employed by the LTA and the public bus operators on public buses in Singapore, and for inviting us to contact Ms Alison Swee, Director for Bus Contract Management, for further information. We intend taking up that invitation today and have attached to this email a letter (which includes two annexes and five appendices) addressed to Ms Swee seeking further information that would assist the work of the Committee.

Subject to the consent of the Chief Executive of the Hong Kong Special Administrative Region, to whom the Committee is required to furnish a report by the end of the year, we would be delighted to provide you with a copy of that report.

Letter to Land Transport Authority, Singapore (20180919).pdf
LTA Letter_Annex I.pdf
LTA Letter_Annex II.pdf
LTA_Appendix I.pdf
LTA_Appendix II.pdf
LTA_Appendix III.pdf
LTA_Appendix IV.pdf
LTA_Appendix V.pdf

Kind regards,
(Mr Justince Michael Lunn)
Chairman, Independent Review Committee
on Hong Kong's Franchised Bus Service

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獨立檢討委員會

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傳真號碼 Fax No.: (852) 3104 0254

19 September 2018

BY EMAIL (*Alison_SWEE@lta.gov.sg*)

Ms Alison Claire SWEE Wee Leng
Director for Bus Contract Management
Land Transport Authority
1 Hampshire Road
Singapore 219428

Dear Ms SWEE,

Independent Review Committee on Hong Kong's Franchised Bus Service ("Committee")

I refer to the email correspondence between Mr Jeremy YAP, Deputy Chief Executive, Public Transport Policy & Planning of the Land Transport Authority ("LTA"), and the Chairman of this Committee on seeking the assistance of the LTA in providing information on various matters pertaining to the safety of public bus services in Singapore. For your information, I am also attaching our letter of 1 June 2018 at **Annex I**, which sets out the background of the setting up of the Committee and its terms of reference.

On behalf of the Committee, I would like to express my gratitude to you and Mr YAP for agreeing to provide the assistance that the Committee is seeking. Please find attached to this letter an attachment (**Annex II**) setting out the matters that the Committee is interested to learn more about from the LTA. As the Committee has been tasked to submit its report to the Chief Executive of the Hong Kong Special Administrative Region in December 2018, I should be most grateful if the response to the matters set out in Annex I could be made available to the Committee in around two weeks' time.

Your assistance is much appreciated. Should you have any queries, please feel free to contact the undersigned at (852) 2867 2551 (e-mail: peter_chan@irc-bus.gov.hk) or Mr Justin TO at (852) 2867 4612 (e-mail: yt_to@irc-bus.gov.hk).

Yours sincerely,

(CHAN Ping-fai, Peter)
Secretary, Independent Review Committee on
Hong Kong's Franchised Bus Service

cc Messrs. Wilkinson & Grist, Solicitors to the Committee (Attn: Ms Rebecca Lau)

Encl

香港專營巴士服務
獨立檢討委員會

香港金鐘道66號
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Independent Review Committee on Hong Kong's Franchised Bus Service

21/F, Queensway Government Offices,
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1 June 2018

BY EMAIL (*chua_chong_kheng@lta.gov.sg*) & BY AIRMAIL

Mr CHUA Chong Kheng
Deputy Chief Executive
Infrastructure and Development
Land Transport Authority
1 Hampshire Road
Singapore 219428

Dear Mr CHUA,

Independent Review Committee on Hong Kong's Franchised Bus Service ("Committee")

I write to seek your assistance in respect of the matter set out in this letter.

In common with the government of Singapore, the government of the Hong Kong Special Administrative Region ("HKSAR") attaches great importance to the safety of our respective franchised bus service. Following a fatal incident involving a franchised bus in Hong Kong on 10 February 2018, which resulted in the death of 19 passengers, the Chief Executive of HKSAR announced the setting up of the Committee to comprehensively review the operation and monitoring of franchised buses so as to ensure that public bus services of Hong Kong are safe and reliable. The Chairman of the Committee is the Honourable Mr Justice Michael Lunn, and Members are Mr Rex Auyeung Pak-kuen and Professor Lo Hong-kam, while the Terms of Reference of the Committee are set out in the **Annex** to this letter.

The Committee has commenced its work and is examining a range of technological devices and traffic management measures that might improve the safety of franchised bus services in Hong Kong. These include, inter alia, the installation of cameras capable of detecting drowsiness in bus drivers (also known as "anti-fatigue systems" or "anti-dozing devices") as well as giving buses priority for using roads, including bus lanes and existing bus stops. For further information on the Committee, including the information that the Committee has gathered and the records of the hearings it has had held, please refer to the website of the Committee (www.irc-bus.gov.hk).

We note from your website that the Land Transport Authority (LTA) has required that new buses operating under the LTA's contracts be equipped with anti-fatigue systems for detecting drowsiness of drivers. Further, we note from online sources, as well as a research report prepared by the Legislative Council of Hong Kong on franchised bus services in Singapore[1], that Singapore has introduced a system of bus lanes and gives priority to buses operating under LTA's contracts when such buses exit many bus stops to rejoin the road. It would assist us greatly if you were to share with us in general terms the research that the LTA conducted in advance of introducing the above measures and describe how the systems have been deployed in Singapore, indicating whether or not any difficulties have been encountered (e.g. impacts to traffic flow on roads with high traffic volumes) and how they have been overcome.

In addition to technological devices and traffic management measures, the Committee is also looking into the training regime of bus drivers in Hong Kong. We note that the LTA also has relevant and valuable experience in this regard as the authority responsible for providing training for public bus drivers in Singapore. Relevant to that is the fact that some of the double-decker bus models used in Singapore are also used in Hong Kong. In order that the Committee is better informed as to the adequacy of the training provided in Hong Kong by the franchised bus operators to their bus drivers, it would assist us if you were to describe the content and length of the training provided to public bus drivers in Singapore. Moreover, the Committee would like to know if bus simulators are used in the training of drivers in Singapore. If so, a description of the models that are used, how they are used in training and its effectiveness in enhancing the skills of bus drivers and driving safety would be highly appreciated.

Finally, we note that all public bus operators are required to comply with Quality of Service (QoS) Standards, including an accident rate (QoS Standard 2.1), non-compliance with which incurs a financial penalty for the public bus operators. Please describe how those standards were determined and advise if any financial penalties have been imposed under the Bus Contracting Model.

Since the Committee is tasked to complete its work by the end of 2018, the Committee would be most grateful if LTA could share with us the abovementioned information at the earliest possible juncture. On a related note, the Committee has learnt from the Transport Department (TD) of Hong Kong that the TD has been maintaining contact with the LTA and that an attachment programme between LTA and TD has been arranged, with a senior engineer from the LTA sent to the TD for a two-week attachment in June 2018. If the LTA considers it appropriate, the Committee would be pleased to make contact with the LTA engineer.

[1] The research report is available at the website of the Legislative Council: www.legco.gov.hk/research-publications/english/1415in05-franchised-bus-services-in-seoul-and-singapore-20150203-e.pdf

Your assistance is much appreciated. Should you have any queries, please feel free to contact the undersigned at (852) 2867 2551 (e-mail: peter_chan@irc-bus.gov.hk) or Mr Justin TO at (852) 2867 4612 (e-mail: yt_to@irc-bus.gov.hk).

Yours sincerely,

(CHAN Ping-fai, Peter)
Secretary, Independent Review Committee on
Hong Kong's Franchised Bus Service

cc Hong Kong Economic and Trade Office, Singapore
Messrs. Wilkinson & Grist (Attn: Ms Rebecca Lau)

Encl

Annex

Independent Review Committee on Hong Kong's Franchised Bus Service
Terms of Reference

From the point of view of safety, in the light of the fatal accident on 10 February and other recent serious incidents involving franchised buses in Hong Kong:

(a) to examine the operation and management of bus franchises under the current legislative, franchise and other contractual requirements;

(b) to examine the present regulatory and monitoring system for franchised buses; and

(c) in relation to the above, to make recommendations to the Chief Executive on safety-related measures with a view to sustaining a safe and reliable franchised bus service in Hong Kong.

Note:
Issues relating to the causes and liability of persons involved in the fatal accident on 10 February 2018 will be investigated by the Police and fall outside the Committee's terms of reference.

Annex II

List of Matters of Interest to the Committee

(I) Adoption of technological devices on buses

1. The Committee has been informed by Hong Kong's Transport Department ("TD") that arising from the traffic accident on Tai Po Road which took place on 10 February 2018, the TD set up a Working Group on Enhancement of Safety of Franchised Buses ("the Working Group"), which was tasked, amongst other things, to explore the installation of a number of on-vehicle safety devices, including –
   (a) speed display unit for passengers;
   (b) active / passive roll stability control;
   (c) electronic stability control;
   (d) speed control aided by GPS;
   (e) speed limiter to cap maximum speed within 70 km/hr[1];
   (f) collision prevention and lane keeping device; and
   (g) monitoring device on captain's condition e.g. dozing, drowsiness.

2. After deliberation, the Working Group recommended that items (b), (c) and (e) above be pursued, such that all new double-deck buses procured from July 2018 would be required to have electronic stability control and speed limit retarders for capping the maximum speed of buses at 70 km/hr even when going downhill, while some existing buses would have such devices retrofitted. In addition, the Working Group recommended that trials be conducted on items (d), (f) and (g) above. A paper submitted by the TD to the Legislative Council of Hong Kong setting out the Working Group's recommendation in paragraphs 4 to 9 is attached at **Appendix I** for reference.

3. We understand that the Land Transport Authority ("LTA") has already installed a number of safety-related devices on its buses such as telematics devices, cameras and speed limiters and is exploring the adoption of additional safety features such as blind spot warning systems.

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[1] Buses in Hong Kong currently are required to have speed limiters installed. Such speed limiters performs its function by means of cutting off fuel supply to the engine when the speed is over 70 km/hr, but it cannot control over-speeding downhill which is steep enough for the vehicle to be in free roll by the force of gravity. The Working Group therefore considered upgrading the speed limiter to include a "retarder function" that could slow down the vehicle when its speed is above 70 km/hr.

4. In connection with paragraphs 1 and 2 above, the Committee would like to invite the LTA to provide information on the following questions:

(a) has the LTA adopted, or considered the adoption of any of the devices listed in paragraph 1 above? In the case of speed limiters, do speed limiters in LTA's buses have "retarder functions" that can actively reduce the speed of a bus when it exceeds the designated speed limit?

(b) if a device is currently adopted by LTA, please share with the Committee information on its use by LTA, including the year when the device was adopted for use on buses, the name of the supplier of the device, a brief description on the mechanism by which the device functions, as well as any assessment by LTA on the effectiveness of the device in enhancing bus safety.

(c) if a device was considered by LTA and LTA decided against its adoption, please share with the Committee the findings of any research, trial or assessment conducted by LTA with respect to that device.

5. In addition to the devices listed in paragraph 1 above, the Committee notes from a news article published on 4 August 2014 by the Strait Times (**Appendix II**, source: http://www.straitstimes.com/singapore/transport/new-devices-on-smrt-buses-for-safer-ride) that the SMRT has "installed recorders in buses to track if its drivers are speeding or driving recklessly" (i.e. whether the drivers have "exceeded the 60kmh speed limit, accelerate or brake too abruptly and change lanes or take a turn too sharply") and that "SMRT said it is also using big data analytics to study driving behaviour and routes, to identify areas for improvement".

6. The Committee has also learnt from another news article from the Strait Times published on 29 June 2017 (**Appendix III**, source: www.straitstimes.com/singapore/transport/tracker-helps-bus-drivers-to-better-their-performance) that Tower Transit, one of the bus operators in Singapore, has adopted a Greenroad telematics system "which tracks how a vehicle is driven in real time via GPS and sensors".

7. In connection with the telematics devices described in the news articles in paragraphs 4 and 5 above, the Committee would like to invite the LTA to provide information on the following questions:

(a) what devices currently installed on LTA's bus fleet are used for the purpose of monitoring the driving behaviour of bus drivers, e.g. driving speed, sudden acceleration, harsh braking, etc.?

(b) how is the information collected by the device for monitoring driving behaviour used? Is the monitoring of driving behaviour (using this information) conducted by the LTA or the bus operators? Has consideration been given to conducting real-time monitoring of driving behaviour so that the LTA and/or bus operators can intervene in real-time if a driver is driving in an unsafe manner?

(c) please provide information on the use of "big data analytics" for studying driving behaviours mentioned in paragraph 4 above, including whether it is still in use, the purpose of the analysis and its effectiveness.

(II) The installation of seat belts on franchised buses

8. TD set out the recommendations of the Working Group on the installation of seat belts on franchised buses in Hong Kong in paragraphs 10 to 17, which stated that seat belts would be provided for all seats in future procurement of new buses and consideration would be given to retrofitting seat belts for some of the seats of some of the existing buses. Annex B to the paper also noted that there were no requirement in all seven jurisdictions which it reviewed, including Singapore, for buses to have seat belts installed.

9. In connection with paragraph 8 above, the Committee would like to invite the LTA to provide information on the following questions:

(a) is the statement that there is no requirement for the installation of seat belts on buses in Singapore, referred to in paragraph 8 above, an accurate description of the current arrangements for LTA's bus fleet?

(b) what, if any, consideration / review has been given / conducted to installing / retrofitting seat belts on LTA's bus fleet, including their technical feasibility, applicability in terms of usage and risk factors, and cost-benefit considerations?

(III) Traffic management measures facilitating bus operations

10. The Committee notes from a research report prepared by the Legislative Council of Hong Kong (excerpt at **Appendix IV**, source: www.legco.gov.hk/research-publications/english/1415in05-franchised-bus-servi

ces-in-seoul-and-singapore-20150203-e.pdf) that Singapore has implemented a bus lane scheme and a Mandatory Give-Way to Buses scheme. The Committee also notes that the LTA has the following webpages on the two schemes:

Bus lane scheme: http://www.lta.gov.sg/content/ltaweb/en/roads-and-motoring/road-safety-and-regulations/road-regulations.html and www.onemotoring.com.sg/content/onemotoring/en/on_the_roads/traffic_management/full_day_bus_lanes.html

Mandatory Give-way to Buses scheme: www.lta.gov.sg/content/ltaweb/en/public-transport/buses/mandatory-give-way-to-buses-scheme.html and http://www.onemotoring.com.sg/content/onemotoring/en/on_the_roads/traffic_management/mandatory_give_way.html

11. In connection with the bus lane scheme and the Mandatory Give-Way to Buses scheme, the Committee would like to invite the LTA to provide information on the following questions:

(a) did the LTA conduct any research, trial or assessment when introducing the bus lane scheme (including the extension of the scheme in 2005 to include full-day bus lanes) and the Mandatory Give-Way to Buses scheme? If so, please share the findings with the Committee. The Committee is particularly interested in any possible concerns on the drawbacks of such schemes (e.g. impact on traffic flow on roads with high traffic volumes) and how they have been overcome.

(b) the Committee notes from LTA's webpages that LTA makes use of on-board bus lane enforcement cameras and traffic wardens to enforce the bus lane scheme. On these, the Committee would like to know:

(i) who operates the on-board bus lane enforcement cameras and how? For example, is it the case that the camera is on at all times and that the operator only needs to record the time of the day when a violation of the rules of the bus lane scheme takes place so that the Traffic Police can follow it up? Or does it require the operator to press a button to start recording a video footage after witnessing a violation of the rules?

(ii) are bus operators and bus drivers expected to play a role in the enforcement of the bus lane scheme?

(iii) how is the video footage captured by the on-board bus lane

enforcement cameras used in the investigation and prosecution of offences?

(iv) what is the role played by the traffic wardens?

(v) when the bus lane scheme was implemented in 1974 and when the scheme was extended to include full-day bus lanes in 2005, how were the changes received by the drivers of other vehicles? How long did it take for them to get used to the changes?

(c) how is the Mandatory Give-Way to Buses scheme implemented?

(d) (i) what percentage of bus stops are covered in the Mandatory Give-Way to Buses scheme? What are the criteria for determining which bus stops are covered by the scheme?

(ii) are enforcement cameras either on buses or on the roadside used to investigate and prosecute offences?

(IV) Bus driver training

12. Please provide information relating to the content and length of the following types of training:
(a) training for newly recruited full-time bus drivers;
(b) training for newly recruited part-time bus drivers;
(c) refresher training for full-time bus drivers;
(d) refresher training for part-time bus drivers; and
(e) remedial training for bus drivers and the criteria for determining which drivers should receive such training.

13. Has any training been provided to bus drivers on fostering passenger relationship and the handling of difficult passengers, in particular those who abuse or attack the bus drivers physically?

(V) Bus service monitoring

14. The Committee notes that the LTA has established a set of Quality of Service ("QoS") Standards that all bus operators are required to comply with and the standards are set out on the following webpage: www.lta.gov.sg/content/ltaweb/en/public-transport/buses/lta-role-in-public-bus-services/quality-of-service--qos--standard.html.

15. In connection with the QoS Standards, the Committee would like to invite the LTA to provide information on the following questions:

(a) how were the two existing QoS standards, i.e. the figures of "96% of the total Scheduled Mileage" in QoS Standard 1.1 and "0.75 accidents per month per 100,000 bus-km" of QoS Standard 2.1, determined? The Committee notes that these two standards were also included in the Operating Performance Standards used before the adoption of the Bus Contracting Model (www.lta.gov.sg/content/ltaweb/en/public-transport/buses/lta-role-in-public-bus-services/quality-of-service--qos--standards--pre-bcm-.html). How were the Operating Performance Standards were determined in the first place? On what basis was their use continued in the Bus Contracting Model?

(b) are there any mechanisms in place to ensure that bus operators will regularly review the safety aspect of their operations and have any safety performance indicators been devised to measure their safety performance apart from accident occurrences? For example, the Committee notes that franchised bus operators in Hong Kong are required by the TD to prepare annual Forward Programme Plans that, amongst others things, include statistical analysis on the types and causes of accidents involving their buses. A sample of the analysis prepared by one of the bus operators in 2017 is attached as **Appendix V** for reference.

(c) have any bus operators ever been found to have failed in complying with the QoS Standards and therefore penalised financially? If yes, please provide information on the number of such instances and the amount of financial penalties involved.

(d) the extent to which the QoS Standard pertaining to accident involvement (QoS Standard 2.1) would impact the driving behaviour of bus drivers to enhance bus safety having regard to the fact that the penalty is inflicted upon the respective bus operator, and whether a corresponding penalty / incentive system is in place to incentivise good driving behaviour thereby enhancing bus safety.

- End -

For discussion on
25 July 2018

Legislative Council Panel on Transport
Enhancement of Safety of Franchised Buses

Purpose

This paper briefs Members on the recommended measures to further enhance safety of franchised buses ("FBs").

Background

2. Following a fatal traffic accident involving a franchised bus of the Kowloon Motor Bus Company (1933) Limited ("KMB") at Tai Po Road on 10 February 2018, the Transport Department ("TD") set up in mid-March 2018 a Working Group on the Enhancement of Safety of Franchised Buses ("WG"), which comprises members from all FB operators [1] and the major bus manufacturers[2], to consider and study possible measures to further enhance bus safety. The scope of work of the Working Group covers the following major areas:-

(a) to explore the technical feasibility, applicability and cost-effectiveness of, and any other issues relating to the installation of in-vehicle safety devices/technologies and seatbelts on all seats of FBs; and

(b) to review the training arrangements adopted by the FB operators.

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[1] The five FB operators in Hong Kong are –
(a) KMB,
(b) The Long Win Bus Co. Ltd. ("LW"),
(c) Citybus Limited ("CTB"),
(d) New World First Bus Services Limited ("NWFB"), and
(e) New Lantao Bus Co., (1973) Ltd ("NLB").

[2] Three major bus manufacturers, which currently supply all the double-deck buses to the five FB operators, viz. Alexander Dennis Limited, Volvo Bus, and Regal-MAN, have been invited to join the technical meetings under the WG.

3. So far, the WG has held three meetings since March 2018; the Technical Group under the WG has also met five times. The findings and recommendations of the WG are set out in the ensuing paragraphs.

In-vehicle safety devices/technologies

Proposed installation of in-vehicle safety devices

4. With the relevant bus manufacturers' confirmation on the technical feasibility, all FB operators have committed that all **new double-deck buses** procured from July 2018 onwards will be incorporated with the following two in-vehicle safety devices :-

(a) **Electronic Stability Control ("ESC")** - The ESC is an electronic control program for improving the stability of a vehicle by detecting and reducing the loss of traction, e.g. skidding. The ESC also provides roll stability control which can reduce the risk of a vehicle to rollover in extreme cornering or evasive manoeuvres. In mitigating the loss of control when a vehicle is cornering, the ESC would detect loss of steering control (i.e. under-steering or over-steering when the vehicle is cornering) and will automatically activate the electronic braking system of the vehicle to assist steering of the vehicle to keep the vehicle running on its intended track. Braking of the vehicle may automatically be applied to the vehicle wheels individually. ESC may also reduce the engine power until the control of the cornering vehicle is regained.

(b) **Retarders for capping the maximum speed of the speed limiters on downhill ("speed limiting retarder")** - All FBs are now equipped with speed limiters to limit the maximum speed of a bus at 70 km/hour. The current speed limiter performs its function by means of cutting off fuel supply to the engine when the speed is over 70 km/hour, but it cannot control over-speeding downhill which is steep enough for the vehicle to be in free roll by the force of gravity. It is technically feasible to enhance the speed limiter with a "retarder" to slow down a bus when the speed is over 70 km/hour under the downhill situation.

5. As for **existing buses**, the bus manufacturers have confirmed that it should be technically feasible to provide ESC and speed limiting retarder on some buses of the newer models[3], subject to the development of the retrofitting scheme and tests. Out of the total fleet of about 6 000 existing FBs, about 3 300 double-deck buses may be feasible for retrofitting. The WG recommends that the FB operators and the bus manufacturers start the development of these two add-on devices for existing buses, with a working target to commence the tests of the devices and trials of the retrofitting work in about 12 to 18 months (i.e. in the second half of 2019). Subject to proven technical feasibility and financial viability, all FB operators would then develop detailed plans for retrofitting.

Trials of new safety technology

6. In order to enable the FB operators to step up their management and control of their bus fleet, and reduce the potential risks arising from human errors or effect of unsafe driving behaviour, the WG considered that new safety technology which can assist the FB operators in monitoring and controlling bus safety should be actively explored. Generally, the FB operators have committed to further exploring sources of supply of various latest safety devices/technology and launch **trials** with a view to establishing the technical feasibility and cost-effectiveness of their application in FBs :-

(a) **Bus Monitoring and Control System ("BMCS")** - In view of the latest technological development in bus fleet management system and black box with functions on real time fleet supervision, bus speed recording, Global Positioning System ("GPS") location recording, etc., the WG considered that it should be a medium-term goal for FB operators to develop a comprehensive BMCS with positioning function, operational information monitoring function, and variable speed limiting function with geo-fencing technology. In brief, by making use of GPS or other positioning technologies, the system will match the legal speed limit at the actual bus location. This real time speed limit information can then be used to control the enhanced speed limiter (i.e. speed limiter with 2 speed settings). In other words, the bus speed could be controlled or limited within the applicable speed

[3] These include Euro V buses of ADL Enviro 500 manufactured from 2013, Volvo B9TL and MAN A95 buses and all Euro VI buses.

limits (i.e. 50km/hour or 70km/hour depending on the road section). The system will also enable the FB operators to monitor their bus fleet more closely and to take appropriate management action against over speeding and other unsafe or improper driving behavior such as heavy braking or inappropriate speed during cornering or downhill. To this end, FB operators have agreed to proceed with developing the system and conducting trials in two phases, namely:-

(i) Phase 1 : A BMCS with positioning function, operational information (such as vehicle speed, brake status, deceleration, etc.) monitoring function and geo-fencing technology for fleet management will be put on trial to achieve detection of speeding and provide real-time alert to the bus captains; and

(ii) Phase 2: Subject to the successful development of the Phase 1 Trial, the BMCS so developed will be incorporated with additional application of enhanced speed limiter being developed by bus manufacturers so as to limit the bus speed in accordance with the corresponding speed limit of various road sections.

