A future ‘quiet HGV’ permissive certification scheme – phase 1 report

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A future 'quiet HGV' permissive certification scheme
Phase 1 report

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'Quiet HGV' Permissive Certification Scheme

Client: Department for Transport, Freight and Logistics Division

(Ian Turner)

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## Glossary of abbreviations

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<th>Description</th>
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<tbody>
<tr>
<td>AQMA</td>
<td>Air Quality Management Area</td>
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<tr>
<td>BESTUFS</td>
<td>Best Urban Freight Solutions (project acronym)</td>
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<tr>
<td>BRC</td>
<td>British Retail Consortium</td>
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<tr>
<td>C&amp;U</td>
<td>Construction and Use Regulations</td>
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<tr>
<td>CIVITAS</td>
<td>Cleaner and better transport in cities (