(b) **Collision alert and lane keeping devices** - The collision alert system is an add-on device which will give an alert to the bus captain in the event of a possible crash. The lane keeping device is also an add-on device to alert the bus driver when the bus starts moving away from the lane other than proper steering. Both devices are available in the market. Thus, trial of using the devices in FB to assess their applicability and effectiveness is recommended.

(c) **Driver monitoring device** – Such device monitors the bus captain's behavior on-board and alerts him / her if it detects a lack of attention or drowsiness. When the system detects potential unsafe behaviours such as "looking aside", 'dozing", "drowsiness" or "bad posture", the system will give visual warning and voice alert. Such device is available in the market, and trial of using it in FB to assess its applicability and effectiveness is recommended.

7. Details of the above-mentioned proposed trials and the target timeframe for the trials are set out in **Annex A**

8. To evaluate the applicability and effectiveness of using geo-fencing technology to control vehicle speed, which is one of the vital parts of the BMCS mentioned in paragraph 6(a) above, the TD plans to engage a service provider to carry out an independent trial on vehicles. A trial of the technology will be conducted first on private cars. Subject to the satisfactory result of the technological trial on private cars, the hardware system for controlling the speed limiter of buses will be developed. The independent trial is at preliminary planning stage, and further details of the trial will be developed.

9. The WG has also explored the proposal for installing a speed display unit ("SDU") in bus compartments to provide visual display of the current speed of FB for information of the passengers on-board. Although such device is technically not difficult to install, the FB operators cautioned the WG that it may give rise to possible conflicts between the bus captains and the passengers on board, and that bus captains may have concerns on the proposal. The WG considers that at this juncture, the priority should be to ask the FB operators to press ahead on the development and trials of the BMCS, which is a more effective and comprehensive solution for monitoring the operation and driving behaviour of bus captains, instead of pressing for the installation of the SDU and relying on passengers to monitor the vehicle speed.

Installation of Seat Belts on Passenger Seats

Technical feasibility

10. At present, all the exposed seats[4] on FBs are installed with seat belts to prevent passengers from falling out from the seats.

[4] Exposed seats refer to forward facing seats in a FB which are not immediately behind another forward-facing seats or an internal partition/panel. Usually, there are about one and 14 exposed seats on a single-decker and a double-decker respectively. Unlike other non-exposed seats, which there are some forms of "restraints" (either a seat back or a partition) that can help restraint the passengers from falling out of the seats during accidents, exposed seats do not have such restraints. Installation and use of seat belts on these exposed seats provide some protection in restraining the passengers from falling out of the seats.

11. As confirmed with the bus manufacturers, it is technically feasible to supply all new buses with seat belts for all passenger seats conforming to relevant international standards. In this regard, all FB operators have agreed that all passenger seats of **all new buses** ordered from **July 2018 onwards** will be installed with seat belts.

12. Regarding retrofitting of seat belts on all passenger seats of existing buses, the bus manufacturers have advised that the floor structure (especially on the lower deck) of the existing buses is not designed for seat belt installation and that the bus body's frame cannot absorb the relevant impact force. Hence, reinforcement of the existing floor structure, body's frame and replacement of all the existing passenger seats by those with seat belts fitted is required. In practice, retrofitting seat belts on passenger seats, in particular those on the lower-deck, will involve substantial modification and reinforcement of the bus chassis, including reinforcement of the structure of the FB, addition of support mountings, replacement of all seats by those with seat belts, as well as passing the pull tests of the seat belts and seats to confirm their compliance with the international standards, etc. Considering the above, the bus manufacturers have advised that it is technically impracticable, if not infeasible, to retrofit seat belts on all passenger seats of both upper and lower decks.

13. However, it should be more feasible to retrofit seat belts on **all passenger seats of the upper deck only in some vehicle models** of the existing double-deck fleet. If all passenger seats on the upper deck are retrofitted with seat belts, it is expected that the weight of the bus will be increased by 300 to 400kg and consequently the passenger carrying capacity may need to be reduced by 7 to 8 passengers.

14. In this regard, the WG considers that time and manpower resources are critical. The bus manufacturers do not have the required labour and workshop facilities in Hong Kong to conduct the retrofit work. The FB operators would need to spare their skilled workers and workshop facilities for the work; at the same time, the regular vehicle maintenance work should not be affected. The FB operators would also need to arrange the retrofit work carefully so that they would have enough FBs for the provision of service and as backup vehicles at any point of time. Some bus operators have expressed concerns that the

retrofitting of seat belts would not only incur significant financial implication[5], but also considerable time and manpower resources, not to mention the need to re-deploy or procure additional buses to maintain the existing bus service level during the whole process.

Overseas' experience/practices

15. The WG has reviewed the prevailing overseas practices or requirements on the installation and wearing of seat belts on buses. Currently, for inter-cities or cross-boundary routes, some overseas jurisdictions (e.g. United States, United Kingdom and Netherlands) have mandated the provision of seat belts for all passenger seats, while others (e.g. United Kingdom, Netherlands, and Australia (Victoria)) have imposed mandatory requirement of wearing seat belts. Nevertheless, for buses serving urban routes buses or buses allowed to carry standing passengers, none of the overseas jurisdictions that the WG has reviewed thus far have statutory requirements for the provision of seat belts on passenger seats. According to the transport authorities of those jurisdictions, the urban buses are typically used for short journeys, in terms of both time and distance, and undertaken at moderate speeds on urban routes. Thus, no seat belt requirement at passenger seats on these urban buses has been imposed. A summary of the findings is at the **Annex B**.

Recommendation and proposed way forward

16. Having regard to the points mentioned in paragraphs 10 to 15 above, the WG has arrived at the following recommendations with a view to giving extra protection to seated passengers :-

(a) seat belts should be provided for **all seats** in future procurement of **new buses**; and

(b) subject to further assessment on the technical, operational and financial feasibility, consideration may be given to retrofitting all seats in the **upper deck with seat belts on buses deployed for specific bus routes**,

[5] With the absence of detailed study on the technical details for retrofitting seat belts on all seats in the upper deck, a rough estimate on the costs of retrofitting a bus is about HK$200,000 (excluding manpower and overhead costs).

i.e. long-haul routes which are operated via expressways [6] with relatively fewer bus stops[7].

17. The TD will require the FB operators to explore in more details in conjunction with the bus manufacturers to ascertain the technical feasibility of retrofitting seat belts on the upper deck of different bus models, the operational and capacity considerations in developing the timetable for the retrofitting works and how such considerations may be addressed, as well as the financial implications, in order to decide whether and, if so, how all passenger seats on the upper deck of existing double deck buses deployed for long-haul routes mentioned in paragraph 16(b) can be retrofitted with seat belts. In the meantime, the TD will work with the FB operators to promote the use of seat belts if they are available (at exposed seats or on new buses).

Training for Franchised Bus Captains

18. The WG has also reviewed the existing training arrangements provided by the FB operators to bus captains. The WG has agreed that the TD should promulgate a practice note on training framework for FB captains. The practice note seeks to align the training arrangements of different FB operators and lay down a set of industry-wide standard practices in respect of the FB captains' training framework, including the basic requirements on modules, as well as duration and weighting, so as to provide a common basis for internal monitoring and audit within individual FB operators.

19. Under the practice note, the structure of the training arrangement for bus captains, irrespective of whether they are full-time or part-time bus captains, should at least include :-

(a) Regular Training

(i) *induction course for new recruits* would include both classroom training and behind-the-wheel road training in order to equip them

[6] Examples are the Island Eastern Corridor, Kwun Tong Bypass, Tolo Highway, Tuen Mun Road, the North Lantau Highway, Tsing Long Highway, etc.

[7] According to the FB operators, about 2 000 buses are deployed on these routes.

with the necessary information and skills and experience in bus operations before providing passenger service; and

(ii) *refresher course* once every three years to share important and current job-related information with the in-service bus captains.

(b) Special-purpose Training

(i) *new bus route training*, in the form of behind-the-wheel training, for in-service bus captains to ensure that they are familiar with the route before they are deployed on service;

(ii) *training for operating new bus type /model with new driving features*, in the form of behind-the-wheel training, for in-service bus captains to ensure that they are familiar with the operation of the new bus type/model before they are deployed to operate the new bus type/model on service; and

(iii) *remedial training* for in-service bus captains with improper driving behaviour or attitude.

20. As for the regular trainings for bus captains, the practice note has also aligned the modules, with relative weightings, to be covered. Such trainings should cover the following modules :-

Modules	**Weightings**
(a) Safe driving and road safety	60% - 85%
(b) Cognition of in-vehicle device/facilities	
(c) Handling of incident/emergency	15% - 40%
(d) Customer service & emotional management	
(e) Knowledge of company rules, traffic regulations, occupational health and safety	

21. To ensure that adequate and appropriate trainings are provided to the bus captains, the FB operators have agreed to and will set up an internal monitoring and audit mechanism to develop key indicators to measure the effectiveness of the training system provided to bus captains, monitor the

performance of indicators, and in the light of the findings of the monitoring effort, to review and determine appropriate actions or measures.

22. Given that different FB operators have different bus networks operating in different operating environment, it is necessary for them to tailor make individual specific training programmes to cater for their respective operational needs while following the common framework and standards as set out in the above-mentioned practice note. The FB operators are revamping their training courses and will start implementing the new arrangements in accordance with the practice note by phases starting from October 2018 onwards. The TD will review the practice note with FB operators on a regular basis, in order to strive for the best standard practices to cater for the ever-changing operating needs and public expectations on safe FB services.

Advice sought

23. Members are invited to note the content of this paper.

Transport and Housing Bureau
Transport Department
July 2018

Annex A

Proposed Trials on In-vehicle Safety Devices and Technologies on FBs

Proposed in-vehicle safety devices/technologies	Trials Recommended	Target Timeframe
(1) Bus monitoring & control system (BMCS) – An integral system with positioning function, operational information monitoring function, variable speed limiting function with geo-fencing technology. Phase 1 Trial : BMCS with positioning function, operational information (such as vehicle speed, brake status, deceleration, etc.) monitoring function and geo-fencing technology for fleet management to achieve detection of speeding and provide real-time alert to the bus captains. Phase 2 Trial : BMCS to utilize the functions developed in Phase 1 together with speed limiter with 2 speed settings, being developed by bus manufacturers to achieve automatic speed limiting functions (50km/hr or 70km/hr depending on the speed limit of road section).	KMB/LW were conducting trial with a bus manufacturer to test the speed limiting by GPS. All FB operators would develop and conduct trial on the application of GPS technology for their bus fleet monitoring & speed control system. Phase 1 trial on the application of GPS will include at least 2 routes for each FB operator.	Phase 1 trial to be embarked by end 2018. Phase 2 trial to be embarked within 2019, subject to the satisfactory trial result of Phase 1 and the satisfactory development of speed limiter with 2 speed setting.

Proposed in-vehicle safety devices/technologies	Trials Recommended	Target Timeframe
(2) Collision alert/ lane keeping devices	CTB/NWFB will install this device in 5 buses for training and assessment purposes. These buses will also be deployed on service trips. KMB/LW and NLB will explore similar devices from different suppliers and embark on a trial.	To embark on the trial by end 2018.
(3) Driver monitoring device	KMB/LW will embark on a trial on this device on 4 buses. CTB/NWFB and NLB will explore similar devices from different suppliers and embark on a trial.	To embark on the trial within 2018.

Annex B

Summary of Statutory Requirements of the Fitting/Use of Seat Belts on Buses in Overseas Jurisdictions

Jurisdictions	Installation Requirement	Type	Wearing Requirement
United States	All passenger seats (Except for urban buses)	3-point/ lap-belt	Not mandatory
United Kingdom	All passenger seats (Except for urban buses with standing passengers)	3-point/ lap-belt(1)	Mandatory
Netherlands	All passenger seats (Except for public transport buses)	Lap-belt	Mandatory
Australia (Victoria)	Only exposed seats (Except for buses with standing passengers)	Lap-belt	Mandatory
New Zealand	No	N/A	N/A
Canada	No	N/A	N/A
Singapore	No	N/A	N/A

Note:

1. Lap-belts may only fitted in forward facing non-exposed seats where an appropriate energy absorbing seat or surface is present in front.

2.13 Upon the introduction of distance-based fare charging system, the commuters are found to pay about 30% less on average for using public transportation service. Even if a passenger travels a long distance with multiple transfers, the system is designed to charge less than the old way of charging per each ride.

Benefits of the franchised bus service reform

2.14 The bus reform introduced in 2004, coupled with the subsequent enhancement measures, has helped improve the operation of bus services in a number of areas, including:

(a) increasing bus speed from 11 km per hour to 22 km per hour;

(b) boosting the number of bus passengers by six times;

(c) enhancing the reliability of bus services by five times; and

(d) improving the punctuality of bus services, attributable to increased speed in the median exclusive bus lanes and scientific bus management with the use of the TOPIS system.[4]

3. Singapore

3.1 In Singapore, the franchised bus services[5] are intended to complement the mass rapid transit ("MRT") system and bring commuters closer to their destination. The Land Transport Authority ("LTA"), being a central bus network planner, aims to put in place an efficient, integrated and sustainable bus system which focuses on improving journey quality for commuters, thereby reducing reliance on private transport that causes the problems of traffic congestion and pollution.[6]

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4 Source: UN-Habitat (2013).

5 Franchised bus services are operated by two private companies, namely the SBS Transit Ltd and the SMRT Buses Ltd.

6 LTA works with the Public Transport Council ("PTC") and the latter is an independent body established in 1987 to monitor the quality and affordability of bus services. Together, they have established the Quality of Service Standard that all public bus operators must abide by.

3.2 Over the years, Singapore has implemented a comprehensive package of public transport measures to enhance bus services and network efficiency, featuring (a) bus route rationalisation, (b) provision of government funding for purchasing more buses to improve service frequency, reliability and comfort levels, (c) installation of more integrated transport hubs and bus hubs, (d) implementation of bus priority measures and (e) offer of real-time bus information for commuters.

Bus route restructuring

3.3 To provide quality bus services and enhance network efficiency, LTA took over the role of bus planning from the operators in 2010 and published the Bus Route Master Plan for public consultation. The Master Plan mapped out detailed bus routes, service specifications and infrastructure facilities for the bus network over the next three to five years. Under the Master Plan, LTA adopted three key principles for the planning of the bus routes:

(a) improving journey quality, including greater transfer convenience, better service reliability and where possible, shorter journey times;

(b) having better integration between bus and rail, with buses feeding the MRT network directly and quickly for a more effective hub-and-spoke model; and

(c) maintaining the overall financial viability of the bus system.

3.4 During the public consultation exercise, LTA met with communities across the country to collect their views on how to improve the efficiency of the bus network. One common feedback was that services covering long distances were unreliable. LTA proposed to split a long bus route into two shorter complementary routes, notwithstanding the trade-off of requiring commuters who used it for longer inter-town travel to make a transfer. As a remedial measure, LTA suggested the installation of more user-friendly transit interchanges. After seeking the approval from PTC, LTA went ahead with the proposal and phased in the changes to the bus routes progressively starting from end-2010 to allow more time for commuters and bus operators to adjust.

Provision of more choices for bus users

3.5 In recent years, LTA has allowed bus operators the flexibility of making use of service and fare differentiation to cater for the needs of diverse commuter segment. A case in point is the introduction of premium bus service scheme for commuters who are prepared to pay a higher fare for having better bus service, e.g. a more direct journey with a more comfortable ride and guaranteed seats. The provision of premium bus services is positioned to bridge the gap between personalised services (i.e. cars and taxis) and basic bus/rail services. To encourage greater market participation and innovation by private bus operators, there are minimal regulations in bus routes, fares and service frequency for such premium bus services. Another example is the launch of the more expensive Fast Forward bus services with fewer stops and flexible routing to avoid traffic congestion. Commuters travelling on Fast Forward buses can save up to 20% in travel time during the morning and evening peak hours.

Implementation of the Bus Services Enhancement Programme

3.6 Under the *Land Transport Master Plan 2013*, LTA plans to increase the length of the rail network by 55% from 178 km in 2012 to the targeted length of 278 km in ten years' time. As new rail lines take time to build, LTA launched the Bus Service Enhancement Programme ("BSEP") in 2012 to address commuters' concerns, particularly bus crowding and frequency. Under BSEP, a total of S$1.1 billion (HK$6.7 billion) has been earmarked for purchasing 1 000 new buses and introducing 80 new bus route services between 2012 and 2017 to enhance connectivity and improve bus service levels.

3.7 The first phase of BSEP, comprising the purchase of 550 new buses and the offer of 40 new bus route services, was completed at end-2014. The second and final phase will involve purchasing 450 more buses during 2015-2017, and increasing available resources for an additional 40 expanded bus route services.[7] Upon the full implementation of BSEP by 2017 and with new purchase made by private bus operators, the total capacity of the bus system will increase by about 35%, or about 1 400 buses, in five years.

[7] Most of these new bus routes will be feeder or short trunk services to serve new areas of developments such as Sengkang and Punggol.

3.8 Under BSEP, the public bus operators are required to improve bus frequencies, especially during peak periods. It is stipulated that 90% of all bus services must operate within 10-12 minute intervals. In particular, more feeder bus services are required to run at scheduled intervals of 10 minutes or less.

Installation of more integrated transport hubs and bus hubs

3.9 LTA is committed to providing more and better connections for commuters by installing more integrated transport hubs where air-conditioned bus interchanges and rail stations are co-located with retail and commercial activities. The provision of integrated transport hubs allows transfers to be done more comfortably and provide added convenience as commuters can do some shopping before transferring to their connecting MRT or bus. All bus interchanges are barrier-free and have wheelchair-accessible facilities.

3.10 Seven integrated transport hubs are currently built, which are located at Bedok[8], Boon Lay, Ang Mo Kio, Clementi, Sengkang, Serangoon and Toa Payoh. Six more will be provided at Bukit Panjang, Hougang, Joo Koon, Jurong East, Marina South and Yishun in tandem with re-development in the respective areas over the next 10 years.

3.11 In addition, LTA has developed bus hubs to create more waiting and boarding space for commuter comfort and reduce the average time each bus needs to dwell at the bus stops. These bus hubs are installed with real-time bus arrival/departure information panels to help passengers better manage their travel time.

[8] The Bedok Integrated Transport Hub was opened in November 2014. The 1.6 hectare interchange is one of the largest bus interchanges in Singapore with 29 bus services calling at it. The new interchange is expected to benefit about 40 000 commuters daily.

Provision of bus priority measures

Implementation of bus lane scheme

3.12 One of the key bus priority measures in Singapore is the implementation of bus lane scheme[9] to give priority to buses on the road, enabling them to enter and exit stops more smoothly and provide faster rides for commuters. After several rounds of extension, the length of bus lanes increased to 150 km in 2014 from 120 km in 2008.

3.13 In a measure to ensure that the bus lane scheme remain effective in improving travel time for buses, LTA has made use of traffic wardens and on-board bus lane enforcement cameras. The traffic wardens are deployed at various hotspot areas to record the vehicle licence plate number of motorists who infringe bus lanes. These locations are usually the ones where most of the scheduled buses were obstructed.

3.14 In addition, about 90 buses across 12 SBS Transit[10] bus services that ply along routes with bus lanes are fitted with video cameras to record bus lane infringements (**Figure 1**). This system requires little intervention by the driver as the video is set to continuously monitor the road in front of the bus. The video camera also allows LTA officers to assess the circumstances more accurately if motorists are caught on video infringing bus lanes. As for the penalty, motorists who drive on bus lanes during restricted hours are fined S$130 (HK$795).

[9] Aside from buses, only emergency service, police vehicles and bicycles are allowed on bus lanes. There are two types of bus lane in Singapore: (a) normal bus lanes (operating from 7:30 am to 9:30 am and from 5 pm to 8 pm between Monday and Friday) and (b) full-day bus lanes (operating from 7:30 am to 8 pm between Monday and Saturday).

[10] The SBS Transit is a public transport operator providing both bus and rail services. It has established a strong presence in the bus services market with a total fleet of close to 3 000 buses and a 75% market share.

Figure 1 — Video camera to detect bus lane infringement

Source: Land Transport Authority.

Provision of the Mandatory Give-Way to Buses scheme

3.15 The Mandatory Give-Way to Buses scheme[11] is also an important measure implemented to improve the speed and reliability of bus services. The operation of this scheme is similar conceptually to a zebra crossing, except that it is meant for buses. When nearing a bus stop under the scheme, motorists will first see triangular give way markings on the road (**Figure 2**). These markings indicate that motorists approaching these bus stops need to slow down and watch out for buses pulling out of the bus bay. Motorists come to a complete stop before the give way line and give way to buses exiting the bus bay at the location. Motorists may continue their journey once the bus has successfully exited the bus bay.[12] As for the penal provision, motorists who do not give way to buses exiting from bus bays, where the new road markings are drawn or if they stay in the yellow box marked "Give Way to Buses" are liable to a fine of S$130 (HK$795). According to LTA, after implementing the bus priority measures, bus average speeds have been increased from 16-19 km per hour to 20-25 km per hour.[13]

[11] Signal priority is also given for buses approaching some major junctions by extending the green-time for them.

[12] As of November 2014, there were a total of some 320 bus stops under this scheme. LTA is tasked with reviewing and implementing the scheme in phases to benefit more commuters.

[13] Source: Land Transport Authority (2015).

Figure 2 — Illustration of bus stop with Mandatory Give-Way to Buses scheme

Source: Land Transport Authority.

Offer of real-time bus information for commuters

3.16 Commuters need accurate information to plan their journeys. For example, if a commuter knows one bus is running late, he or she may choose to hop on another bus going in the same direction. LTA has worked with the public bus operators to ensure that commuters can see departure times of all bus services departing from interchanges. Currently, bus arrival times can be shown on bus arrival information display panels at over 100 bus stops across the city. Furthermore, LTA is working on a project on the feasibility of providing information on the level of crowding on buses so that commuters can make more informed choices for their journeys.

3.17 LTA has also launched MyTransport.SG, a portal that consolidates information and e-services for land transport users. Within MyTransport.SG, MyTransport.SG Mobile provides commuters information on public transport services on mobile devices, including real-time bus arrival information that is also shown on display panels at the bus stops across the city. Commuters may also make use of the Journey Planner to plan their journeys using public transportation. The portal's interactive map covers bus and rail trips that can be made across the city.

Introduction of distance-based fare charging system

3.18 LTA has introduced the distance-based fare charging system to give commuters a more equitable fare structure based on distance travelled

regardless of the mode of public transport used (between bus and MRT, and between buses) and the number of valid transfers made. With distance-based fares, commuters pay the same fare whether they travel directly to their destination, or make transfers during the journey. Commuters have the flexibility to decide on the best route to reach their destination.

Improvement of reliability through operations

3.19 In addition to the above measures implemented for improving the operating environment of franchised bus operators, LTA works with PTC to put in place the Quality of Service ("QoS") Standards to safeguard commuters' interest in terms of bus service provision. Currently, the QoS standards comprise the following two categories:

(a) Operating Performance Standards which measure minimum daily or monthly operational deliverables, either at the bus network or route levels. They cover the aspects of bus reliability, loading and safety; and

(b) Service Provision Standards which measure overall bus route planning and provision of services. They cover the aspects of service availability, integration and information.

3.20 In cases of non-compliance with the QoS standards, PTC is empowered to impose financial penalty on franchised bus operators to keep service lapses to the minimum. The penalty quantum ranges from S$2,000 (HK$12,240) per day per bus service to S$100,000 (HK$612,000) per month per standard (see **Appendix** for the Operating Performance Standards and the Service Provision Standards for bus services, and the penalty framework for non-compliance with QoS Standards.) Based on the latest publicly available information, both the SBS Transit Ltd and the SMRT Buses Ltd[14] fully complied with all the QoS standards between December 2012 and May 2014.

[14] It operates a fleet of more than 1 050 buses, serving mainly in housing estates in northern and north-western Singapore.

Table 1 — Quality of Service Standards for bus services

Operating Performance Standards	
Reliability	
Scheduled bus trips operated on each bus service	At least 96% monthly.
Bus service should adhere to not more than five minutes of its scheduled headway (frequency) upon departure at the bus interchanges and terminals	Not less than 85% daily.
Bus breakdown rate on all bus services	Less than 1.5% monthly.
Loading	
Bus loading during weekday peak periods on each bus service	Not exceeding 95% daily.
Safety	
Accident rate on all bus services	Less than 0.75 per 100 000 bus-km per month.
Service Provision Standards	
Availability of up-to-date information	• To provide hotline and information on internet website for convenient trip planning. • To display information at all bus interchanges/terminals with passenger boarding activities. • To display information at all bus stops with display facilities. • To provide timetables at bus stops for bus services with long headway (i.e. headway of 20 minutes or more, for more than 20% of the bus trips).

Table 1 — Quality of Service Standards for bus services (cont'd)

Availability	
Access to any bus service	To run at least one bus service within 400 m radius of any development subject to minimum demand.
Provision of direct bus service connections	To run direct bus services: (a) between a public housing estate and a nearby bus interchange or MRT station; (b) between major employment/activity centres and a nearby bus interchange or MRT station; and (c) between public housing districts and downtown.
Bus service operating hours	At least 18 hours daily, unless otherwise stipulated by PTC.
Bus service scheduled headways (frequencies)	• At least 80% of bus services to operate at headway of not more than 10 minutes during weekday (excluding public holidays) peak periods, unless otherwise stipulated by PTC. • At least 90% of feeder bus services to operate at headway of not more than 10 minutes during weekday (excluding public holidays) peak periods, unless otherwise stipulated by PTC. • At least 85% of bus services to operate at headway of not more than 20 minutes during off-peak periods, unless otherwise stipulated by PTC. • 100% of bus services to operate at headway of not more than 30 minutes, unless otherwise stipulated by PTC.
Integration	
Bus service integration in public housing districts	• At least one bus service to depart from the bus interchange/terminal at 6 am or earlier, daily. • At least one bus service to depart from the bus interchange/terminal at 12 midnight or after the last train service, whichever is later, daily.

Source: Public Transport Council.

Table 2 — Penalty framework for Non-Compliance with the Quality of Service Standards

Service Provision Standards	
Standards	**Financial penalty**[(1)]
Operator-based (Monthly) standards	
All Service Provision Standards	S$100,000 (HK$612,000) per month on each non-compliant standard.
Operating Performance Standards	
Route-based (Daily) Standards	
Standard on headway adherence Standard on loading	S$20,000 (HK$122,400) for each non-compliant day on each non-compliant route.
Route-based (Monthly) Standards	
Standard on percentage of scheduled trips operated	S$20,000 (HK$122,400) per month on each non-compliant route.
Operator-based (Monthly) Standards	
Standard on bus breakdown rate Standard on accident rate	S$100,000 (HK$612,000) per month on each non-compliant standard.

Note: (1) All such sums collected by PTC shall go into the government's consolidated fund.
Source: Public Transport Council.

8. BUS SAFETY

8.1 Introduction

8.1.1 Safety is the top priority in the operation of KMB. Safety is enhanced through the strengthening of communication, documentation, training, deployment and performance monitoring as well as improvements in bus maintenance and design. Considerable efforts have also been made to promote traffic safety by passenger education and publicity.

8.1.2 This chapter includes an analysis of the types/causes of accidents for the past two calendar years (2015 and 2016) and the relationship of accident rates with respect to different factors, including bus captain age, length of service, and length of driving hours before the accident, bus types, etc.

8.1.3 The chapter further discusses the various measures that have been or are being undertaken to promote safety.

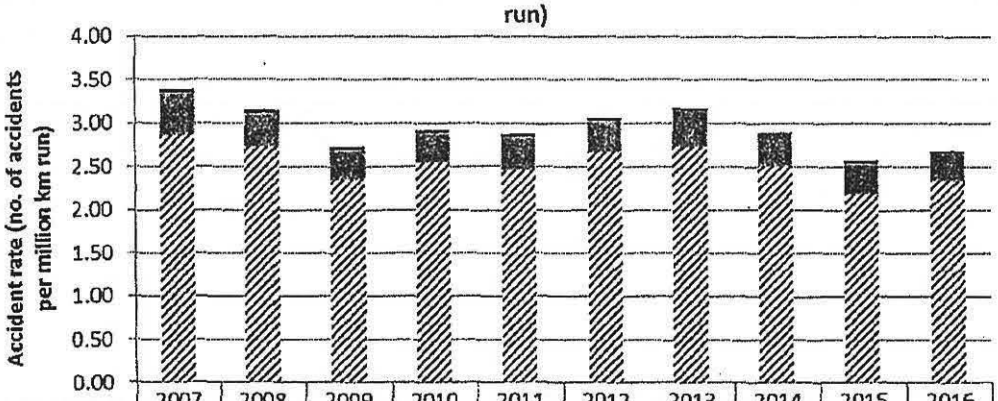
8.2 Analysis of Bus Accidents in the Past Two Calendar Years

8.2.1 The analyses for the two-year period 2015 to 2016. The results are presented below.

Trend of Accident Rates

8.2.2 Accident rates from 2007 to 2016 are shown in Figure 8.1. Following the increase in accident rate from 2011 to 2013, notable reduction was achieved in 2014 and 2015. Slight increase of slight injury was found in 2016.

Figure 8.1 KMB - Accident rates involving personal injuries and deaths (per million km run)



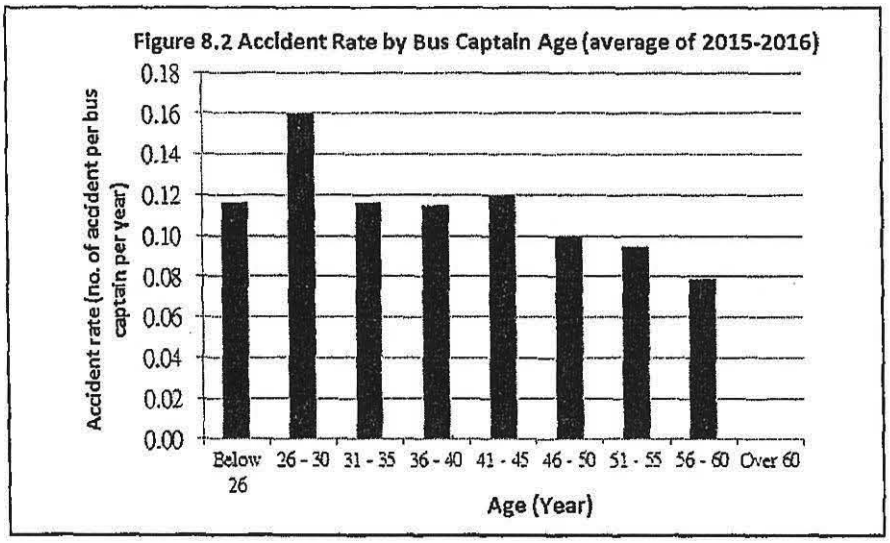
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Fatal Injury	0.04	0.03	0.02	0.02	0.03	0.02	0.02	0.00	0.03	0.02
Serious Injury	0.50	0.40	0.35	0.35	0.39	0.37	0.43	0.38	0.36	0.32
Slight Injury	2.85	2.72	2.35	2.55	2.45	2.66	2.72	2.51	2.18	2.34

Year

Accident Rate by Bus Captain Age

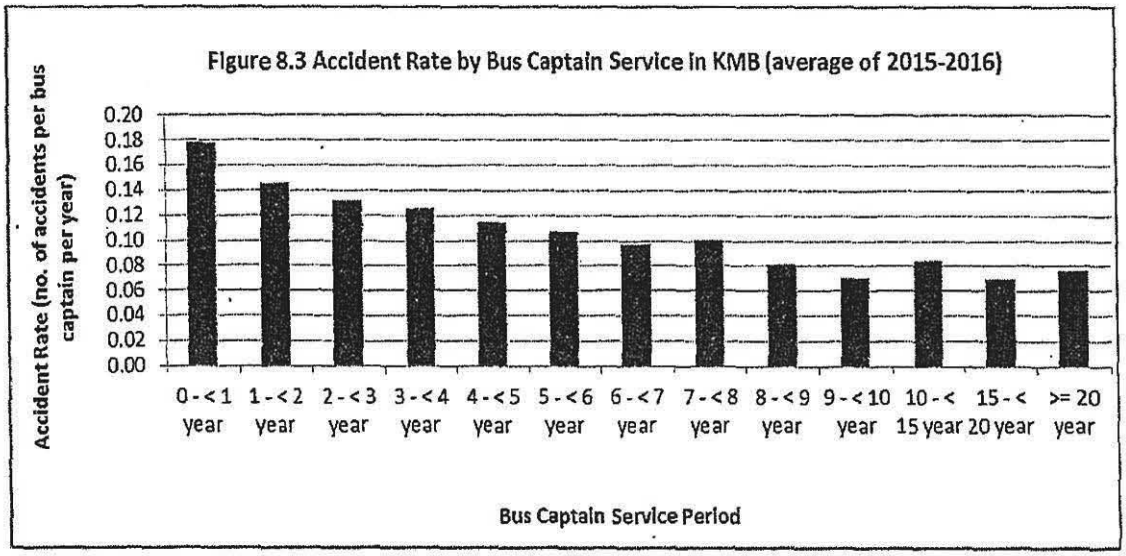
8.2.3 Results of an analysis of accident rate by bus captain age are shown in Figure 8.2. The results show that younger bus captains are more prone to higher accident rates, but this is mainly due to the fact that these bus captains have relatively less bus driving experience and they are more prone to accidents in their first few months of service. This is also shown in the relationship between accident rates and years of service.

Figure 8.2 Accident Rate by Bus Captain Age (average of 2015-2016)



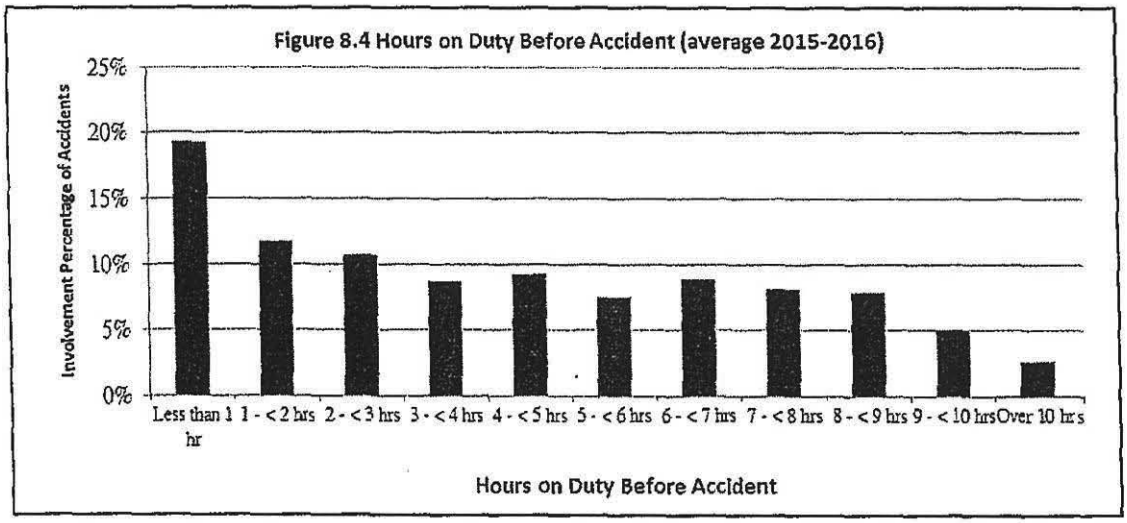
Accident Rate by Years of Service

8.2.4 The results of an analysis on accident rate by experience in terms of years of service in the Company are shown in Figure 8.3. As mentioned above, the likelihood of an accident occurring in the first year immediately following recruitment is relatively higher. The accident rate then falls as experience increases.



Accident Rate by Hours on Duty Before Accident

8.2.5 The analysis results in Figure 8.4 show that there is no correlation between the occurrence of accident and the number of hours on duty before the accident.



Accidents by Nature

8.2.6 The results of an analysis of accident nature are shown in Table 8.1 below. The results are expressed in terms of percentage of accidents during the two years 2015-2016.

Table 8.1 Accidents by nature in percentage

Accident nature	Percentage (%)
Passenger Loss Of Balance	51.5%
Head On/Tail Collision	13.5%
Collision W/TP Veh (changing lane)	11.4%
J/O Collision	6.0%
Injury To Pedestrian	4.8%
Glancing Collision	4.2%
Injury To Alighting/Boarding Passenger	3.2%
Hit St. Obj/Veh/Animal	2.2%
Injury To Passenger Inside Bus	1.7%
Collision With Other Veh (rolling back /forward /reversing)	0.6%
Others	0.6%
Entering R/A Collision	0.2%
Bus Overturn/Topple	0.1%
Total:	100.0%

8.2.7 The majority of the accidents (51.5%) were due to passengers losing balance while on the bus. More than half of these cases were caused by the bus braking in traffic. Accidents with injuries sustained as a result of different kinds of collisions accounted for 35.9% while accidents with injury to pedestrians accounting for 4.8% of all the accidents.

8.2.8 The breakdown by our classification of accident nature is as follows:

Table 8.2 Accidents by nature

Accident Nature	No. of Accidents	
	2015	2016
Passenger Loss Of Balance	445	448
Head On/Tail Collision	128	106
Collision W/TP Veh (changing lane)	88	109
J/O Collision	56	48
Injury To Pedestrian	43	40
Glancing Collision	30	43
Injury To Alighting/Boarding Passenger	22	33
Hit St. Obj/Veh/Animal	12	27
Injury To Passenger Inside Bus	17	13
Collision With Other Veh (rolling back/forward/reversing)	5	6
Others	4	6
Entering R/A Collision	3	1
Bus Overturn/Topple	0	1
Total:	853	881

8.2.9 Accidents related to "Head On/Tail Collision" dropped significantly while "Collision W/TP Veh (changing lane)" and "Hit St. Obj/Veh/Animal" increased in 2016.

Accidents by Liability

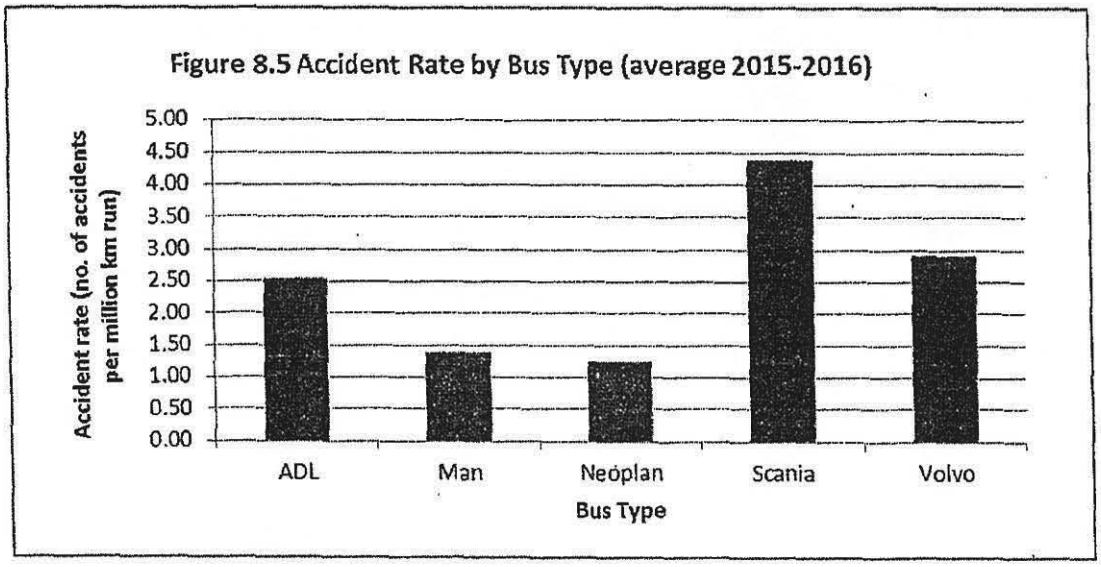
8.2.10 The breakdown of liability in the two-year period is shown in Table 8.3 below. For 75% of the cases, the bus captains were not blameworthy.

Table 8.3 Accidents by Liability of Bus Captain

Liability of KMB Bus Captain	Percentage (%)
Negligent	25
Innocent	75
Total:	100

Accidents by Bus Type

8.2.11 Accidents by bus type were also analysed and the results are shown in Figure 8.5. The general results are not significant enough to show any direct relationships between accident rate and bus type, and the differences among bus types can be attributable to operating environment (e.g. route), roads, bus captains and other factors.



Number of Non-collision Franchised Bus Accidents Involving Passenger Casualty

Table 8.4 Number of Non-collision Franchised Bus Accidents Involving Passenger Casualty

	Number of Non-collision Franchised Bus Accidents involving passenger casualty	Percentage over all accidents involving franchised buses	No. of accidents involving passenger losing balance on stairway (No. of casualty) (i)	No. of accidents involving passenger injured by door (No. of casualty) (ii)	No. of accidents involving passenger losing balance elsewhere except (i) & (ii) (No. of casualty) (iii)
2016	494	56%	109	29	356

Contributory Factors of Traffic Accidents

8.2.12 To prevent similar traffic accidents from recurring, bus captains who are involved in repeated blameworthy traffic accidents are referred to the Bus Captain Training School to attend training. The training course includes defensive driving concepts, case studies, experience sharing and assessment.

8.2.13 KMB produces its "Bus Captain Safe Driving Handbook" which is posted at staff website for all bus captains currently in its fifth edition (1 March 2016), the handbook includes driving regulations and points to note about safe driving, covering every aspect of a bus captain's daily work. It is aimed at assisting bus captains in establishing a proper safe driving attitude and encouraging them to take all practical steps aimed at achieving safe driving.

Accidents by experience of the bus captains on the route

Table 8.5 Accidents by Experience of the Bus Captains on the Route

Experience of the bus captains on the route (Year)	Distribution of accidents from 2015-2016 (%)
0-<1	30.5%
1-<2	13.5%
2-<3	9.8%
3-<4	6.2%
4-<5	4.6%
5-<6	3.0%
6-<7	2.1%
7-<8	1.9%
8-<9	1.7%
9-<10	1.7%
10-<11	1.1%
11-<12	4.0%
12-<13	6.4%
13-<14	3.6%

Experience of the bus captains on the route (Year)	Distribution of accidents from 2015-2016 (%)
14-<15	2.0%
15-<16	2.2%
16-<17	2.2%
17-<18	2.3%
18-<19	0.9%
19-<20	0.2%
24-<25	0.1%

8.2.14 As mentioned above, the percentage of traffic accidents for bus captains with less than 1 year route driving experience is the highest as compared to those bus captains with years of route driving experience. The figures indicate that less experienced bus captains (<1 year driving experience on the routes) were more likely to be involved in traffic accidents. They need time to get familiar with the characteristics of the routes and the road environment.

Accidents by experience of the bus captains on the bus model operated

Table 8.6 Accidents by Experience of the Bus Captains on the Bus Model Operated

Experience of the bus captains on the bus model operated (Year)	Distribution of accidents from 2015-2016 (%)
0-<1	16.7%
1-<2	11.4%
2-<3	8.1%
3-<4	6.7%
4-<5	4.5%
5-<6	3.3%
6-<7	2.3%
7-<8	2.5%
8-<9	2.0%
9-<10	1.3%
10-<11	1.7%
11-<12	1.5%
12-<13	3.3%
13-<14	7.8%
14-<15	7.9%
15-<16	6.2%
16-<17	4.3%
17-<18	5.2%
18-<19	2.4%
19-<20	0.7%
20-<21	0.3%

8.2.15 The figures indicate that less experienced bus captains (<1 year driving experience on the bus model operated) had the highest traffic accident involvement rate.

Accidents by the number of routes which a bus captain operated in one shift

Table 8.7 Accidents by the Number of Routes which a Bus Captain Operated in One Shift

Number of routes which a bus captain operated in one shift	Distribution of accidents in 2015-2016 (%)
1	87.3%
2	11.3%
3	1.4%

Accidents by the number of buses which a bus captain operated in one shift

Table 8.8 Accidents by the Number of Buses a Bus Captain Operated in One Shift

Number of buses a bus captain operated in one shift	Distribution of accidents in 2015-2016 (%)
1	72%
2	25%
3	3%

8.3 Bus Captain Training and Monitoring

8.3.1 As part of KMB's dedication to provide safe, reliable and comfortable services for our passengers, comprehensive systems of bus captain training and monitoring have been set up in KMB. Elements of defensive driving, good driving attitude and emergency handling are incorporated in various training courses. Driving performance monitoring is carried out with systematic checking by driving instructors and followed up with disciplinary actions if required. Moreover, real-time Driving Indicators (駕駛提示器) will also help to identify those bus captains who have a higher incidence of 'harsh braking' on a given route than is normal. This information can be used as to ensure that appropriate proactive feedback is given to a bus captain with aim of promoting improved driving behaviour that will in turn serve to prevent/reduce 'loss of balance' cases (as well as accidents in general).

8.3.2 KMB buses have various safety related features to enhance road and passenger safety. Speed monitoring and limiting devices are already installed or are being installed on buses.

- The electronic tachographs are being used to monitor bus captain performance, especially with regard to speeding. An electronic tachograph is standard equipment on new buses. At the end of April 2017, a total of 3,922 KMB buses (i.e. 100% of registered licensed fleet) were installed with electronic tachographs; and,

- Real-time Driving Indicators are installed in all buses which can help bus captains to utilize the driving skills learnt in the Eco-safe Driving Training

Course. As denoted above, the benefits of such Eco-safe driving to the bus captains are:

1. Reduce the risk of accidents while driving;
2. Reduce stress levels and enhanced satisfaction of driving; and,
3. Increase confidence in vehicle control and driving technique.

8.3.3 Details of training provided to new and serving bus captains are given in Annex 8.1.

8.3.4 Bus captains who are involved in serious traffic accidents will be suspended from driving duty and referred to receive professional counselling service. Remedial driving training will also be arranged for them.

8.3.5 To prevent similar traffic accidents from recurring, bus captains who are involved in repeated blameworthy traffic accidents are referred to the Bus Captain Training School to attend training. The training course includes defensive driving concepts, case studies, experience sharing and assessment.

8.3.6 Communication channels with staff and labour unions are well established and these channels facilitate the exchange of views on issues including safety.

8.3.7 As a safety enhancement measures, the Company has appointed a professional counselling service provider to operate a 24-hour Hotline（傾心線）for our staff and their immediate family members, including spouse and children, to raise and discuss any problems or difficulties they may encounter in their daily lives. The purpose is to provide a channel for staff members to relieve their pressure and seek help from independent professional counsellors as they may see fit. The discussions are strictly confidential and contents will not be revealed to the Company. The Company also organises a series of seminars on health and disease prevention for its staff members with the aim of raising their awareness of the importance of healthy living.

8.3.8 Alcoholic Breathing Test of Bus Captains is randomly conducted to control the incidence of driving under influence.

8.3.9 The current system of bus captain training will continue to be reviewed regularly.

8.3.10 The performance monitoring system will continue to uphold driving and safety standards.

8.3.11 A new training module, in the form of classroom discussion led by Driving Instructors of KMB's Bus Captain Training School, has been added to the bus

captain training programmes from March 2016. Besides the new bus captains, other in-service bus captains have participated in this "Care for Passenger" classroom discussion when they attend refresher training. To make sure that the "Care for Passenger" message can reach existing bus captains in a timely manner, highlights of this training module has been available on the staff web from April 2016 and bus captains are required to log-on the staff web to go through the content.

8.4 Rostering, Scheduling and Duty Dispatch

8.4.1 KMB follows rostering, scheduling and duty dispatch systems having due regard to the Transport Department Guidelines on Driver Working Hours. The systems also ensure that only bus captains who satisfy training requirements are assigned to duties.

8.4.2 Arrangements are made to assign new bus captains to easy routes in the first few months of appointment to allow for a period of familiarisation and settling in.

8.4.3 In order to help new bus captains adapt to the new working environment, KMB has enhanced and introduced an all-rounded "Buddy Scheme for New Bus Captain" in May 2015. In this enhanced scheme, new bus captains are provided with New Bus Captain Orientation regarding bus operational and mechanical aspects. Experienced bus captains accompany new bus captains with the aim of providing the new bus captains with enhanced 'on the job' support in their early days with the Company. Hotline at the Bus Captain Training School is available for new bus captains to obtain consultation from driving instructors and mentors respectively.

8.4.4 Ongoing adjustment in journey time, layover time and meal break is made with the solicited input from frontline staff and efforts in this regard have been accelerated in recent years.

8.4.5 The Company is continuously enhancing the systems and control mechanisms for ensuring and monitoring compliance with Driver Working Guidelines.

8.4.6 The percentage of duties in KMB that involve bus or route hopping was (56.9% and 30.5% respectively) as at the end of April 2017.

8.5 Bus Maintenance and Safety Features

8.5.1 All KMB buses are subject to a maintenance and quality assurance system which aims to keep the buses in top conditions. Speed monitoring and limiting devices are already installed on KMB buses.

8.5.2 The buses have many safety related features to enhance road and passenger safety, such as,

- seat belts have been retrofitted at the four seats on the first row on the upper deck ,
- double hand rails have been retrofitted to all double deck buses with straight staircases; and
- to help reduce accidents involving elderly passengers due to 'losing balance on board', the new bus specifications have included continuous railing, extending from the entrance into the saloon (as far as is practicable).

8.5.3 All KMB buses are subject to a stringent maintenance and quality assurance system which keeps the buses in good roadworthy conditions. The existing maintenance and quality assurance system will be continued.

8.5.4 Speed limiting devices have been a standard feature of all KMB buses.

8.5.5 KMB will continue to review and consider the retrofit of safety features as necessary to the vehicles to enhance road and passenger safety.

8.5.6 According to the bus manufacturers, the current bus models available do not have the required structural integrity to have all seats or seats in upper deck seatbelt-enabled. Currently, all SLF buses in KMB already have seatbelts fitted at the "vulnerable" positions, i.e. the exposed seats. It would be a complete bus body structural re-design of the vehicle to have all seats with seatbelts that are currently non-existent in the market. Not only do the standard seats need to be changed to ones with stronger anchorage points and wider pedestal legs, but the overall bus construction would need extensive localized reinforcement along the floor / inter-floor structure that inevitably render the vehicle unnecessarily heavy, reduced passenger carrying capacity and less fuel efficient for public bus application.

8.5.7 There were 44 buses installed with 3-point seat belts on all seats by the end of April 2017. Survey will be conducted to assess the utilization rate of seat belt on buses which are installed with 3-point seat belt on all seats

8.6 Promotion of Passenger Safety

8.6.1 Safety awareness among bus captains is promoted by means of in-house videos, notices, posters, tool-box talk, safety messages on Terminus Management System, and safety tips provided at staff website.

8.6.2 KMB produces its "Bus Captain Safe Driving Handbook" which is posted at staff website for all bus captains currently in its fifth edition (1 March 2016), the handbook includes driving regulations and points to note about safe driving, covering every aspect of a bus captain's daily work. It is aimed at assisting bus captains in establishing a proper safe driving attitude and encouraging them to take all practical steps aimed at achieving safe driving.

8.6.3 Various projects to educate the public and passengers on the safe use of bus services have been undertaken. These include on-board stickers, KMB Facebook and KMB Apps to remind passengers from taking safety precautions.

8.6.4 Education of passengers on the importance of road safety and safety on buses by using the Bus Stop Announcement System ("BSAS") will continue. The safety messages were broadcast in Cantonese, English and Putonghua.

8.6.5 KMB Facebook and KMB Apps have been used to increase passenger awareness to 'Hold the Handrail' since March 2016.

8.6.6 Before Boarding: Existing efforts continue to remind passengers to hold the handrails by outdoor staff at busy locations.

8.6.7 During the Journey: The message to remind passengers to hold the handrails has been broadcast via the Bus Stop Announcement System before approaching each and every bus stop on all KMB routes. Re-arrangement of the sound track has started in March 2016.

8.6.8 "Hold the handrail" sticker has been posted at a prominent place of the bus compartment to catch the attention of passengers.

8.7 Programmes for Elderly and Persons with Disabilities

8.7.1 To encourage young people to give their seat to passengers in need, KMB depots regularly receive visits from local youth centres, primary and secondary schools and other educational institutes. In addition to being introduced to the depots' operations, the visitors are informed of the caring facilities in bus compartments, including the priority seats.

8.7.2 Also, KMB's volunteer club, Friends of KMB, is committed to promoting the message of "Good Passenger - Good Citizen". Friends of KMB

provides voluntary assistance at carnivals organized by District Councils, NGOs and Road Safety Council to enhance public awareness of road safety, offer seats to people in need and to promote safe travel tips for the elderly.

8.7.3 KMB makes use of its bus stop announcement system to broadcast relevant messages in Cantonese, English and Putonghua encouraging passengers to give their seats to those in need.

8.7.4 Stickers are placed on buses to raise awareness about the need to hold the handrail when travelling on buses.

8.7.5 To further enhance safety awareness among elderly passengers, outdoor staff visit bus stops frequently used by the elderly to remind them to hold handrail whilst riding on buses.

8.7.6 Bus Stop Assistants have been assisting persons in need to find a seat and helping wheelchair users while boarding/alighting.

8.8 Proposed Target and Other Measures

8.8.1 KMB proposes to use the 3-year average of 2014 to 2016 actual accident involvement rate of 2.71 (defined as the number of buses involved in accidents per million km operated) as a target for the purpose of this Five-Year Plan period. It represents a 6% reduction from the accident rate in 2014, the highest record among 2014-2016.

8.8.2 KMB has created a database of "Driving Tips in Special Attention Areas". The database provides structured instructions and tips on best driving practices for all bus captains driving on particular routes, so that expertise and knowledge of the most experienced bus captains can be effectively transferred to all others. To promote bus captains' awareness of safe driving, all relevant bus routes are listed in the database, supplemented by photos and layout drawings for easy reference.

8.8.3 The existing systems of Safety Bonus and Safety Awards will continue to promote safety awareness among bus captains. Safety awareness will continue to be emphasised in communications as stated above.

8.8.4 Internal meetings will continue to be held regularly to monitor accident statistics and propose methods of accident reduction. The importance of systematic 'feedback loops' in safety management will be emphasised to ensure that lessons are learned from any incidents that do occur.

8.8.5 KMB will continue to communicate with Transport Department on road safety issues.

8.8.6 On-street monitoring and promotion by inspectors will be conducted in strategic locations on a regular basis to promote safety messages to passengers.

8.8.7 KMB's volunteer club, Friends of KMB will visit NGOs to promote the message of passenger safety and conducts, such as offering seat to passenger in need, moving into the bus compartment after boarding, holding handrail and wearing seat belt.

Annex 8.1

A. Regular Training for New Bus Captains

	Training Type	Nature	Duration	Frequency	No. of route / bus type trained
1.	Basic Training	To teach bus driving technique to prepare for Transport Department class 17 licence tests and to equip trainees with the skills required to carry out the duties of a bus captain. Classroom lectures on company rules, passenger safety, accident black spot analysis, emergency handling procedure and concept of quality service. On road training on defensive driving technique, bus type familiarisation and route training (night drive included).	18 days full time (68 hours on road driving practice by each trainee and 18 hours classroom training)	Before posting to duty	2 routes 3-4 bus types
2.	Special Facilities Training	With the assistance of a simulated bus model, bus captains are trained on the operation of Octopus System, Bus Stop Announcement System, Destination Signboard and Fare Display.	Included in Basic Training	Before posting to duty	Not applicable

B. Regular Training for Serving Bus Captains

	Training Type	Nature	Duration	Frequency	No. of route / bus type trained
1.	Driving Enhancement Training	This training covers: - defensive driving technique - customer service improvement skills - route familiarization - bus type familiarization (previous route training and bus type training incorporated into 1 type of training: driving enhancement training	1 day full time	In service bus captains for driving skill enhancement, or before posting to a new route or drive a new bus type	1 route & highway training 1 bus type
2.	Remedial Training	Aimed at bus captains who are found to be inadequate in certain driving areas or service level. The training will specifically tackle these areas until the bus captain reaches an acceptable level before he/she is released to perform normal duties.	1 to 6 days full time	For bus captains who are found to have driving irregularities or away from driving duties for a period of time.	1 route 1 bus type

- Training protocols are subject to ongoing review, albeit that the aim will be to continue to do all that is reasonably practicable to ensure the safety and comfort of passengers, staff and other road users at all times

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Independent Review Committee on Hong Kong's Franchised Bus Service

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21 September 2018

BY EMAIL (*Alison_SWEE@lta.gov.sg*)

Ms Alison Claire SWEE Wee Leng
Director for Bus Contract Management
Land Transport Authority
1 Hampshire Road
Singapore 219428

Dear Ms SWEE,

Independent Review Committee on Hong Kong's Franchised Bus Service ("Committee")

I write further to my letter of 19 September 2018.

In my letter of 19 September 2018, an attachment setting out the matters that the Committee would like to invite the Land Transport Authority ("LTA") to provide information on is included. The Committee notes that, for the purpose of preparing the response to these matters or otherwise, you and other colleagues at the LTA may wish to be provided with some facts and background information regarding the franchised bus regime in Hong Kong. It is in this connection that I write this letter to set out a brief summary of the types of information gathered by the Committee.

The Committee gathers information through two main channels, namely: (i) written submissions received from identified interested parties (e.g. government departments, bus operators, unions, etc.) and other members of the public; and (ii) oral evidence provided at hearings by selected interested parties. To facilitate the oral evidence hearings and to provide a channel for the public to follow the work of the Committee, a set of hearing bundles containing the relevant written submissions received by the Committee has been prepared and uploaded to the website of the Committee (www.irc-bus.gov.hk/eng/bundles.html). The documents included are organised into different bundles based on whom the documents are received from.

For the purpose of gaining a general understanding on the franchised bus regime in Hong Kong, the Transport Department of Hong Kong has prepared 12 papers that can be found on pages 34 to 137 of the TD-1 bundle (i.e. the document referred to as "Transport Department (Submissions)" in the webpage provided above), while the Transport and Housing Bureau of Hong Kong has also provided an overview paper on pages 7 to 21 of the THB-1 bundle (i.e. the document referred to as "Transport and Housing Bureau (Submissions)"). Furthermore, there are also separate bundles prepared for the franchised bus operators in Hong Kong, namely: (i) the Kowloon Motor Bus Company (1933) Limited and Long Win Bus Company Limited; (ii) Citybus Limited and New World First Bus Services Limited; and (iii) New Lantao Bus Company (1973) Limited.

The Committee has also gathered much useful information from interested parties through oral evidence hearings. So far, the Committee has received oral evidence from the Transport and Housing Bureau, the Transport Department, all three franchised bus operators, unions representing bus drivers, District Councils, one of the overseas experts engaged by the Committee, as well as some other parties such as black box manufacturer and advocacy group on road safety matters. Transcripts of the hearings conducted by the Committee have also been uploaded to the Committee's website at www.irc-bus.gov.hk/eng/transcripts.html.

I hope that the information above will be of assistance to you and your colleagues. Should you require any further information or assistance for identifying certain information from the information sources set out above, please feel free to contact the undersigned at (852) 2867 2551 (e-mail: peter_chan@irc-bus.gov.hk) or Mr Justin TO at (852) 2867 4612 (e-mail: yt_to@irc-bus.gov.hk).

Yours sincerely,

(CHAN Ping-fai, Peter)
Secretary, Independent Review Committee on
Hong Kong's Franchised Bus Service

cc Messrs. Wilkinson & Grist, Solicitors to the Committee (Attn: Ms Rebecca Lau)

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Executive Summary

1. Under the Bus Contracting Model ("BCM"), the public bus operators' ("PTOs") have the responsibility to ensure safety on the public buses. This includes ensuing that their Bus Captains ("BCs") are trained for safe operations. The PTOs are also required to do everything necessary and reasonable to ensure the safety of passengers and their employees under BCM.

2. As part of their contractual requirements, the bus operators are required to submit their Safety Management Plans to the Land Transport Authority ("LTA"), to demonstrate their ability to ensure safe and efficient operations of the bus services. The proposed plans include safety plans, processes and mitigations measures in the following areas:

a. Ensuring safe and comfortable driving by BCs;
b. Minimising bus accidents;
c. Ensuring the safety and comfort of passengers while on board the buses, and the safety of passengers while boarding and alighting; and
d. Ensuring the safety of passengers using the bus interchanges.

3. To inculcate safe driving habits, the Singapore Bus Academy ("SGBA") [1] conducts a module on Safe Driving Techniques as part of the Enhanced Vocational Licence Training Programme, which all newly hired BCs are required to attend. Beyond SBGA's training, all the PTOs train their respective BCs for at least five weeks before they are deployed on revenue services. PTOs also have mentorship programme for newly hired BCs so that the experienced mentors can provide advice to the new ones.

4. Besides the contractual requirements, LTA also have in place the necessary regulatory requirements to ensure safety. This includes the Quality of Service ("QoS") standard on accident rates as well as the vehicle safety requirements for vehicle registration and licensing. In Singapore, wheeled vehicles, such as buses must comply with Road Traffic (Motor Vehicles, Construction and Use) Rules which require the installation of safety features such as safety glass, fire extinguishing apparatus, and first aid equipment.

5. Under the BCM, critical assets are owned by LTA and leased to the bus operators. Since 2012, LTA has been procuring new buses to renew our aging bus fleet. All our public buses include the basic safety features such as speed limiters as well as CCTV cameras, which include reverse cameras and are used an aid for post incident investigation purposes. Other standard features include:

- Blind-spot mirrors to improve line of sight for BCs to enhance safety when turning at junctions or changing lanes.
- Safety sensors on edges on door to prevent the doors from opening or closing when they encounter obstacles.

[1] The Singapore Bus Academy ("SGBA") was established in 2016 to offer centralised training to all bus professionals.

- Accelerator interlock to prevent the bus from driving off when the door(s) is/are open.
- Exit door is unable to close when the ramp is deployed.

6. Beyond the standard features, PTOs have also installed additional features, such as telematics, collision warning system, etc, on the buses to enhance safety and efficiency of operations.

7. More details of the above are elaborated in the following pages.

LTA's Replies on Independent Review Committee on Hong Kong's Franchised Bus Service's Questions

I. Adoption of technological devices on buses

In paragraph 4 of Annex II, the following were asked:

a. Has LTA adopted, or considered the adoption of any of the devices listed in paragraph 1, which are as follows:
   i. Speed display unit for passengers;
   ii. Active/passive roll stability control;
   iii. Electronic stability control;
   iv. Speed control aided by GPS;
   v. Speed limiter to cap maximum speed within 70 km/hr;
   vi. Collision prevention and lane keeping device; and
   vii. Monitoring device on captain's condition e.g. dozing, drowsiness.

In the case of speed limiters, do speed limiters in LTA's buses have "retarder function" that can actively reduce the speed of a bus when it exceeds the designated speed limited?

b. If a device is currently adopted by LTA, please share with the Committee information on its use by LTA, including the year when the device was adopted for use on buses, the name of the supplier of the device, a brief description on the mechanism by which the device functions, as well as any assessment by LTA on the effectiveness of the device in enhancing bus safety.

c. If a device was considered by LTA and LTA decided against its adoption, please share with the Committee the findings of any research, trial or assessment conducted by LTA with respect to that device.

Below are some safety features adopted by LTA.

S/N	Devices	Description	Supplier
1	Electronic Stability Control ("ESC") & Traction Control System ("TCS") Speed Limiter	• ESC helps to avoid a crash by significantly reducing the risk of skidding during an emergency manoeuvre. • TCS is typically a secondary function of the ESC, and designed to prevent loss of traction of driven road wheels.	Electronic Stability Programme and Traction Control System are bus supplier specific (i.e, Volvo, Mercedes, MAN bus manufacturer specific)
2	Speed Limiter	Speed limiter limits the maximum speed to 60 km/hr.	Bus supplier specific (i.e., Volvo, Mercedes, MAN, ADL bus suppliers specific).

S/N	Devices	Description	Supplier
3	Collision prevention and lane keeping device	Mobileye uses video sensors to provide warnings for collision prevention.	Mobileye (collision & lane keeping)
4	Anti-Fatigue System	Buses delivered from Jan 2018 will be fitted with Anti-Fatigue System to monitor in real time the driver's levels of fatigue and distraction.	Guardian Anti-Fatigue System

In paragraph 7 of Annex II, the following were asked:

a. What devices currently installed on LTA's bus fleet are used for the purpose of monitoring the driving behaviour of bus drivers, e.g. driving speed, sudden acceleration, harsh braking, etc.?

b. How is the information collected by the device for monitoring driving behaviour used? Is the monitoring of driving behaviour (using this information) conducted by the LTA or the bus operators? Has consideration been given to conducting real-time monitoring of driving behaviour so that the LTA and/or bus operators can intervene in real-time if a driver is driving in an unsafe manner?

c. Please provide information on the use of "big data analytics" for studying driving behaviours mentioned in paragraph 4 above, including whether it is still in use, the purpose of the analysis and its effectiveness.

Devices installed on public buses and monitoring of driving behaviours

1. Currently, around 40% of the entire bus fleet are installed with telematics and about 15% of the fleet have collision warning systems. PTOs are progressively installing more of such devices to monitor BCs' driving behaviour. Poor driving behaviours, such as speeding, abrupt lane change, sharp cornering, hard braking and sudden acceleration, will be detected by the system and the data used to improve BCs' driving performance through timely feedback. Some of the newer telematics system have both real time visual and audio alerts to give instantaneous feedback. To strengthen and encourage good driving behaviours, good performing BCs are incentivised while poor performing ones are coached.

II. The installation of seat belts on franchise buses

In paragraph 8 of Annex II, the following were asked

a. Is the statement that there is no requirement for the installation of seat belts on buses in Singapore, referred to in paragraph 8 above, an accurate description of the current arrangements for LTA's bus fleet?

b. What, if any, consideration/ review has been given/ conducted to installing/ retrofitting seat belts on LTA's bus fleet, including their technical feasibility, applicability in terms of usage and risk factors, and cost-benefit considerations?

Seat belt and vehicle safety requirements in Singapore

1. Today, every bus is required to meet vehicle construction and safety standards before it is allowed to be registered. All registered buses are subject to compulsory periodic inspections and are required to pass the inspections before they can continue to be used on the roads.

2. Small buses (with maximum laden weight not more than 3,500 kg and seating capacity of up to 15 passengers) that are fitted with front and rear passenger seat belts are subject to a speed limit of 70 km/h. Bigger buses are subject to a speed limit of 60 km/h. Those with maximum laden weight of more than 10,000 kg are required to install speed limiters to prevent them from speeding.

3. Beyond the vehicle safety requirements, registered small buses are required by LTA to be fitted with forward-facing seats with retractable three-point seat belts[2]. Small buses refer to buses with a seating capacity of not more than 15 passengers, excluding the driver, and a maximum laden weight up to 3,500 kg. Some of these buses are used to ferry school children today. These requirements were implemented, in April 2009, after extensive studies by LTA, together with international consultants and safety experts. Findings from the studies showed that small buses posed the most serious bus safety challenge in Singapore; and many countries, including Australia, the United States, the United Kingdom and Japan, mandated the installation of rear seat belts in small buses only.

4. Larger buses, by virtue of their design, size and mass, can better absorb the impact of a collision compared to small buses. The forces of a collision felt by occupants in a large bus are likely to be less than those experienced in small buses. As a result, in the event of a collision, the injuries for passengers on a small bus in general tend to be more severe than those in a bigger bus.

5. The consideration stated in paragraph 4, coupled with the current safety requirements for big buses, such as the compulsory periodic inspections, strict

[2] A three-point seat belt offers greater safety than a two-point only lap belt or a bus with no belts as it provides upper body restraint at two of the strongest parts of the body, i.e. the pelvis and the rib cage. Three-point safety belts are designed to be able to provide maximum protection in a forward-facing seat when they are loaded in the forward direction as they would be in a frontal crash. Hence, it was recommended that all passenger seats in small buses have to be fitted with forward-facing seats with retractable three-point seat belts.

speed limit and speed limiter requirements for big buses as stated in paragraphs 1 and 2, do not provide impetus or compelling reasons to require bigger buses to be fitted with seat belts. Careful study will be necessary as the impact on the bus operators (e.g. costs incurred, disruptions to business operations, etc.) and other stakeholders (e.g. logistic preparations by the bus body builders, additional costs to be borne by bus passengers, financial assistance provided by the government, etc.) will be significant, given our previous experience in implementing the seat belt requirements for small buses (details are shared below).

LTA's Experience in Retrofitting of Small Buses

6. To enhance the safety of school children, priority was given to small buses carrying school children (school buses) to have seat belts retrofitted to comply with the seat belt requirements by end 2011 (about three years from the announcement of the seat belt requirements). All other small buses were given up to end 2013 to retrofit seat belts to comply with the requirements.

7. The retrofitting was phased in to minimise disruption to bus operations. For school buses, LTA also took into account practical considerations, such as the restriction of the retrofitting works to only during school holidays. This was to avoid disruption to students during the school term and to lessen operational downtime for bus operators. The in-use school buses also saw a drop in seating capacity once their seats were retrofitted. This was because arising from retrofitting seat belts, the 3 children to 2 adults ratio employed previously for the seats in school buses had to be removed. Hence, school bus operators required sufficient time to retrofit their bus fleet and to make up for the shortfall in seating capacity. To minimise disruption to the transport of displaced school children, LTA worked closely with the school bus operators to schedule school buses for seat belt retrofitting within the three-year period.

8. LTA appointed workshops to undertake the retrofitting of seat belts and its authorised vehicle inspection centres to check for compliance with the requirements. These workshops have the necessary equipment and qualified personnel, and use seats and seat belts that meet safety standards and specifications. They also worked with the Professional Engineers (PEs) on the strengthening of floorboards (if necessary) and seat anchorage design to ensure that seat belts would be effective in the event of an accident.

9. Financial assistance was also provided by the Government to owners of small buses to defray the cost of retrofitting seat belts or replacing their buses with new ones. School buses scheduled for earlier retrofitting were affected by the reduction of seating capacity. Hence, owners of these buses were given additional financial assistance.

10. Young children below eight years old were required to use booster seats in addition to the wearing of 3-point seat belts. Hence, additional financial assistance was also provided to operators who ferry these young children to schools or childcare centres.

III. Traffic Management measures facilitating bus operations

In paragraph 11 of Annex II, the following were asked

a. Did the LTA conduct any research, trial or assessment when introducing the bus lane scheme (including the extension of the scheme in 2005 to include full-day bus lanes) and the Mandatory Give-Way to Buses scheme? If so, please share the findings with the Committee. The Committee is particularly interested in any possible concerns on the drawbacks of such schemes (e.g. impact on traffic flow on roads with high traffic volumes) and how they have been overcome.

b. The Committee notes from LTA's webpages that LTA makes use of on-board bus lane enforcement cameras and traffic wardens to enforce the bus lane scheme. On these, the Committee would like to know:

   i. who operates the on-board bus lane enforcement cameras and how? For example, is it the case that the camera is on at all times and that the operator only needs to record the time of the day when a violation of the rules of the bus lane scheme takes place so that the Traffic Police can follow it up? Or does it require the operator to press a button to start recording a video footage after witnessing a violation of the rules?

   ii. are bus operators and bus drivers expected to play a role in the enforcement of the bus lane scheme?

   iii. how is the video footage captured by the on-board bus lane enforcement cameras used in the investigation and prosecution of offences?

   iv. what is the role played by the traffic wardens?

   v. when the bus lane scheme was implemented in 1974 and when the scheme was extended to include full-day bus lanes in 2005, how were the changes received by the drivers of other vehicles? How long did it take for them to get used to the changes?

c. How is the Mandatory Give-Way to Buses scheme implemented?

   i. What percentage of bus stops are covered in the Mandatory Give-Way to Buses scheme? What are the criteria for determining which bus stops are covered by the scheme?

   ii. Are enforcement cameras either on buses or on the roadside used to investigate and prosecute offences?

<u>Normal and Full Day Bus Lanes</u>

1. As the original bus lanes scheme was launched in 1974, the analysis and trials done more than 40 years ago might not be relevant in today's context. The full-day bus lanes were introduced much later. In 2005, the first set of full-day bus lane was painted along Orchard Road, a busy shopping street in Singapore, as

a trial. Data collected indicated that increase in bus speed ranged from 7% to 20% on week days, and 14% to 28% on Saturdays. However, the actual increase was also dependent on the time of the day.

2. Bus lanes are not popular among the motorists who feel that road space is being taken away. Hence, careful evaluation of the benefits from having bus lanes' is required to justify the reduction in road space for other motorists.

3. LTA will implement new bus lanes when evaluations show that the lanes have positive net benefits. LTA first identifies locations where high volume of buses ply the road during relevant bus lane operating hours. Followed by evaluation of the efficacy of the proposed bus lane at these locations in improving the travel speed for buses. This includes checking the bus lane's impact on general traffic flow, because slowing general traffic may have a knock-on effect on bus journey times that negate the benefits of the bus lane. LTA will also try to address and mitigate concerns from stakeholders, such as bus operators, residents, and local businesses, whose activities may be affected by the proposed bus lanes. Finally, the costs and impact of these mitigated concerns are weighed against benefits of the proposed bus lanes.

4. For post-implementation, LTA often have to adjust the design slightly after the traffic settles into equilibrium, to cater to the need of motorists who are turning left (since the bus lanes are on the at-most left lane of the road). LTA might refrain from implementing bus lanes where there are multiple left side roads within a short distance. Today, there are 211km of bus lanes which still undergo changes in their designs occasionally to cater to road works and changes in travel patterns.

5. Most roads within the Electronic Road Pricing Zones have bus lanes, as they complement the Road Pricing Charges in managing and influence the shift from cars to public transport such as buses and trains.

Operation hours for Normal and Full-Day Bus Lanes Scheme

6. The operating hours are shown in the table below

Days	**Normal Bus Lanes**	**Full Day Bus Lanes**
		
Monday - Friday	7.30am – 9.30am 5pm – 8pm	7.30am – 11pm
Saturday	Not applicable	7.30am – 11pm

Days	Normal Bus Lanes	Full Day Bus Lanes
Sunday and Public Holidays	Not applicable	Not applicable

Enforcement of bus lanes using On-board Bus Cameras

7. To ensure the bus lanes remain effective in improving travel time for buses, the traffic wardens are deployed by LTA at various hotspot areas island wide to record the vehicle licence plate number of motorists who infringe bus lanes.

8. The traffic warden will carry out enforcement against motorist who travel or remain in the bus lane during the restricted hours. This is achieved by taking photographs of the offending vehicle committing the violation. There is no requirement for the vehicle to stop nor any physical interaction between the traffic warden and the driver. The photos taken will send to LTA, which in turn will lead to a Notice of Traffic Offence being mailed to the registered owner. Motorists who drive on the bus lanes during restricted hours face a $130 fine. If it is not paid, the penalty can go up to a $1,000 fine or three months' imprisonment.

9. The PTOs are not responsible for the enforcement of the bus lanes. However, to assist LTA and to ensure better journeys for commuters, PTOs will provide the video footage captured on their buses for LTA to investigate. It requires the Bus Captain to press a button to start recording of a video footage after witnessing a violation.

Bus Priority Box

10. The Bus Priority Box Scheme was introduced as a three-month pilot trial in December 2008 to address the problem of buses needing to wait for gaps in traffic stream before they could exit the bus stops to join the main road traffic. If the buses wait too long, bus queue builds up at bus stops and have a knock-on effect on bus stop operations. The trials were successful, and 347 bus stops had bus priority boxes painted (~7% of the bus stops) to date. These bus stops are selected based on needs and safety. Due to safety reasons, the schemes will not be implemented on high speed roads, single lane roads or sites where there is no clear sight of traffic.

11. Before the trial, LTA did a prototype sketch of the scheme to engage critical stakeholders, such as Traffic Police, Automobile Association of Singapore and bus operators, and obtained their comments on legislation, enforcement, clarify any motorists' doubts, public education materials and usefulness to bus drivers.

12. The biggest challenge faced then was to educate motorists of the new traffic rules and change their mind sets. Leaflets explaining the new traffic rules were thus mailed together with correspondences to motorists (such as reminder to renew road tax), and questions were introduced in motorists' basic theory tests to reinforce the new rules. After 10 years of implementing the scheme, a positive shift in motorists' mind sets was noted through social media discussions.

Nevertheless, Bus Captains are constantly reminded to practise safe defensive driving at these bus priority boxes.

13. The actual impact of this scheme to traffic is relatively minor compared to bus lanes. The triangular give-way markings on the road warns motorists of the presence of exiting buses at a sufficient distance ahead, so that motorists have time and space to give way by either switching to another lane, or reducing their speed progressively to create enough gaps in the traffic stream for the buses to exit. Hence, it is not necessary for motorists to come to a complete stop just because of this scheme.

IV. Bus Drivers Training

In paragraph 12 of Annex II, the following were asked

a. Please provide information relating to the content and length of the following types of training:
   i. training for newly recruited full-time bus drivers;
   ii. training for newly recruited part-time bus drivers;
   iii. refresher training for full-time bus drivers;
   iv. refresher training for part-time bus drivers; and
   v. remedial training for bus drivers and the criteria for determining which drivers should receive such training.

b. Has any training been provided to bus drivers on fostering passenger relationship and the handling of difficult passengers, in particular those who abuse or attack the bus drivers physically?

Training for newly recruited Bus Captains ("BCs")

1. The training for newly recruited full-time and part-time BCs are similar. It is mandatory for all newly employed BCs to undergo a five-day "Enhanced Vocational Licence Training Programme" ("EVLTP"), as shown in Table 1, conducted by the Singapore Bus Academy ("SGBA")[3]. The programme draws upon the industry's best practices and comprises six modules conducted by both in-house trainers and trainers from the National Transport Workers' Union ("NTWU") and two of the bus operators, SBST and SMRT. These modules provide foundational training for new BCs across all operators.

Table 1: Modules for EVLTP (5-day programme)

	Modules
1	Overview of Public Transport Industry
2	Omnibus Driver's Vocational Licence (ODVL) Rules and Regulations
3	Sectoral Tripartism
4	Overview of New On-Board Bus Equipment (NOBE) and Common Fleet Management System (CFMS)
5	Service Literacy
6	Safe Driving Techniques: a. Hazard Awareness Training and Test ("HATT") b. Scenario-based Simulator Training

2. Beyond the foundational BC training provided by SGBA, each bus operator also provide their own training. Some examples of their training modules are shown in Table 3 below. New BCs (full and part time) undergo an average of 5-6 weeks' training by the PTOs (excluding the 5-day foundational training at SGBA) before they are deployed on revenue services.

[3] The Singapore Bus Academy was launched in October 2016 as a centralised training academy to offer enhanced training to all bus professionals.

Table 3: Examples of Training by PTOs

S/N	Training Modules	Descriptions
1	Apply Basic Safe Driving Techniques	Provides trainees with basic and defensive driving skills in various traffic conditions and traffic rules applicable to public bus drivers.
2	Operate Bus Equipment	Provides trainees with occupational skills to operate on board bus equipment such as integrated driver fare console.
3	Operate a Service Route	Enables trainees to identify and familiarise with service route and use correct safe driving techniques.
4	Handle Incident	Provides trainees with skills to manage incidents appropriately by following standard procedures.
5	Provide Basic Customer Service Standards	Provides trainees with occupational skills to manage customers' enquiries and expectations based on organisational procedures.
6	Manage and Cope with New Working Environment	Provides trainees with skills to manage and cope in the bus operation working environment.
7	Operate Bus Controls and Devices	Enables trainees to operate bus controls and devices competently such as wheelchair accessible bus ramp.

3. Mentorship programmes are also provided to the new BCs so that advice can be given from experienced mentors.

Refresher and continual training for Full- or Part-Time BCs

4. As part of skills upgrading, continual refresher training will be given to their BCs, regardless full or part-time. These BCs will undergo training to reinforce road safety as well as enhancement of driving skills. Such training are mostly provided in the in-house training centre of the PTOs. Continual training also prepares the BCs for a progressive career in the industry. Examples of such courses conducted by PTOs are:
   a. Driving Enhancement;
   b. Route Training;
   c. Regulation Requirement;
   d. Safety and Security Training; and
   e. Continual Operations Training.

5. Remedial training will also be provided to BCs who are identified as high risk, i.e. repeated safety offences committed or repeatedly failed to improve themselves despite counselling. These high-risk BCs will have to attend remedial driving/

corrective training. Customer Service Improvement Programme is another remedial course designed for BCs with poor customer service record.

Service Related Training

6. The module on Service Literacy conducted by the SGBA seeks to equip BCs with the necessary soft skills to handle difficult commuters. For assault cases, the BCs have been advised to stop the bus immediately and to report to their Operation Control Centre ("OCC") for instruction. Where needed, Police may be activated. The OCC will also inform and alert the other bus services that ply on the affected route to be cautious.

7. BCs are also covered under the "Protection From Harassment Act"[4] that was in place from November 2014.

[4] Any person who contravenes the rules shall be guilty of an offence and shall be liable on conviction to a fine not exceeding $5,000 or to imprisonment for a term not exceeding 12 months or to both.

V. Bus Service Monitoring

In paragraph 15 of Annex II, the following were asked

In connection with the QoS Standards, the Committee would like to invite the LTA to provide information on the following questions:

a. How were the two existing QoS standards, i.e. the figures of "96% of the total Scheduled Mileage" in QoS Standard 1.1 and "0.75 accidents per month per 100,000 bus-km" of QoS Standard determined? The Committee notes that these two standards were also included in the Operating Performance Standards used before the adoption of the Bus Contracting Mode (www.lta.gov.sg/content/ltaweb/en/publictransport/buses/lta-role-in-public-bus-services/quality-of_service—qos—standards--pre-bcm-.html). How were the Operating Performance Standard were determined in the first place? On what basis was their use continued in the Bus Contracting Model?

b. Are there any mechanisms in place to ensure that bus operators will regularly review the safety aspect of their operations and have any safety performance indicators been devised to measure their safety performance apart from accident occurrences? For example, the Committee notes that franchised bus operators in Hong Kong are required by the TD to prepare annual Forward Programme Plans that, amongst others things, include statistical analysis on the types and causes of accidents involving their buses. A sample of the analysis prepared by one of the bus operators in 2017 is attached as Appendix V for reference.

c. Have any bus operators ever been found to have failed in complying with the QoS Standards and therefore penalised financially? If yes, please provide information on the number of such instances and the amount of financial penalties involved.

d. The extent to which the QoS Standard pertaining to accident involvement (QoS Standard 2.1) would impact the driving behaviour of bus drivers to enhance bus safety having regard to the fact that the penalty is inflicted upon the respective bus operator, and whether a corresponding penalty /incentive system is in place to incentivise good driving behaviour thereby enhancing bus safety.

Quality of Service Standards ("QoS")

1. Prior to the Bus Contracting Model ("BCM"), the Public Transport Council ("PTC") was the regulator for bus service performance. As part of the PTC's regulatory framework for bus services, Quality of Service ("QoS") Standards were imposed on basic bus services provided by the PTOs, through terms and conditions in the Bus Service Operator's Licence ("BSOL").

2. The QoS Standards were first introduced in 2006, by PTC, covering 11 parameters under two broad categories: (i) Operating Performance Standards, which measure the quality/performance of the specific bus services run by the operators on a daily or monthly basis; and (ii) Service Provision Standards, which measure the overall quality/level of service. QoS Standards then ensured that

PTOs would not cut back on the bus service quality, even as they reduce operating costs and increase profits. The QoS standards were also calibrated carefully to avoid increasing compliance costs of the bus operators unduly and at the same time, ensure the provision of an adequate level of service.

3. With the move to the BCM, bus service reliability is measured using the Bus Service Reliability Framework ("BSRF") and First and Last Bus Punctuality ("FLBP"). Hence, only two QoS standards remain (i.e. Standard 1.1 and 2.1).

4. Since the move to the BCM, no PTO has failed the QoS Standard regarding accident rate in the last two years. The current financial penalties for each instance of non-compliance to:
   - QoS Standard 1.1: $20,000 per month on each non-compliant route
   - QoS Standard 2.1: $100,000 per month each non-compliant standard

   PTOs have in place continual safety training for BCs, remedial training for identified high risk BCs as well as incentive schemes for safe driving, to keep bus accidents to a minimum.

5. All the PTOs have established a safety management system, which covers risk analysis and assessment, risk reduction and control management as well as performance measurement, audit and periodic reviews. LTA also works closely with the four PTOs to ensure safe bus operations. PTOs are encouraged to innovate and use technology to enhance safety standards, such as the use of telematics to monitor BCs' driving behaviour. LTA also reviews the bus accident rates regularly and shares with the PTOs on learning outcomes and best practices, to improve the overall safety standards for the industry.

6. In addition, LTA recently introduced the Public Transport Operator Safety Award in the LTA's Annual Safety Award Convention (ASAC 2018), to give due recognition to bus operators that have been proactive in promoting safe work practices and ensuring the safety of their workers and the public.

********The End********

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獨立檢討委員會

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Independent Review Committee on Hong Kong's Franchised Bus Service

**21/F, Queensway Government Offices,
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24 October 2018

BY EMAIL (*Alison_SWEE@lta.gov.sg*)

Ms Alison Claire SWEE Wee Leng
Director for Bus Contract Management
Land Transport Authority
1 Hampshire Road
Singapore 219428

Dear Ms SWEE,

Independent Review Committee on Hong Kong's Franchised Bus Service ("Committee")

The Committee thanks you and your other colleagues of the Land Transport Authority ("LTA") for the reply of 17 October 2018, which has provided the Committee with much useful information on various matters relevant to the safety of franchised buses in Hong Kong. To enable the Committee to have a better understanding of the measures adopted and to be adopted in Singapore to enhance bus safety, we seek further information on some of the matters addressed in the LTA's reply, which are set out below.

On the bus lane scheme

2. Paragraph 3 on page 8 of the reply states that before the LTA implements a new bus lane, an evaluation of the benefits and costs is conducted to ensure the new bus lane will have positive net benefits. The Committee would like to obtain further details of how such evaluation is conducted, specifically:

(i) is the "efficacy of the proposed bus lane…in improving the travel speed of buses" the only factor considered in evaluating the benefit of implementing a new bus lane? If so, how is the efficacy quantified?

(ii) what types of costs and concerns from stakeholders are taken into account in evaluating the cost of implementing a new bus lane? How are they quantified, so that they can be compared against the benefits?

(iii) it would assist the Committee to be provided with a past evaluation of a particular road section to serve as an illustration of how the benefits and costs are evaluated. If you are unable to provide that information, it would assist to be provided with a summary of the process, indicating the different parts of the analysis, the timeline of that process and the determination of cost-benefit for implementing the bus lane scheme.

On the monitoring of speeding

3. It is noted from paragraph 1 of page 4 of the reply, that around 40% of the bus fleet in Singapore is currently installed with telematics and about 15% of the fleet have collision warning systems. Furthermore, it is noted that other devices are installed on some buses, such as a speed limiter with a threshold set to 60 km/h, driving monitoring system that detect speeding and give real time alerts. What is the incidence of speeding in excess of speed limits by franchised buses in Singapore? How is driving in excess of speed limits by franchised buses monitored by the bus operators? How effective is that monitoring?

4. By way of background, all franchised buses in Hong Kong are installed with black-boxes/telematics and speed limiters. As far as speeding is concerned, the black-boxes currently installed on Hong Kong's franchised buses are capable of generating exceptional speeding reports to the bus company when the speed of a franchised bus exceeds a prescribed threshold for a duration determined by the bus operator, though no real-time monitoring is conducted by bus operators at present. "Passive" speed limiters[1], with a prescribed speed limit of 70 km/h, are installed on all franchised buses. For your reference, franchised buses in Hong Kong mostly travel on roads with a speed limit of 50 km/h, with the exception of expressways which, whatever the speed limits are for other vehicles, have a speed limit of 70 km/h for franchised buses.

5. To obtain a 'snapshot' of the instances of speeding in excess of the speed limits by franchised buses the Committee has commissioned a consultant to conduct a speed survey of franchised buses at 20 selected road sections in Hong Kong. The survey findings confirm that, even though the majority of the franchised buses surveyed travelled at speeds well within the speed limits of the road sections concerned, there were cases of speeding by franchised buses, albeit in respect of less than 10% of the buses surveyed. All of these cases of speeding took place on road sections with speed limits of 50 km/h and the buses involved all travelled within 70 km/h, i.e. the prescribed limit of the speed limiter.

6. It is in connection with the above that the Committee seeks further information on whether or not in Singapore instances of buses' travelling at speeds lower than that set for the speed limiter (i.e. 60 km/h) but nonetheless above the

[1] That is, a speed limiter without an active "retarder" which functions by cutting off the fuel supply to the engine when the prescribed speed is exceeded. This means that if the bus is travelling downhill, it can continue to accelerate even though it is already travelling at or has exceeded the prescribed speed limit.

statutory speed limit of the particular road are perceived by the LTA to be an issue and, in particular, whether any of the monitoring devices mentioned in paragraph 3 above are used to detect and, if so, help prevent instances of this type of speeding. If so, please inform the Committee of the LTA's assessment, if any, of the effectiveness of these measures.

On safety features installed on buses

7. Of safety features adopted by the LTA on its public buses (pages 3 and 4 of the reply), the Committee seeks further information as to the chronology of the process of the initial consideration of the use of the four safety technological devices described in those pages, the trials of those devices, and the installation, of such devices on LTA buses, together with a brief explanation of why it was determined that those devices be installed on buses. Furthermore, the Committee seeks clarification on whether the speed limiter, listed as the second item in the table, is an active[2] or a passive one[3].

On the use of on-board bus cameras for law enforcement

8. Of the enforcement of bus lanes, in part by the use of on-board bus cameras (paragraphs 7 to 9 on page 9 of the reply), the Committee seeks the following further information:

(i) Is the video footage captured by the public bus operators used as evidence in taking enforcement action or only as information that triggers further investigations by the LTA? Specifically, other occasions that the LTA issue a Notice of Traffic Offence to a registered vehicle owner based solely on the video footage captured by a bus captain on the on-board bus camera of a public bus, in particular in the absence of any evidence, including photographs, from a traffic warden? In the event that the violation is challenged, is the bus captain required to give evidence as a witness?

(ii) Typically, what is the duration in time of the relevant parts of such video footage? The Committee has received written submissions from an interested party asserting that such video footage can be as long as 5 to 10 minutes in length. That statement has led to concerns being expressed in evidence by one of the franchised bus operators in Hong Kong over the practicality of deploying bus captains to capture video footage of traffic offences using on-board bus cameras, having regard to the fact that enforcing traffic laws is certainly not their primary duty.

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[2] That is, a speed limiter with an active "speed limiting retarder" with slow down function that can actively reduce the speed of a bus using gears and breaks.

[3] As described in footnote 1 above, this refers to a speed limiter without an active "retarder" which functions by cutting off the fuel supply to the engine when the prescribed speed is exceeded. This means that if the bus is travelling downhill, it can continue to accelerate even though it is already travelling at or has exceeded the prescribed speed limit.

9. On behalf of the Committee, may I express our gratitude to the LTA once again for sharing its information and experience with the Committee. Should you require any further information or assistance, please feel free to contact the undersigned at (852) 2867 2551 (e-mail: peter_chan@irc-bus.gov.hk) or Mr Justin TO at (852) 2867 4612 (e-mail: yt_to@irc-bus.gov.hk).

Yours sincerely,

(CHAN Ping-fai, Peter)
Secretary, Independent Review Committee on
Hong Kong's Franchised Bus Service

cc Messrs. Wilkinson & Grist, Solicitors to the Committee (Attn: Ms Rebecca Lau)

Executive Summary

In response to your questions dated 24 October 2018, we have prepared the replies in the following pages.

In brief, the bus lanes were introduced to give buses priority on the roads, as buses ferry higher number of passengers compared to other vehicles, such as cars. During the peak hours where roads are congested with other traffic, bus lanes give priority to buses, which improves travel experience for bus commuters with faster journey times and smoother rides. This also enables our road infrastructure to serve more road users, and helps to optimise overall usage of our scarce road space. However, for better public acceptance, we will engage the community and relevant stakeholders to see if their concerns can be addressed.

On speed monitoring, the buses procured include some basic safety features. The Public Transport Operators ("PTOs"), on their own initiative with the aim to ensure safety, have installed additional safety features to enhance the safety in the buses.

You may refer to the following pages for more details.

On the bus lane scheme

1. Paragraph 3 on page 8 of the reply states that before the LTA implements a new bus lane, an evaluation of the benefits and costs is conducted to ensure the new bus lane will have positive net benefits. The Committee would like to obtain further details of how such evaluation is conducted, specifically:

    i. is the "efficacy of the proposed bus lane...in improving the travel speed of buses" the only factor considered in evaluating the benefit of implementing a new bus lane? If so, how is the efficacy quantified?

    ii. what types of costs and concerns from stakeholders are taken into account in evaluating the cost of implementing a new bus lane? How are they quantified, so that they can be compared against the benefits?

    iii. it would assist the Committee to be provided with a past evaluation of a particular road section to serve as an illustration of how the benefits and costs are evaluated. If you are unable to provide that information, it would assist to be provided with a summary of the process and the determination of cost-benefit for the bus lane scheme.

The aim of our policy is to shift the mindset of road users by encouraging them to use public transport. When we provide bus lane, we would consider factors such as the frequency of buses using the bus lane and a traffic impact assessment has to be conducted to review the traffic impact of a bus lane. For instance, we will consider the number of buses and commuters compared to the number of cars and car passengers along the heaviest lane.

It is also crucial to engage the key stakeholders for better public acceptance before implementing any bus lane.

We regret that we are unable to provide a specific example of a past evaluation due to the confidential nature of the details contained in the evaluation.

On the monitoring of speeding

2. It is noted from paragraph 1 of page 4 of the reply, that around 40% of the bus fleet in Singapore is currently installed with telematics and about 15% of the fleet have collision warning systems. Furthermore, it is noted that other devices are installed on some buses, such as a speed limiter with a threshold set to 60 km/h, driving monitoring system that detect speeding and give real time alerts. What is the incidence of speeding in excess of speed limits by franchised buses in Singapore? How is driving in excess of speed limits by franchised buses monitored by the bus operators? How effective is that monitoring?

3. It is in connection with the above that the Committee seeks further information on whether or not in Singapore instances of buses travelling at speeds lower than that

set for the speed limiter (i.e. 60 km/h) but nonetheless above the statutory speed limit of the particular road are perceived by the LTA to be an issue and, in particular, whether any of the monitoring devices mentioned in paragraph 3 above are used to detect and, if so, help prevent instances of this type of speeding. If so, please inform the Committee of the LTA's assessment, if any, of the effectiveness of these measures.

For road safety, buses are required to travel within the speed limit of 60 km/hr on expressways and 50 km/hr on other roads, unless specific roads require a lower speed limit. In Singapore, the average distance between each bus stop is approximately 400m. Since public buses are required to stop at the bus stops for boarding and alighting activities, public buses generally travel at much lower speeds compared to the given speed limit of the road. Any incidences of speeding will be investigated by the Traffic Police and public transport operators ("PTOs"). The downloaded video image recorded by CCTV installed in the buses could also be used for investigation, if required.

The PTOs will monitor the driving behaviours of the bus captains with the use of the telematics devices installed on the buses. Since the incentives are tied closely to the performance, the PTOs will have to review the driving behaviour regularly and ensure that the bus captains are complying with the regulations.

On safety features installed on buses

4. Of safety features adopted by the LTA on its public buses (pages 3 and 4 of the reply), the Committee seeks further information as to the chronology of the process of the initial consideration of the use of the four safety technological devices described in those pages, the trials of those devices, and the installation, of such devices on LTA buses, together with a brief explanation of why it was determined that those devices be installed on buses. Furthermore, the Committee seeks clarification on whether the speed limiter, listed as the second item in the table, is an active or a passive one.

In Singapore, the speed limiter, similar in function as Hong Kong franchised buses, is required by the law (since 1999). Traction Control System (TCS) is provided by the bus manufacturers (from 2000 onwards). To enhance safety, from 2018 onwards, collision prevention (incorporating lane-keeping feature) and Anti-fatigue system are currently being installed on the buses.

These safety features are still under trial. Outcome from the trial likely to be available after 4th quarter 2019.

On the use of on-board bus cameras for law enforcement

5. Of the enforcement of bus lanes, in part by the use of on-board bus cameras (paragraphs 7 to 9 on page 9 of the reply), the Committee seeks the following further information:

   i. Is the video footage captured by the public bus operators used as evidence in taking enforcement action or only as information that triggers further investigations by the LTA? Specifically, other occasions that the LTA issue a Notice of Traffic Offence to a registered vehicle owner based solely on the video footage captured by a bus captain on the on-board bus camera of a public bus, in particular in the absence of any evidence, including photographs, from a traffic warden? In the event that the violation is challenged, is the bus captain required to give evidence as a witness?

   ii. Typically, what is the duration in time of the relevant parts of such video footage? The Committee has received written submissions from an interested party asserting that such video footage can be as long as 5 to 10 minutes in length. That statement has led to concerns being expressed in evidence by one of the franchised bus operators in Hong Kong over the practicality of deploying bus captains to capture video footage of traffic offences using on-board bus cameras, having regard to the fact that enforcing traffic laws is certainly not their primary duty.

Bus Captains are not responsible for the enforcement of the bus lanes. They are required to press a button located in their cabin to start recording of a video footage after witnessing a violation. When they return to the bus interchange, they will report such cases to the management for follow up action.

The PTOs would download the recorded video image, with the motorists caught driving in the bus lane during the restricted hours to LTA. There is no fixed duration of the video clip as long as it captures the offence. LTA will assess the case and issue a Notice of Traffic Offence to a registered vehicle owner if the motorist is proven to have committed the offence.

In many cases, the motorist would appeal for the wavier of fine. LTA would review the appeal cases and waiver would be given on case by case basis. Motorists can view the video image at the LTA office if they request to do so.

香港專營巴士服務
獨立檢討委員會

香港金鐘道66號
金鐘道政府合署21樓

Independent Review Committee on Hong Kong's Franchised Bus Service

**21/F, Queensway Government Offices,
66 Queensway, Hong Kong**

本函檔號 Our Ref.: CSO/IRC-BUS/CR/7-45/17
來函檔號 Your Ref.:

電話號碼 Tel No.: (852) 2867 2551
傳真號碼 Fax No.: (852) 3104 0254

18 May 2018

BY EMAIL (*customer.care@abellio.co.uk*) & BY REGISTERED AIRMAIL

Abellio Group
301 Camberwell New Road
London SE5 0TF
United Kingdom
(Attn: Ms Joanna Walker, Head of Strategy)

Dear Sirs,

Independent Review Committee on Hong Kong's Franchised Bus Service

We act for the Independent Review Committee on Hong Kong's Franchised Bus Service ("**the Committee**"). Following the crash of a double-decker bus on 10 February 2018, in which 19 passengers died and 65 persons were injured, the Hong Kong Government set up the Committee on 13 March 2018 to examine the operation and management of bus franchises in Hong Kong, and the related regulation and monitoring of franchised buses with a view to making safety-related recommendations and to ensure that public bus service of Hong Kong are safe and reliable. The Chairman of the Committee is the Honourable Mr Justice Michael Lunn, and Members are Mr Rex Auyeung Pak-kuen and Professor Lo Hong-kam.

We are given to understand from your company's website that Abellio group is one of the leading bus operators that provide bus services across London on behalf of Transport for London and that your company operates over 750 buses and employing 2,500 staff across 6 depots in Central, South and West London. We also note that Mr Tony Wilson, Managing Director, London & Surrey of Abellio has given evidence in the Greater London Assembly Transport Committee meeting on 2 February 2017 on bus safety related issues. In this regard, we believe your company is well placed to provide invaluable assistance to the Committee.

Furthermore, in common with the bus operators in London, the franchised bus operators in Hong Kong provide services in built-up areas with heavy traffic using bus fleets with a significant number of double-decker buses, many of which are supplied by Alexander Dennis Limited, e.g. 12-metre Enviro 500 Double-deck bus, 12.8-Metre Enviro 500 Double-deck bus, E500 Euro V Double-Deck bus and Euro VI Hybrid Double-Deck bus.

We also note from the website of the Transport for London that the London's bus fleet is one of the safest in the world with fewer than three injuries for every million passenger journeys.

One of the terms of reference of the Committee is to provide recommendations to the Chief Executive of the Hong Kong Special Administrative Region on **safety-related measures** with a view to sustaining a safe and reliable franchised bus service in Hong Kong.

To that end, we write to ask if you would kindly assist the Committee in its work by completing the questionnaire at the **Annex** to share with us information related to your bus operation. The information you provide would enable this Committee to make recommendations on possible measures to enhance the safety of franchised bus services in Hong Kong. [Note: You may fill in the attached e-questionnaire and return it to us by e-mail to ***peter_chan@irc-bus.gov.hk***]

We would be very grateful for your assistance. No doubt, in due course, the Committee would be pleased to acknowledge your assistance in the report that it will make to the Chief Executive of the Hong Kong Special Administrative Region.

Yours faithfully,

(CHAN Ping-fai, Peter)
Secretary, Independent Review Committee on
Hong Kong's Franchised Bus Service

cc Hong Kong Economic and Trade Office, London
Messrs. Wilkinson & Grist (Attn: Ms Rebecca Lau)
Mr Tony Wilson, Managing Director, London & Surrey of Abellio

Encl

Annex

Information on Franchised Bus Service in London

Bus Company: Abellio

Recruitment

(1) What selection criteria do you employ for the recruitment of bus captains, in particular do you use any psychological screening/assessment (as advised or recommended by psychologist or otherwise) to ensure that the recruited bus drivers possess the requisite temperament to perform their driving duties satisfactorily even when in stressful situations, e.g. when faced with verbal abuse from difficult passengers including those who are intoxicated?

Remarks:

Training / Assessment

(2) (a) Does your company provide a training programme for drivers on recruitment together with any subsequent refresher training?

Yes ☐ No ☐

Remarks:

(b) If so, do you make use of bus simulators?

Yes ☐ No ☐

Remarks:

(3) Do you employ any ongoing assessment of the stresses to which a bus driver may be subject, e.g. from day-to-day driving in a crowded city and dealing with difficult passengers, and the impact those stresses might have on his/her driving behaviour?

Yes ☐ No ☐

Remarks:

Bus Driver fatigue

(4) Does the law and/or your company impose a maximum number of working hours and driving hours for your bus drivers and is there specific provision for breaks and mealtimes? If so, please describe the requirements briefly.

Yes ☐ No ☐

Remarks:

Safety Procedures and Technology

(5) Does your company use any of the following safety-related equipment or measures on your buses and, if not, please indicate whether or not the use was considered, but rejected:

(a) Tachograph / "Black box" systems? If so, does it allow real-time monitoring of bus driving? Does it use data provided by the Global Positioning System ("GPS")? What use is made of the data obtained from the combined systems?

Yes ☐ No ☐

Remarks:

(b) Electronic Stability Control and Roll Stability Control?

Yes ☐ No ☐

Remarks:

(c) Speed control by geo-fencing system, using GPS? If so, is the GPS signal affected by high-rise buildings in London? If so, with what consequences?

Yes ☐ No ☐

Remarks:

(d) Active vehicle speed retardation system, which may involve changing gears or application of brakes rather than merely cutting off the supply of fuel to the engine? If so, are different speed limits set for different locations, e.g. to comply with different speed limits or to have regard to the nature of the road and area? Has your company considered the feasibility of retrofitting such a vehicle speed retardation system to buses already in service?

Yes ☐ No ☐

Remarks:

(e) Speed display unit in passenger compartments to provide passengers with real-time information of the speed of the bus at any given time?

Yes ☐ No ☐

Remarks:

(f) Collision prevention and lane keeping devices?

Yes ☐ No ☐

Remarks:

(g) Driver alertness monitoring devices, including anti-dozing devices? If so, what equipment is used and over what period has it been used?

Yes ☐ No ☐

Remarks:

(h) Autonomous Emergency Braking System that allows a vehicle to detect its surroundings and automatically apply the brakes?

Yes ☐ No ☐

Remarks:

(i) Has your company retrofitted seat belts to seats on buses? If so, did you encounter any difficulties in doing so because of the structural integrity of the bus?

Yes ☐ No ☐

Remarks:

(j) Has your company taken any specific measures to protect bus drivers from unruly passengers, e.g. the use of transparent screens or CCTV cameras?

Yes ☐ No ☐

Remarks:

(k) Does your company apply any particular Road Safety Management System e.g. ISO 39001?

Yes ☐ No ☐

Remarks:

(l) Is your company able to take action against either drivers or passengers pursuant to by-laws, without having to rely on the police?

Yes ☐ No ☐

Remarks:

Deployment of Double-Decker Buses

(6) Have double-decker buses been deployed to operate on roads with steep gradients and narrow configuration? If yes, what are the criteria for determining whether they are suitable to operate on these roads?

Yes ☐ No ☐

Remarks:

Thank you for taking the time to complete the questionnaire.
Please save your answers to the questions and email the response to peter_chan@irc-bus.gov.hk or yt_to@irc-bus.gov.hk.

- End -

Annex

Information on Franchised Bus Service in London

Bus Company: Abellio

Recruitment

(1) What selection criteria do you employ for the recruitment of bus captains, in particular do you use any psychological screening/assessment (as advised or recommended by psychologist or otherwise) to ensure that the recruited bus drivers possess the requisite temperament to perform their driving duties satisfactorily even when in stressful situations, e.g. when faced with verbal abuse from difficult passengers including those who are intoxicated?

Remarks:

Applicants are recruited through a standard procedure involving application, interview and references. We do not currently use any psychological assessment, however this is being considered for the future.

Our interview process is structured in such a way to discuss how the applicant would respond in certain situations to ensure they offer the correct temperament for the job.

Training / Assessment

(2) (a) Does your company provide a training programme for drivers on recruitment together with any subsequent refresher training?

Yes ☑ No ☐

Remarks:

We recruit drivers via two main channels, those who already hold a bus license and those who are trainees. We have a different training programme depending on which channel, however both sets of drivers would attend a minimum of a 3-day induction, following by route familiarisation at the depot as well undertaking training courses developed to the specific requirements of our customer, TfL.

All drivers undergo at least one day refresher training each year through the CPC course, which focuses on areas such as safe and defensive driving. We also undertake regular assessments of staff during the year.

(b) If so, do you make use of bus simulators?

Yes ☐ No ☑

Remarks:

No, we do not use bus simulators

(3) Do you employ any ongoing assessment of the stresses to which a bus driver may be subject, e.g. from day-to-day driving in a crowded city and dealing with difficult passengers, and the impact those stresses might have on his/her driving behaviour?

Yes ☐ No ☐

Remarks:

Our management structure within the operating depot has the role of Staff Manager and Driving Standards Manager who are specifically tasked with improving the standard of driving. They also mentor staff in their first year of service.

We combine this internal resource with external support to undertake assessments on all staff during the year to assess their driving.

We also arrange staff forums where they have the ability to meet the Leadership team to discuss issues. The Driving Standards Manager will also visit staff at route termini to discuss detailed route issues.

Bus Driver fatigue

(4) Does the law and/or your company impose a maximum number of working hours and driving hours for your bus drivers and is there specific provision for breaks and mealtimes? If so, please describe the requirements briefly.

Yes ☑ No ☐

Remarks:

All driving work is undertaken within the UK domestic driving rules, which have a maximum of 5.5 hours driving before a 30 minute break. The maximum driving hours are 10 hours and a minimum rest period of 8 hours is required between shifts. There is also a limit on the maximum amount of days drivers can work in one week.

We have separate company agreements which provides for improved conditions above the minimum set out in law.

Safety Procedures and Technology

(5) Does your company use any of the following safety-related equipment or measures on your buses and, if not, please indicate whether or not the use was considered, but rejected:

(a) Tachograph / "Black box" systems? If so, does it allow real-time monitoring of bus driving? Does it use data provided by the Global Positioning System ("GPS")? What use is made of the data obtained from the combined systems?

Yes ☑ No ☐

Remarks:

We are currently reviewing the system we use, having previously adopted a system which would monitor driving styles and alert to any harsh braking or acceleration. We have found the system difficult to calibrate and therefore have not been able to gain meaningful data from it for management use and are therefore looking at alternative options.

We have recently commenced a trial of the Mobileye system on 50 buses which alerts drivers to potential hazards such as following too close to the vehicle in front, speeding and pedestrians close to or crossing the path of the bus. Early indications are that this system has resulted in a decline in incidents.

(b) Electronic Stability Control and Roll Stability Control?

Yes ☐ No ☑

Remarks:

(c) Speed control by geo-fencing system, using GPS? If so, is the GPS signal affected by high-rise buildings in London? If so, with what consequences?

Yes ☐ No ☑

Remarks:

The driver monitoring system we have previously used did offer the ability to monitor speed. We were not aware of any significant issues as a result of high rise buildings.

(d) Active vehicle speed retardation system, which may involve changing gears or application of brakes rather than merely cutting off the supply of fuel to the engine? If so, are different speed limits set for different locations, e.g. to comply with different speed limits or to have regard to the nature of the road and area? Has your company considered the feasibility of retrofitting such a vehicle speed retardation system to buses already in service?

Yes ☐ No ☑

Remarks:

(e) Speed display unit in passenger compartments to provide passengers with real-time information of the speed of the bus at any given time?

Yes ☐ No ☑

Remarks:

(f) Collision prevention and lane keeping devices?

Yes ☑ No ☐

Remarks:

We have recently commenced a trial of the Mobileye system on 50 buses which alerts the driver to potential hazards as the bus proceeds.

Early indications are that this system has resulted in a decline in incidents.

(g) Driver alertness monitoring devices, including anti-dozing devices? If so, what equipment is used and over what period has it been used?

Yes ☐ No ☑

Remarks:

(h) Autonomous Emergency Braking System that allows a vehicle to detect its surroundings and automatically apply the brakes?

Yes ☐ No ☑

Remarks:

(i) Has your company retrofitted seat belts to seats on buses? If so, did you encounter any difficulties in doing so because of the structural integrity of the bus?

Yes ☐ No ☑

Remarks:

(j) Has your company taken any specific measures to protect bus drivers from unruly passengers, e.g. the use of transparent screens or CCTV cameras?

Yes ☑ No ☐

Remarks:

All of our buses are fitted with "assault" screens whereby there is a clear screen between the driver and passenger.

All buses are fitted with CCTV systems which record in the passenger area as well as outside of the bus and in newer vehicles, the driver's cab. These systems are actively maintained and used in case of any incidents. They are also used in defence of accident claims.

(k) Does your company apply any particular Road Safety Management System e.g. ISO 39001?

Yes ☐ No ☑

Remarks:

(l) Is your company able to take action against either drivers or passengers pursuant to by-laws, without having to rely on the police?

Yes ☑ No ☐

Remarks:

The company has a formal disciplinary system for staff should they not adhere to procedures. This may result in a warning or dismissal from their role. This is undertaken in stages, with an appeal process if required.

We are not able to take any action against passengers.

Deployment of Double-Decker Buses

(6) Have double-decker buses been deployed to operate on roads with steep gradients and narrow configuration? If yes, what are the criteria for determining whether they are suitable to operate on these roads?

Yes ☑ No ☐

Remarks:

A formal route test would be undertaken with Transport for London (TfL), the operator and local authority to agree the suitable bus type for the route. No change to bus type would be approved without this assessment.

We would operate double deck buses where the length and height of bus allows for their safe operation and work with TfL if modification to the road layout may be required to accommodate the bus route.

We have no areas where a certain bus type has not be used due to gradient. Where a narrow road has existed, options for narrower or smaller buses would be considered.

Thank you for taking the time to complete the questionnaire.
Please save your answers to the questions and email the response to peter_chan@irc-bus.gov.hk or yt_to@irc-bus.gov.hk.

- End -

香港專營巴士服務
獨立檢討委員會

香港金鐘道66號
金鐘道政府合署21樓

**Independent Review Committee on
Hong Kong's Franchised Bus Service**

21/F, Queensway Government Offices,
66 Queensway, Hong Kong

本函檔號 Our Ref.: CSO/IRC-BUS/CR/7-45/17
來函檔號 Your Ref.:

電話號碼 Tel No.: (852) 2867 2551
傳真號碼 Fax No.: (852) 3104 0254

18 May 2018

BY EMAIL (*pr.london@stagecoachbus.com*) & BY REGISTERED AIRMAIL

Stagecoach Group
Communications Department
Stagecoach London Head Office
West Ham Garage
Stephenson Street
London E16 4SA
(Attn: Mr Mark Threapleton, Managing Director)

Dear Sirs,

Independent Review Committee on Hong Kong's Franchised Bus Service

We act for the Independent Review Committee on Hong Kong's Franchised Bus Service ("**the Committee**"). Following the crash of a double-decker bus on 10 February 2018, in which 19 passengers died and 65 persons were injured, the Hong Kong Government set up the Committee on 13 March 2018 to examine the operation and management of bus franchises in Hong Kong, and the related regulation and monitoring of franchised buses with a view to making safety-related recommendations and to ensure that public bus service of Hong Kong are safe and reliable. The Chairman of the Committee is the Honourable Mr Justice Michael Lunn, and Members are Mr Rex Auyeung Pak-kuen and Professor Lo Hong-kam.

We are given to understand from the website that Stagecoach UK Bus is part of the Stagecoach Group which is one of the largest bus operators in the UK. Stagecoach Group has a fleet of 1,300 buses serving routes in and around east and south-east London. We also note that Stagecoach Group companies and employees have been recognized at the 2017 UK Bus Awards.

Your website also showed that your drivers have to undertake a Safe, Skilled and Fuel Efficient Driver programme as part of their training and that your company operates a maintenance program that is far more rigorous than the legal requirements.

Furthermore, in common with the bus operators in London, the franchised bus operators in Hong Kong provide services in built-up areas with heavy traffic using bus fleets with a significant number of double-decker buses, many of which are supplied by Alexander Dennis Limited, e.g. 12-metre Enviro 500 Double-deck bus, 12.8-Metre Enviro 500 Double-deck bus, E500 Euro V Double-Deck bus and Euro VI Hybrid Double-Deck bus.

We also note from the website of the Transport for London that the London's bus fleet is one of the safest in the world with fewer than three injuries for every million passenger journeys.

One of the terms of reference of the Committee is to provide recommendations to the Chief Executive of the Hong Kong Special Administrative Region on **safety-related measures** with a view to sustaining a safe and reliable franchised bus service in Hong Kong.

To that end, we write to ask if you would kindly assist the Committee in its work by completing the questionnaire at the **Annex** to share with us information related to your bus operation. The information you provide would enable this Committee to make recommendations on possible measures to enhance the safety of franchised bus services in Hong Kong. [Note: You may fill in the attached e-questionnaire and return it to us by e-mail to ***peter_chan@irc-bus.gov.hk***]

We would be very grateful for your assistance. No doubt, in due course, the Committee would be pleased to acknowledge your assistance in the report that it will make to the Chief Executive of the Hong Kong Special Administrative Region.

Yours faithfully,

(CHAN Ping-fai, Peter)
Secretary, Independent Review Committee on
Hong Kong's Franchised Bus Service

cc Hong Kong Economic and Trade Office, London
Messrs. Wilkinson & Grist (Attn: Ms Rebecca LAU)

Encl

Annex

Information on Franchised Bus Service in London

Bus Company: Stagecoach London Head Office

Recruitment

(1) What selection criteria do you employ for the recruitment of bus captains, in particular do you use any psychological screening/assessment (as advised or recommended by psychologist or otherwise) to ensure that the recruited bus drivers possess the requisite temperament to perform their driving duties satisfactorily even when in stressful situations, e.g. when faced with verbal abuse from difficult passengers including those who are intoxicated?

Remarks:

Training / Assessment

(2) (a) Does your company provide a training programme for drivers on recruitment together with any subsequent refresher training?

Yes ☐ No ☐

Remarks:

(b) If so, do you make use of bus simulators?

Yes ☐ No ☐

Remarks:

(3) Do you employ any ongoing assessment of the stresses to which a bus driver may be subject, e.g. from day-to-day driving in a crowded city and dealing with difficult passengers, and the impact those stresses might have on his/her driving behaviour?

Yes ☐ No ☐

Remarks:

Bus Driver fatigue

(4) Does the law and/or your company impose a maximum number of working hours and driving hours for your bus drivers and is there specific provision for breaks and mealtimes? If so, please describe the requirements briefly.

Yes ☐ No ☐

Remarks:

Safety Procedures and Technology

(5) Does your company use any of the following safety-related equipment or measures on your buses and, if not, please indicate whether or not the use was considered, but rejected:

(a) Tachograph / "Black box" systems? If so, does it allow real-time monitoring of bus driving? Does it use data provided by the Global Positioning System ("GPS")? What use is made of the data obtained from the combined systems?

Yes ☐ No ☐

Remarks:

(b) Electronic Stability Control and Roll Stability Control?

Yes ☐ No ☐

Remarks:

(c) Speed control by geo-fencing system, using GPS? If so, is the GPS signal affected by high-rise buildings in London? If so, with what consequences?

Yes ☐ No ☐

Remarks:

(d) Active vehicle speed retardation system, which may involve changing gears or application of brakes rather than merely cutting off the supply of fuel to the engine? If so, are different speed limits set for different locations, e.g. to comply with different speed limits or to have regard to the nature of the road and area? Has your company considered the feasibility of retrofitting such a vehicle speed retardation system to buses already in service?

Yes ☐ No ☐

Remarks:

(e) Speed display unit in passenger compartments to provide passengers with real-time information of the speed of the bus at any given time?

Yes ☐ No ☐

Remarks:

(f) Collision prevention and lane keeping devices?

Yes ☐ No ☐

Remarks:

(g) Driver alertness monitoring devices, including anti-dozing devices? If so, what equipment is used and over what period has it been used?

Yes ☐ No ☐

Remarks:

(h) Autonomous Emergency Braking System that allows a vehicle to detect its surroundings and automatically apply the brakes?

Yes ☐ No ☐

Remarks:

(i) Has your company retrofitted seat belts to seats on buses? If so, did you encounter any difficulties in doing so because of the structural integrity of the bus?

Yes ☐ No ☐

Remarks:

(j) Has your company taken any specific measures to protect bus drivers from unruly passengers, e.g. the use of transparent screens or CCTV cameras?

Yes ☐ No ☐

Remarks:

(k) Does your company apply any particular Road Safety Management System e.g. ISO 39001?

Yes ☐ No ☐

Remarks:

(l) Is your company able to take action against either drivers or passengers pursuant to by-laws, without having to rely on the police?

Yes ☐ No ☐

Remarks:

Deployment of Double-Decker Buses

(6) Have double-decker buses been deployed to operate on roads with steep gradients and narrow configuration? If yes, what are the criteria for determining whether they are suitable to operate on these roads?

Yes ☐ No ☐

Remarks:

Thank you for taking the time to complete the questionnaire.
Please save your answers to the questions and email the response to peter_chan@irc-bus.gov.hk or yt_to@irc-bus.gov.hk.

- End -

Annex

Information on Franchised Bus Service in London

Bus Company: Stagecoach London Head Office

Recruitment

(1) What selection criteria do you employ for the recruitment of bus captains, in particular do you use any psychological screening/assessment (as advised or recommended by psychologist or otherwise) to ensure that the recruited bus drivers possess the requisite temperament to perform their driving duties satisfactorily even when in stressful situations, e.g. when faced with verbal abuse from difficult passengers including those who are intoxicated?

Remarks:

Candidates are screened online using an applicant tracking system which then shows them if they are a match for the role they are applying for. They are then required to complete an online application.

If called for interview, a preliminary driving assessment will be conducted to assess an applicants practical driving standards, assess the ability to respond to coaching and instruction during the driving process and assess level of highway code knowledge.
This assessment will also gauge if the applicant is likely to complete the practical driver training element within a specified timescale.

If called for interview applicants are asked to undertake a Recruitment Test, based on the skills required for the post. Areas covered are comprehension, completion of an accident report, numerical and customer service.

Performed on a one to one basis the interview lasts on average 20 minutes. During this process a number of competency based questions will be asked to highlight any areas of concern. Following this:

1. The interviewer will go through the application form confirming that the information supplied is correct and will explore areas of uncertainty, especially those relating to multiple career changes. The reasons for leaving previous jobs are more important that the actual number of jobs had and references are discussed.

Other questions asked may include an insight into an applicants hobbies and interests. Why does the applicant want to be a bus driver?

2. The interviewer will also assess that the applicant has fully understood the information provided on training, PCV Licence, work conditions, shift patterns, pay structure, rest days, holidays and will answer any questions.

Non-advancement at this stage tends to reflect non-disclosures on the application form. Attitude is also a decisive factor, as is flexibility and the ability to work with other people.

If there is any concern about a particular applicant then immediate references are sought or the interview may be terminated and no further action taken.

Training / Assessment

(2) (a) Does your company provide a training programme for drivers on recruitment together with any subsequent refresher training?

Yes ☐ No ☐

Remarks:

New drivers are given training on Customer Service (including disability awareness), our Ticketing and Radio systems and vehicle familiarisation. They also start their training towards a Level 2 City & Guilds qualification in Professional Bus Driving in London and come back to the Training Centre after about 6 months service to do a further two days training towards this qualification including a final assessment test. All bus drivers are required to do 35 hours of periodic training over 5 years to maintain their Driver Qualification Card which enables them to drive a bus in service. Therefore drivers normally attend a 7 hour course every year to achieve this.

Drivers can be referred back to the Training Centre for driving issues and will receive corrective training if necessary. They may also be referred back for behavioural issues and classroom training will be given for this to see if we can educate them to improve this.

(b) If so, do you make use of bus simulators?

Yes ☐ No ☐

Remarks:

(3) Do you employ any ongoing assessment of the stresses to which a bus driver may be subject, e.g. from day-to-day driving in a crowded city and dealing with difficult passengers, and the impact those stresses might have on his/her driving behaviour?

Yes ☐ No ☑

Remarks:

Bus Driver fatigue

(4) Does the law and/or your company impose a maximum number of working hours and driving hours for your bus drivers and is there specific provision for breaks and mealtimes? If so, please describe the requirements briefly.

Yes ☑ No ☐

Remarks:

We abide by UK Domestic Hours Regulations, in addition to which the following local agreement operates:
Time off between working days

A minimum of ten hours rest must be taken between completion of a day's work (be it end of duty or overtime) on one day and the start of a day's work (be it overtime or duty) the following day.

Every effort must be made to provide a 40-minute break between completion of a duty and commencement of overtime or between completion of overtime and start of duty the same day. A minimum break of 30 minutes is guaranteed.

Safety Procedures and Technology

(5) Does your company use any of the following safety-related equipment or measures on your buses and, if not, please indicate whether or not the use was considered, but rejected:

(a) Tachograph / "Black box" systems? If so, does it allow real-time monitoring of bus driving? Does it use data provided by the Global Positioning System ("GPS")? What use is made of the data obtained from the combined systems?

Yes ☑ No ☐

Remarks:

We use a system called Greenroad, which monitors harsh breaking, harsh acceleration and excessive engine idle time. We use this system on peer to peer assessments. Drivers are given green,amber, red score based on the number of events they obtain. Drivers with amber and red scores receive further guidance and training, the system is able to pin point the location of events so drivers can learn the hot spots.

This system is also used to reward drivers in the form of a financial bonus for good driving scores, it is also used as a national measure with the top drivers being awarded elite status who are then entered into local and national driver of the year competitions.

(b) Electronic Stability Control and Roll Stability Control?

Yes ☐ No ☑

Remarks:

(c) Speed control by geo-fencing system, using GPS? If so, is the GPS signal affected by high-rise buildings in London? If so, with what consequences?

Yes ☑ No ☐

Remarks:

This is something our customer (Transport for London) is looking at, we are aware of trials in progress and believe the feedback is very positive.

(d) Active vehicle speed retardation system, which may involve changing gears or application of brakes rather than merely cutting off the supply of fuel to the engine? If so, are different speed limits set for different locations, e.g. to comply with different speed limits or to have regard to the nature of the road and area? Has your company considered the feasibility of retrofitting such a vehicle speed retardation system to buses already in service?

Yes ☑ No ☐

Remarks:

This is something Transport for London are looking at with various manufacturers, it maybe worth talking to them about the findings from the work they have done with the Transport Research Laboratory (TRL).

(e) Speed display unit in passenger compartments to provide passengers with real-time information of the speed of the bus at any given time?

Yes ☐ No ☑

Remarks:

(f) Collision prevention and lane keeping devices?

Yes ☐ No ☑

Remarks:

(g) Driver alertness monitoring devices, including anti-dozing devices? If so, what equipment is used and over what period has it been used?

Yes ☐ No ☑

Remarks:

(h) Autonomous Emergency Braking System that allows a vehicle to detect its surroundings and automatically apply the brakes?

Yes ☐ No ☑

Remarks:

(i) Has your company retrofitted seat belts to seats on buses? If so, did you encounter any difficulties in doing so because of the structural integrity of the bus?

Yes ☐ No ☑

Remarks:

(j) Has your company taken any specific measures to protect bus drivers from unruly passengers, e.g. the use of transparent screens or CCTV cameras?

Yes ☑ No ☐

Remarks:

All our vehicles in London are fitted with overt CCTV monitors that scroll through the various camera views. We have also strated to use cab only audio recording. This system only records the audio interaction with the driver and passengers.

(k) Does your company apply any particular Road Safety Management System e.g. ISO 39001?

Yes ☐ No ☑

Remarks:

(l) Is your company able to take action against either drivers or passengers pursuant to by-laws, without having to rely on the police?

Yes ☑ No ☐

Remarks:

We can take private prosecutions out with staff or members of the public, but it is a vary rare event that we would invoke these actions.

Deployment of Double-Decker Buses

(6) Have double-decker buses been deployed to operate on roads with steep gradients and narrow configuration? If yes, what are the criteria for determining whether they are suitable to operate on these roads?

Yes ☐ No ☐

Remarks:

Route risk assessments would be carried out to review the suitability of the vehicle for that route. Road safety is paramount, so if the route cannot be operated safely we would review all other options from vehicle size and configuration to if the route is suitable for operation of a bus at all.

Thank you for taking the time to complete the questionnaire.
Please save your answers to the questions and email the response to peter_chan@irc-bus.gov.hk or yt_to@irc-bus.gov.hk.

- End -

CONSULTANCY SERVICE

FOR

INDEPENDENT REVIEW COMMITTEE ON HONG KONG'S FRANCHISED BUS SERVICE

REVISED FINAL REPORT

SURVEY OF SPEEDS AT WHICH FRANCHISED BUSES TRAVEL ON 20 SECTIONS OF ROADS

P18-0068 (CEE)

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Signed by: [redacted]

Date: 2 October 2018

Disclaimer

Client's use of the information contained in the summary report is at its own risk and client assumes full responsibility and risk of loss resulting from the use thereof.

1. Introduction

1.1 In the light of several fatal accidents involving franchised buses in Hong Kong in recent years, it is crucial to examine the operation of franchised buses from the safety point of view. One issues that has drawn the attention is the speed of franchised buses regarding the current speed limits.

1.2 Objective of this study is to measure the speeds of franchised buses on 20 selected road sections in Hong Kong, and to examine the extent of speeding of franchised bus (particularly the prevailing speed limit of 50 km/h on general roads).

1.3 For each selected road section, no less than 5 hours (in particular free flow condition) of survey was carried out and no less than 30 buses were measured.

2. Progress

2.1 After a meeting with the Committee on 17 August 2018 and joint site visit on 22 August 2018, a list of 20 road sections for the speed survey was finalized on 23 August 2018 (See **Appendix I**).

2.2 Calibration and certification of the laser speed gun (LTI 20-20 TruSpeed DC Laser Speed gun) was carried out during the period from 20 to 27 August 2018 by Best Engineering Company Limited.

2.3 A surveyor training was conducted on 28 August 2018 by a qualified operator.

2.4 Speed surveys on the 20 sections of road were carried out during the period from 29 August to 23 September 2018, in particular four were on Hong Kong Island, eight were in Kowloon, and eight were in New Territories respectively (See **Appendix II**).

3. Results

3.1 In the speed surveys during the period from 29 August 2018 to 23 September 2018, speed of a total of **2381 buses** were measured, with which **234 (9.8%)** were travelling at the speed higher than 50 km/h (See **Table 1**).

3.2 As shown in **Table 1**, maximum speed captured was **64 km/h** on Ap Lei Chau Bridge Road on 30 August, Po Lam Road on 2 September and Che Kung Miu Road on 20 September 2018, respectively.

3.3 On **Po Lam Road**, of the 108 buses captured, 56 (51.9%) were travelling at a speed greater than 50 km/h.

3.4 Further analyses of speeding by time period are given in **Table 2**.

Table 1. Summary of Speed Survey Results

	Road Section	Date of Survey	Number of Bus Measured	Number of Bus with Speed > 50 km/h (%)		Maximum Speed Captured
1	Lung Mun Road	10 Sep (Mon)	89	2	(2.2%)	59 km/h
2	Che Kung Miu Road	20 Sep (Thu)	102	13	(12.7%)	64 km/h [redacted]
3	A Kung Kok Street	4 Sep (Tue)	86	22	(25.6%)	57 km/h
4	Tsing Yi Road West	8 Sep (Sat)	95	1	(1.1%)	57 km/h
5	Fung Shue Wo Road	13 Sep (Thu)	97	20	(20.6%)	58 km/h
6	Wo Yip Hop Road	9 Sep (Sun)	150	2	(1.3%)	51 km/h
7	Castle Peak Road	23 Sep (Sun)	101	7	(6.9%)	53 km/h
8	Po Hong Road (*70 km/h*)	22 Sep (Sat)	71	0	(0.0 %)	46 km/h
9	Nam Cheong Street	5 Sep (Wed)	63	1	(1.6%)	52 km/h
10	Waterloo Road	6 Sep (Thu)	101	7	(6.9%)	62 km/h
11	Kwun Tong Road	15 Sep (Sat)	80	10	(12.5%)	56 km/h
12	Po Kong Village Road	11 Sep (Tue)	99	8	(8.1%)	58 km/h
13	New Clear Water Bay Road	12 Sep (Wed	86	3	(3.5%)	55 km/h
14	Sau Mau Ping Road	14 Sep (Fri)	85	4	(4.7%)	53 km/h
15	Po Lam Road	2 Sep (Sun)	108	56	(51.9%)	64 km/h [redacted]
16	Pok Fu Lam Road	1 Sep (Sat)	191	5	(2.6%)	54 km/h
17	Wong Chuk Hang Road	31 Aug (Fri)	283	29	(10.2%)	58 km/h
18	Ap Lei Chau Bridge Road	30 Aug (Thu)	243	38	(15.6%)	64 km/h [redacted]
19	Chai Wan Road	29 Aug (Wed)	150	1	(0.7%)	53 km/h
20	Chun Wan Road	7 Sep (Fri)	101	5	(5.0%)	55 km/h
	Overall		**2381**	**234**	**(9.8%)**	**64 km/h**

Table 2. Further Analyses

(a) Lung Mun Road (#1)

	Morning (Before 12:00nn)		Afternoon (After 12:00nn)		Overall	
Bus with speed <= 50 km/h	**12 (Mean 32.1)**	**92.3%**	**75 (Mean 33.2)**	**98.7%**	**87 (Mean 33.0)**	**97.8%**
Less than 31 km/h	7 (Min. 22)	53.8%	35 (Min. 21)	46.1%	42 (Min. 21)	47.2%
31-35 km/h	0	0.0%	8	10.5%	8	9.0%
36-40 km/h	3	23.1%	19	25.0%	22	24.7%
41-45 km/h	2	15.4%	9	11.8%	11	12.4%
46-50 km/h	0	0.0%	4	5.3%	4	4.5%
Bus with speed >50 km/h	**1 (Mean 59)**	**7.7%**	**1 (Mean 51)**	**1.3%**	**2 (Mean 55)**	**2.2%**
51-55 km/h	0	0.0%	1 (Max. 51)	1.3%	1	1.1%
56-60 km/h	1 (Max. 59)	7.7%	0	0.0%	1 (Max. 59)	1.1%
Total	**13 (Mean 34.2)**	**100.0%**	**76 (Mean 33.3)**	**100.0%**	**89 (Mean 33.5)**	**100.0%**

(b) Che Kung Miu Road (#2)

	Afternoon (Before 6:30pm)		Evening (After 6:30pm)		Overall	
Bus with speed <= 50 km/h	**39 (Mean 44.0)**	**88.6%**	**50 (Mean 43.3)**	**86.2%**	**89 (Mean 43.6)**	**87.3%**
Less than 36 km/h	3 (Min. 32)	6.8%	2 (Min. 32)	3.4%	5 (Min. 32)	4.9%
36-40 km/h	7	15.9%	10	17.2%	17	16.7%
41-45 km/h	9	20.5%	22	37.9%	31	30.4%
46-50 km/h	20	45.5%	16	27.6%	36	35.3%
Bus with speed >50 km/h	**5 (Mean 55.8)**	**11.4%**	**8 (Mean 55.8)**	**13.8%**	**13 (Mean 55.8)**	**12.7%**
51-55 km/h	3	6.8%	5	8.6%	8	7.8%
56-60 km/h	2 (Max. 59)	4.5%	1	1.7%	3	2.9%
61-65 km/h	0	0.0%	2 (Max. 64)	3.4%	2 (Max. 64)	2.0%
Total	**44 (Mean 45.4)**	**100.0%**	**58 (Mean 45.0)**	**100.0%**	**102 (Mean 45.2)**	**100.0%**

(c) A Kung Kok Street (#3)

	Morning		Afternoon		Overall	
Bus with speed <= 50 km/h	**24 (Mean 45.7)**	**80.0%**	**40 (Mean 45.6)**	**71.4%**	**64 (Mean 45.6)**	**74.4%**
Less than 41 km/h	3 (Min. 39)	10.0%	3 (Min. 37)	5.4%	6 (Min. 37)	7.0%
41-45 km/h	7	23.3%	16	28.6%	23	26.7%
46-50 km/h	14	46.7%	21	37.5%	35	40.7%
Bus with speed >50 km/h	**6 (Mean 55.8)**	**20.0%**	**16 (Mean 52.9)**	**28.6%**	**22 (Mean 53.7)**	**25.6%**
51-55 km/h	2	6.7%	16 (Max. 55)	28.6%	18	20.9%
56-60 km/h	4 (Max. 57)	13.3%	0	0.0%	4 (Max. 57)	4.7%
Total	**30 (Mean 47.7)**	**100.0%**	**56 (Mean 47.7)**	**100.0%**	**86 (Mean 47.7)**	**100.0%**

(d) Tsing Yi Road West (#4)

	Morning		Afternoon		Overall	
Bus with speed <= 50 km/h	**33 (Mean 38.9)**	**100.0%**	**61 (Mean 37.3)**	**98.4%**	**94 (Mean 37.7)**	**98.9%**
Less than 31 km/h	3 (Min. 28)	9.1%	2 (Min. 30)	3.2%	5 (Min. 28)	5.3%
31-35 km/h	9	27.3%	22	35.5%	31	32.6%
36-40 km/h	7	21.2%	24	38.7%	31	32.6%
41-45 km/h	8	24.2%	9	14.5%	17	17.9%
46-50 km/h	6 (Max. 50)	18.2%	4	6.5%	10	10.5%
Bus with speed >50 km/h	**0**	**0.0%**	**1 (Mean 57)**	**1.6%**	**1 (Mean 57)**	**1.1%**
51-55 km/h	0	0.0%	0	0.0%	0	0.0%
56-60 km/h	0	0.0%	1 (Max. 57)	1.6%	1 (Max. 57)	1.1%
Total	**33 (Mean 38.5)**	**100.0%**	**62 (Mean 37.6)**	**100.0%**	**95 (Mean 37.9)**	**100.0%**

(e) Fung Shue Wo Road (#5)

	Morning		Afternoon		Overall	
Bus with speed <= 50 km/h	**27 (Mean 42.3)**	**75.0%**	**50 (Mean 41.4)**	**82.0%**	**77 (Mean 41.8)**	**79.4%**
Less than 31 km/h	1 (Min. 30)	2.8%	2 (Min. 30)	3.3%	3 (Min. 30)	3.1%
31-35 km/h	0	0.0%	3	4.9%	3	3.1%
36-40 km/h	7	19.4%	16	26.2%	23	23.7%
41-45 km/h	12	33.3%	16	26.2%	28	28.9%
46-50 km/h	7	19.4%	13	21.3%	20	20.6%
Bus with speed >50 km/h	**9 (Mean 53.6)**	**25.0%**	**11 (Mean 52.3)**	**18.0%**	**20 (Mean 52.9)**	**20.6%**
51-55 km/h	7	19.4%	10	16.4%	17	17.5%
56-60 km/h	2 (Max. 58)	5.6%	1 (Max. 56)	1.6%	3 (Max. 58)	3.1%
Total	**36 (Mean 45.2)**	**100.0%**	**61 (Mean 43.4)**	**100.0%**	**97 (Mean 44.0)**	**100.0%**

(f) Wo Yip Hop Road (#6)

	Morning		Afternoon		Overall	
Bus with speed <= 50 km/h	**46 (Mean 37.5)**	**100.0%**	**102 (Mean 38.9)**	**98.1%**	**148 (Mean 38.5)**	**98.7%**
Less than 31 km/h	-	-	2 (Min. 29)	1.9%	2 (Min. 29)	1.3%
31-35 km/h	18 (Min. 31)	39.1%	25	24.0%	43	28.7%
36-40 km/h	19	41.3%	35	33.7%	54	36.0%
41-45 km/h	8	17.4%	31	29.8%	39	26.0%
46-50 km/h	1 (Max 49)	2.2%	9	8.7%	10	6.7%
Bus with speed >50 km/h	**0**	**0.0%**	**2 (Mean 51)**	**1.9%**	**2 (Mean 51)**	**1.3%**
51-55 km/h	0	0.0%	2 (Max. 51)	1.9%	2 (Max. 51)	1.3%
Total	**46 (Mean 37.5)**	**100.0%**	**104 (Mean 39.1)**	**100.0%**	**150 (Mean 38.6)**	**100.0%**

(g) Castle Peak Road near Shek Pai Street (#7)

	Afternoon		Evening		Overall	
Bus with speed <= 50 km/h	**56 (Mean 42.7)**	**90.3%**	**38 (Mean 42.9)**	**97.4%**	**94 (Mean 42.8)**	**93.1%**
Less than 31 km/h	1 (Min. 30)	1.6%	-	-	1 (Min. 30)	1.0%
31-35 km/h	3	4.8%	-	-	3	3.0%
36-40 km/h	11	17.7%	8 (Min. 36)	20.5%	19	18.8%
41-45 km/h	22	35.5%	23	59.0%	45	44.6%
46-50 km/h	19	30.6%	7	17.9%	26	25.7%
Bus with speed >50 km/h	**6 (Mean 52)**	**9.7%**	**1 (Mean 53)**	**2.6%**	**7 (Mean 52.1)**	**6.9%**
51-55 km/h	6 (Max. 53)	9.7%	1 (Max. 53)	2.6%	7 (Max .53)	6.9%
Total	**62 (Mean 43.6)**	**100.0%**	**39 (Mean 43.2)**	**100.0%**	**101 (Mean 43.4)**	**100.0%**

(h)* Po Hong Road (#8) *(Speed limit of 70 km/h)

	Afternoon		Evening		Overall	
Bus with speed <= 70 km/h	**40 (Mean 34.6)**	**100.0%**	**31 (Mean 34.3)**	**100.0%**	**71 (Mean 34.5)**	**100.0%**
Less than 31 km/h	4 (Min. 29)	10.0%	9 (Min. 24)	29.0%	13 (Min. 24)	18.3%
31-35 km/h	21	52.5%	12	38.7%	33	46.5%
36-40 km/h	13	32.5%	6	19.4%	19	26.8%
41-45 km/h	2 (Max. 45)	5.0%	3	9.7%	5	7.0%
46-50 km/h	-	-	1 (Max. 46)	3.2%	1 (Max. 46)	1.4%
Bus with speed >70 km/h	**0**	**0.0%**	**0**	**0.0%**	**0**	**0.0%**
Total	**40 (Mean 34.6)**	**100.0%**	**31 (Mean 34.3)**	**100.0%**	**71 (Mean 34.5)**	**100.0%**

(i) Nam Cheong Street (#9)

	Morning		Afternoon		Overall	
Bus with speed <= 50 km/h	**30 (Mean 37.8)**	**100.0%**	**32 (Mean 38.7)**	**97.0%**	**62 (Mean 38.3)**	**98.4%**
Less than 31 km/h	-	-	1 (Min. 29)	3.0%	1 (Min. 29)	1.6%
31-35 km/h	10 (Min. 31)	33.3%	7	21.2%	17	27.0%
36-40 km/h	11	36.7%	13	39.4%	24	38.1%
41-45 km/h	8	26.7%	9	27.3%	17	27.0%
46-50 km/h	1 (Max 47)	3.3%	2	6.1%	3	4.8%
Bus with speed >50 km/h	0	0.0%	**1 (Mean 52)**	**3.0%**	**1 (Mean 52)**	**1.6%**
51-55 km/h	0	0.0%	1 (Max. 52)	3.0%	1 (Max. 52)	1.6%
Total	**30 (Mean 37.8)**	**100.0%**	**33 (Mean 39.1)**	**100.0%**	**63 (Mean 38.5)**	**100.0%**

(j) Waterloo Road (#10)

	Morning		Afternoon		Overall	
Bus with speed <= 50 km/h	**38 (Mean 39.4)**	**95.0%**	**56 (Mean 41.3)**	**91.8%**	**94 (Mean 40.5)**	**93.1%**
Less than 36 km/h	9 (Min. 31)	22.5%	7 (Min. 32)	11.5%	16 (Min. 31)	15.8%
36-40 km/h	16	40.0%	15	24.6%	31	30.7%
41-45 km/h	10	25.0%	22	36.1%	32	31.7%
46-50 km/h	3	7.5%	12	19.7%	15	14.9%
Bus with speed >50 km/h	**2 (Mean 54)**	**5.0%**	**5 (Mean 53.8)**	**8.2%**	**7 (Mean 53.9)**	**6.9%**
51-55 km/h	2 (Max. 55)	5.0%	4	6.6%	6	5.9%
56-60 km/h	0	0.0%	0	0.0%	0	0.0%
61-65 km/h	0	0.0%	1 (Max. 62)	1.6%	1 (Max. 62)	1.0%
Total	**40 (Mean 40.2)**	**100.0%**	**61 (Mean 42.3)**	**100.0%**	**101 (Mean 41.4)**	**100.0%**

(k) Kwun Tong Road (#11)

	Morning		Afternoon		Overall	
Bus with speed <= 50 km/h	**20 (Mean 43.6)**	**87.0%**	**50 (Mean 42.2)**	**87.7%**	**70 (Mean 42.6)**	**87.5%**
Less than 31 km/h	0	0.0%	1 (Min. 30)	1.8%	1 (Min. 30)	1.3%
31-35 km/h	0	0.0%	4	7.0%	4	5.0%
36-40 km/h	7 (Min. 36)	30.4%	13	22.8%	20	25.0%
41-45 km/h	4	17.4%	17	29.8%	21	26.3%
46-50 km/h	9	39.1%	15	26.3%	24	30.0%
Bus with speed >50 km/h	**3 (Mean 52.7)**	**13.0%**	**7 (Mean 52.4)**	**12.3%**	**10 (Mean 52.5)**	**12.5%**
51-55 km/h	2	8.7%	7 (Max. 54)	12.3%	9	11.3%
56-60 km/h	1 (Max. 56)	4.3%	0	0.0%	1 (Max. 56)	1.3%
Total	**23 (Mean 44.8)**	**100.0%**	**57 (Mean 43.4)**	**100.0%**	**80 (Mean 43.8)**	**100.0%**

(l) Po Kong Village Road (#12)

	Morning		Afternoon		Overall	
Bus with speed <= 50 km/h	**32 (Mean 40.7)**	**91.4%**	**59 (Mean 40.2)**	**92.2%**	**91 (Mean 40.3)**	**91.9%**
Less than 31 km/h	3 (Min. 26)	8.6%	5 (Min. 23)	7.8%	8 (Min. 23)	8.1%
31-35 km/h	4	11.4%	9	14.1%	13	13.1%
36-40 km/h	8	22.9%	13	20.3%	21	21.2%
41-45 km/h	10	28.6%	17	26.6%	27	27.3%
46-50 km/h	7	20.0%	15	23.4%	22	22.2%
Bus with speed >50 km/h	**3 (Mean 53)**	**8.6%**	**5 (Mean 54)**	**7.8%**	**8 (Mean 53.6)**	**8.1%**
51-55 km/h	2	5.7%	3	4.7%	5	5.1%
56-60 km/h	1 (Max. 57)	2.9%	2 (Max. 58)	3.1%	3 (Max. 58)	3.0%
Total	**35 (Mean 41.7)**	**100.0%**	**64 (Mean 41.2)**	**100.0%**	**99 (Mean 41.4)**	**100.0%**

(m) New Clear Water Bay Road (#13)

	Morning		Afternoon		Overall	
Bus with speed <= 50 km/h	**35 (Mean 41.2)**	**100.0%**	**48 (Mean 42.4)**	**94.1%**	**83 (Mean 41.9)**	**96.5%**
Less than 36 km/h	4 (Min. 33)	11.4%	6 (Min. 33)	11.8%	10 (Min. 33)	11.6%
36-40 km/h	11	31.4%	14	27.5%	25	29.1%
41-45 km/h	14	40.0%	12	23.5%	26	30.2%
46-50 km/h	6 (Max. 48)	17.1%	16	31.4%	22	25.6%
Bus with speed >50 km/h	0	0.0%	**3 (Mean 53)**	**5.9%**	**3 (Mean 53)**	**3.5%**
51-55 km/h	0	0.0%	3 (Max. 55)	5.9%	3 (Max. 55)	3.5%
Total	**35 (Mean 41.2)**	**100.0%**	**51 (Mean 43.1)**	**100.0%**	**86 (Mean 42.3)**	**100.0%**

(n) Sau Mau Ping Road (#14)

	Morning		Afternoon		Overall	
Bus with speed <= 50 km/h	**23 (Mean 38.3)**	**100.0%**	**58 (Mean 38.6)**	**93.5%**	**81 (Mean 38.5)**	**95.3%**
Less than 31 km/h	1 (Min. 30)	4.3%	1 (Min. 30)	1.6%	2 (Min. 30)	2.4%
31-35 km/h	7	30.4%	18	29.0%	25	29.4%
36-40 km/h	7	30.4%	19	30.6%	26	30.6%
41-45 km/h	6	26.1%	13	21.0%	19	22.4%
46-50 km/h	2 (Max. 48)	8.7%	7	11.3%	9	10.6%
Bus with speed >50 km/h	0	0.0%	**4 (Mean 52.5)**	**6.5%**	**4 (Mean 52.5)**	**4.7%**
51-55 km/h	0	0.0%	4 (Max. 53)	6.5%	4 (Max. 53)	4.7%
Total	**23 (Mean 38.3)**	**100.0%**	**62 (Mean 39.5)**	**100.0%**	**85 (Mean 39.1)**	**100.0%**

(o) Po Lam Road (#15)

	Morning		Afternoon		Overall	
Bus with speed <= 50 km/h	**4 (Mean 46.8)**	**26.7%**	**48 (Mean 46.2)**	**51.6%**	**52 (Mean 46.2)**	**48.1%**
Less than 41 km/h	0	0.0%	1 (Min. 39)	1.1%	1 (Min. 39)	0.9%
41-45 km/h	0	0.0%	20	21.5%	21	19.4%
46-50 km/h	4 (Min. 45)	26.7%	27	29.0%	30	27.8%
Bus with speed > 50 km/h	**11 (Mean 53.1)**	**73.3%**	**45 (Mean 54.6)**	**48.4%**	**56 (Mean 54.3)**	**51.9%**
51-55 km/h	9	60.0%	30	32.3%	39	36.1%
56-60 km/h	2 (Max. 57)	13.3%	12	12.9%	14	13.0%
61-65 km/h	0	0.0%	3 (Max. 64)	3.2%	3 (Max. 64)	2.8%
Total	**15 (Mean 51.4)**	**100.0%**	**93 (Mean 50.2)**	**100.0%**	**108 (Mean 50.4)**	**100.0%**

(p) Pok Fu Lam Road (#16)

	Morning		Afternoon		Overall	
Bus with speed <= 50 km/h	**74 (Mean 43.2)**	**94.9%**	**112 (Mean 41.3)**	**99.1%**	**186 (Mean 42.0)**	**97.4%**
Less than 31 km/h	2 (Min. 27)	2.6%	0	0.0%	2 (Min. 27)	1.0%
31-35 km/h	2	2.6%	16 (Min. 31)	14.2%	18	9.4%
36-40 km/h	11	14.1%	33	29.2%	44	23.0%
41-45 km/h	40	51.3%	43	38.1%	83	43.5%
46-50 km/h	19	24.4%	20	17.7%	39	20.4%
Bus with speed > 50 km/h	**4 (Mean 53)**	**5.1%**	**1 (Mean 51)**	**0.9%**	**5 (Mean 52.6)**	**2.6%**
51-55 km/h	4 (Max. 54)	5.1%	1 (Max. 51)	0.9%	5 (Max. 54)	2.6%
Total	**78 (Mean 43.7)**	**100.0%**	**113 (Mean 41.3)**	**100.0%**	**191 (Mean 42.3)**	**100.0%**

(q) Wong Chuk Hang Road (#17)

	Morning		Afternoon		Overall	
Bus with speed <= 50 km/h	**53 (Mean 43.0)**	**93.0%**	**201 (Mean 43.6)**	**88.9%**	**254 (Mean 43.5)**	**89.8%**
Less than 31 km/h	0	0.0%	1 (Min. 30)	0.4%	1 (Min. 30)	0.4%
31-35 km/h	2 (Min. 31)	3.5%	7	3.1%	9	3.2%
36-40 km/h	10	17.5%	41	18.1%	51	18.0%
41-45 km/h	27	47.4%	78	34.5%	105	37.1%
46-50 km/h	14	24.6%	74	32.7%	88	31.1%
Bus with speed > 50 km/h	**4 (Mean 54)**	**7.0%**	**25 (Mean 52.4)**	**11.1%**	**29 (Mean 52.7)**	**10.2%**
51-55 km/h	3	5.3%	22	9.7%	25	8.8%
56-60 km/h	1 (Max. 58)	1.8%	3 (Max. 57)	1.3%	4 (Max. 58)	1.4%
Total	**57 (Mean 43.8)**	**100.0%**	**226 (Mean 44.6)**	**100.0%**	**283 (Mean 44.4)**	**100.0%**

(r) Ap Lei Chau Bridge Road (#18)

	Morning		Afternoon		Overall	
Bus with speed <= 50 km/h	**43 (Mean 45.3)**	**84.3%**	**162 (Mean 43.4)**	**84.4%**	**205 (Mean 43.8)**	**84.4%**
Less than 31 km/h	0	0.0%	2 (Min. 8)	1.0%	2 (Min. 8)	0.8%
31-35 km/h	0	0.0%	5	2.6%	5	2.1%
36-40 km/h	5 (Min. 37)	9.8%	25	13.0%	30	12.3%
41-45 km/h	16	31.4%	74	38.5%	90	37.0%
46-50 km/h	22	43.1%	56	29.2%	78	32.1%
Bus with speed >50 km/h	**8 (Mean 52.9)**	**15.7%**	**30 (Mean 54.5)**	**15.6%**	**38 (Mean 54.2)**	**15.6%**
51-55 km/h	7	13.7%	23	12.0%	30	12.3%
56-60 km/h	1 (Max. 56)	2.0%	2	1.0%	3	1.2%
61-65 km/h	0	0.0%	5 (Max. 64)	2.6%	5 (Max. 64)	2.1%
Total	**51 (Mean 46.5)**	**100.0%**	**192 (Mean 45.1)**	**100.0%**	**243 (Mean 45.4)**	**100.0%**

(s) Chai Wan Road (#19)

	Morning		Afternoon		Overall	
Bus with speed <= 50 km/h	**54 (Mean 43.0)**	**100.0%**	**95 (Mean 41.4)**	**99.0%**	**149 (Mean 42.0)**	**99.3%**
Less than 31 km/h	0	0.0%	2 (Min. 29)	2.1%	2 (Min. 29)	1.3%
31-35 km/h	2 (Min. 33)	3.7%	7	7.3%	9	6.0%
36-40 km/h	11	20.4%	30	31.3%	41	27.3%
41-45 km/h	27	50.0%	37	38.5%	64	42.7%
46-50 km/h	14 (Max. 50)	25.9%	19	19.8%	33	22.0%
Bus with speed > 50 km/h	**0**	**0.0%**	**1 (Mean 53)**	**1.0%**	**1 (Mean 53)**	**0.7%**
51-55 km/h	0	0.0%	1 (Max. 53)	1.0%	1 (Max. 53)	0.7%
Total	**54 (Mean 43.0)**	**100.0%**	**96 (Mean 41.5)**	**100.0%**	**150 (Mean 42.0)**	**100.0%**

(t) Chun Wan Road (#20)

	Morning		Afternoon		Overall	
Bus with speed <= 50 km/h	**31 (Mean 42.6)**	**96.9%**	**65 (Mean 41.4)**	**94.2%**	**96 (Mean 41.8)**	**95.0%**
Less than 41 km/h	8 (Min. 38)	25.0%	27 (Min. 35)	39.1%	35 (Min. 35)	34.7%
41-45 km/h	16	50.0%	28	40.6%	44	43.6%
46-50 km/h	7	21.9%	10	14.5%	17	16.8%
Bus with speed > 50 km/h	**1 (Mean 52)**	**3.1%**	**4 (Mean 54)**	**5.8%**	**5 (Mean 53.6)**	**5.0%**
51-55 km/h	1 (Max. 52)	3.1%	4 (Max. 55)	5.8%	5 (Max. 55)	5.0%
Total	**32 (Mean 42.9)**	**100.0%**	**69 (Mean 42.1)**	**100.0%**	**101 (Mean 42.4)**	**100.0%**

Appendix I

Table A1. Schedule of Speed Surveys at 20 Selected Sections of Road

	Road	Location	Traffic Direction	Survey Date
1	Lung Mun Road	Near Long Mun Light Rail Station	Yuen Long direction	10 Sep
2	Che Kung Miu Road^	Near Che Kung Temple	Shatin Centre direction	20 Sep
3	A Kung Kok Street	Near Shatin Hospital	Ma On Shan direction	4 Sep
4	Tsing Yi Road West	Near Cheung Hang Estate	Downhill	8 Sep
5	Fung Shue Wo Road	Near Tsuen Wan Trade Association Primary School	Southbound	13 Sep
6	Wo Yi Hop Road	Near Lei Muk Shue Fire Station	Downhill	9 Sep
7	Castle Peak Road near Shek Pai Street^	Near Wah Tat Industrial Centre	Downhill	23 Sep
8	Po Hong Road^*	Near Verbena Heights	Southbound	22 Sep
9	Nam Cheong Street	Near Shek Kip Mei Park Sports Centre	Southbound	5 Sep
10	Waterloo Road	Near Hong Kong Baptist University	Southbound	6 Sep
11	Kwun Tong Road	Near Ting Fu Street	Westbound	15 Sep
12	Po Kong Village Road	Near Fu Shan Estate	Downhill	11 Sep
13	New Clear Water Bay Road	Near Shun Lee Estate and Jordan Valley Park	Downhill	12 Sep
14	Sau Mau Ping Road	Near Sau Mau Ping Shopping Centre	Hip Wo Street direction	14 Sep
15	Po Lam Road	Near Hong Sing Garden	Po Lam direction	2 Sep
16	Pok Fu Lam Road	Near Queen Mary Hospital	Central direction	1 Sep
17	Wong Chuk Hang Road	Near Aberdeen Sports Ground	Aberdeen direction	31 Aug
18	Ap Lei Chau Bridge Road	Near Sham Wan Towers	Ap Lei Chau direction	30 Aug
19	Chai Wan Road	Near Naptune Terrace	Chai Wan direction	29 Aug
20	Chun Wan Road	Near Cathay Pacific Cargo Terminal	Airport Road direction	7 Sep

^ *Bus checks also conducted in the evening (after 6:30pm)*
** Speed limit of 70 km/h*

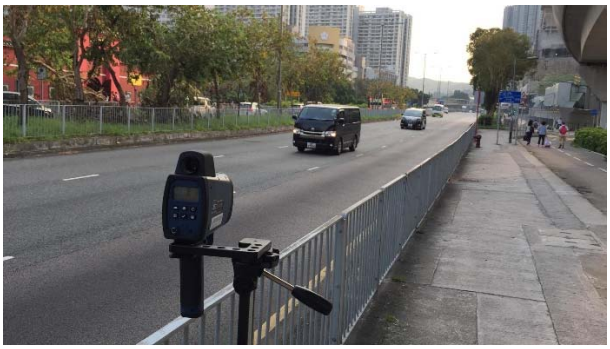
Appendix II

Survey on Lung Mun Road (#1)

Survey date	10 September 2018 (Mon)
Survey time	11:20 am-1:23 pm, 2:23 pm-5:39 pm
Bus checks	Morning (before 12:00nn): 13; Afternoon (after 12:00nn): 76
Weather	Temp: 26.1 degree; Humidity: 80%; Weather: No rain
Location	Yuen Long direction, near Long Mun Light Rail Station
Bus route	A33, E33P, B3, 59A, 59M, 59X, 506
Surveyor	Li Shing Fung

Survey on Che Kung Miu Road (#2)

Survey date	20 September 2018 (Thu)
Survey time	4:10 pm-9:52 pm
Bus checks	Afternoon (before 6:30pm): 44; Evening (after 6:30pm): 58
Weather	Temp: 24.3 degree; Humidity: 77%; Weather: Cloudy
Location	Shatin Centre direction, near Che Kung Temple
Bus route	81C, 85B, 86A, 87B, 89B, 170, 182, 182X, 249X, 281M, 287X, E42
Surveyor	Li Shing Fung



Survey on A Kung Kok Street (#3)

Survey date	4 September 2018 (Tue)
Survey time (Bus checks)	10:26 am-12:28 pm, 1:49 pm-4:49 pm
Bus checks	Morning: 30; Afternoon: 56
Weather	Temp: 35 degree; Humidity: 76%; Weather: No rain
Location	Ma On Shan direction, near Shatin Hospital
Bus route	40X, 43X, 81C, 84M, 85K, 85M, 85X, 86C, 86K, 87D, 89C, 89D, 89S, 286M, 299X, 680, 682
Surveyor	Chan Cheuk Nam

Survey on Tsing Yi Road West (#4)

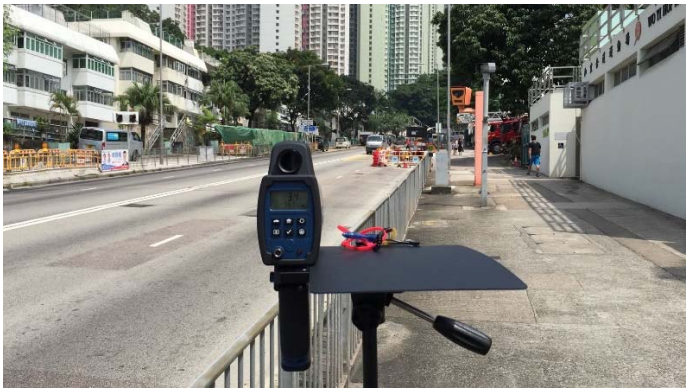
Survey date	8 September 2018 (Sat)
Survey time	9:50 am-12:00 pm; 1:00 pm-4:11 pm
Bus checks	Morning: 33; Afternoon: 62
Weather	Temp: 28 degree; Humidity: 95%; Weather: Instant rain
Location	Downhill, near Cheung Hang Estate upstream gas station
Bus route	E21, E31, E42, 42M, 68E, 248M, 249X, 279X, 948
Surveyor	Li Shing Fung

Survey on Fung Shue Wo Road (#5)

Survey date	13 September 2018 (Thu)
Survey time	10:02 am-12:02 pm, 1:00 pm-4:15 pm
Bus checks	Morning: 36; Afternoon: 61
Weather	Temp: 27 degree; Humidity: 82%; Weather: Slight rain
Location	Sound bound direction, near Tsuen Wan Trade Association Primary School
Bus route	41, 41A, 41M, 42C, 43B, 44, 44M, 49X, E32
Surveyor	Choy Cheuk Hin

Survey on Wo Yip Hop Road (#6)

Survey date	09 September 2018 (Sun)
Survey time	10:50 am-12:50 pm, 2:00 pm-5:11 pm
Bus checks	Morning: 46; Afternoon: 104
Weather	Temp: 27 degree; Humidity: 76%; Weather: No rain
Location	Downhill direction, near Lei Muk Shue Fire Station
Bus route	32, 36, 36A, 36B, 36M, 40X, 46X, 47X, 48X, 73X, 278X
Surveyor	Li Shing Fung



Survey on Castle Peak Road (#7)

Survey date	23 September 2018 (Sun)
Survey time	3:33 pm-8:50 pm
Bus checks	Afternoon: 62; Evening: 39
Weather	Temp: 29 degree; Humidity: 78%; Weather: Sunny
Location	Downhill direction, near Wah Tat Industrial Centre
Bus route	31B, 32, 32A, 35A, 36B, 38, 42, 42A, 42C, 936
Surveyor	Li Shing Fung

Survey on Po Hong Road (#8)

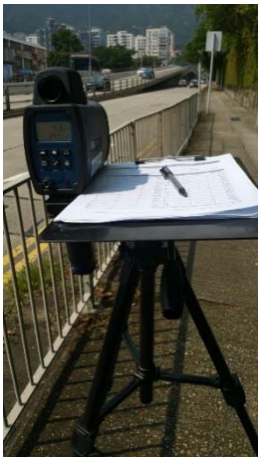
Survey date	22 September 2018 (Sat)
Survey time	3:29 pm-8:40 pm
Bus checks	Afternoon: 40; Evening: 31
Weather	Temp: 29 degree; Humidity: 76%; Weather: Sunny
Location	Southbound, near Verbena Heights
Bus route	98D, 98E, 296M, 297, 298, 690, 694, 798, A29P
Surveyor	Li Shing Fung

Survey on Nam Cheong Street (#9)

Survey date	5 September 2018 (Wed)
Survey time	9:50 am-12:49 pm, 2:09 pm-4:12 pm
Bus checks	Morning: 30; Afternoon: 33
Weather	Temp: 32 degree; Humidity: 74%; Weather: Slight rain
Location	Southbound, near Shek Kip Mei Park Sports Centre
Bus route	2B, 2F, 2D, 86, 86A, 86C, 87B, 214
Surveyor	Chan Cheuk Nam

Survey on Waterloo Road (#10)

Survey date	6 September 2018 (Thu)
Survey time	9:52 am-2:54 pm
Bus checks	Morning: 40; Afternoon: 61
Weather	Temp: 31 degree; Humidity: 70%; Weather: No rain
Location	Southbound, near Hong Kong Baptist University
Bus route	3C, 7, 22, 72X, 81C, 87D, 103, 170, 182, 270A, 271, 281A, 281B
Surveyor	Chan Cheuk Nam



Survey on Kwun Tong Road (#11)

Survey date	15 September 2018 (Sat)
Survey time	10:05-1:38 pm; 2:45-4:22 pm
Bus checks	Morning: 23; Afternoon: 57
Weather	Temp: 29 degree; Humidity: 65%; Weather: No rain
Location	Westbound direction, near Ting Fu Street
Bus route	17, 38, 42C, 74X, 80, 89B, 89X, 101, 258D, 259D, 268C, 269C, 277X, 296C, E22A
Surveyor	Choy Cheuk Hin

Survey on Po Kong Village Road (#12)

Survey date	11 September 2018 (Tue)
Survey time	10:15 am-1:15 pm, 2:27 pm-4:32 pm
Bus checks	Morning: 35; Afternoon: 64
Weather	Temp: 30 degree; Humidity: 57%; Weather: No rain
Location	Downhill direction, near Fu Shan Estate
Bus route	3B, 3D, 3M, 116, 203E
Surveyor	Choy Cheuk Hin

Survey on New Clear Water Bay Road (#13)

Survey date	12 September 2018 (Wed)
Survey time	10:10 am-1:45 pm, 2:40 pm-4:43 pm
Bus checks	Morning: 35; Afternoon: 51
Weather	Temp: 28 degree; Humidity: 74%; Weather: Slight rain
Location	Downhill, near Jordan Valley Park
Bus route	14H, 23, 23M, 26, 26M, 27, 29M, 42, 88, 213D, 214, 290A
Surveyor	Choy Cheuk Hin

Survey on Sau Mau Ping Road (#14)

Survey date	14 September 2018 (Fri)
Survey time	10:33 am-1:35 pm, 2:40 pm-4:45 pm
Bus checks	Morning: 23; Afternoon: 62
Weather	Temp: 27 degree; Humidity: 68%; Weather: No rain
Location	Hip Wo Street direction, near Sau Mau Ping Shopping Centre
Bus route	13M, 13X, 95M, 213X, 290, 601, 613
Surveyor	Choy Cheuk Hin

Survey on Po Lam Road (#15)

Survey date	2 September 2018 (Sun)
Survey time (Bus checks)	11:10 am-1:10 pm; 4:00 pm-7:01 pm
Bus checks	Morning: 15; Afternoon: 93
Location	Po Lam direction, near Hong Sing Garden
Weather	Temp: 26.5 degree; Humidity: 87%; Weather: Slight rain
Bus route	A29P, 93A, 95, 95M, 98A, 98C, 290, 290A
Surveyor	Yip Siu Kai

Survey on Pokfulam Road (#16)

Survey date	1 September 2018 (Sat)
Survey time	09:11 am-11:11 am; 12:14 pm-1:12 pm; 1:27 pm -3:35 pm
Bus checks	Morning: 78; Afternoon: 113
Weather	Temp: 26 degree; Humidity: 89%; Weather: Slight rain
Location	Central direction, near Queen Mary Hospital
Bus route	4, 4X, 7, 30X, 37X, 40, 40M, 71, 94, 970, 970X, 973
Surveyor	Yip Siu Kai

Survey on Wong Chuk Hang Road (#17)

Survey date	31 August 2018 (Fri)
Survey time	10:54am-1:28pm, 2:47pm-5:19pm
Bus checks	Morning: 57; Afternoon: 226
Weather	Temp: 28 degree; Humidity: 86%; Weather: Fine
Location	Aberdeen direction, near Aberdeen Sports Ground
Bus route	37B, 38, 42, 70, 72, 72A, 73, 76, 90, 97, 99, 107, 170, 592, 629, 671, 973
Surveyor	Yip Siu Kai

Survey on Ap Lei Chau Bridge (#18)

Survey date	30 August 2018 (Thu)
Survey time	10:26 am-10:40 am, 11:02 am-2:10 pm, 3:16 pm-5:00 pm
Bus checks	Morning: 51; Afternoon: 192
Weather	Temp: 27 degree; Humidity: 89%; Weather: Slight rain
Location	Ap Lei Chau direction, near Shum Wan Towers
Bus route	A10, 90B, 91, 94A, 95, 95C, 96, 98, 171, 590, 592, 593, 671
Surveyor	Yip Siu Kai

Survey on Chai Wan Road (#19)

Survey date	29 August 2018 (Wed)
Survey time	10:26 am-12:19 pm, 2:16 pm-5:32 pm
Bus checks	Morning: 54; Afternoon: 96
Weather	Temp: 26 degree; Humidity: 89%; Weather: Slight Rain
Location	Chai Wan direction, near Naptune Terrace
Bus route	A12, 8, 8H, 8X, 19, 81, 82, 106, 118, 606, 682, 682B, 694, 780
Surveyor	Yip Siu Kai

Survey on Chun Wan Road (#20)

Survey date	7 September 2018 (Fri)
Survey time	10:12 am-3:15 pm
Bus checks	Morning: 32; Afternoon: 69
Weather	Temp: 31 degree; Humidity: 70%; Weather: No rain
Location	Airport Road direction, near Cathy Pacific Cargo Terminal
Bus route	E11, E22, E22A, E23, E32, E33, E34A, E34B, E41, E42, S52, S64
Surveyor	Chan Cheuk Nam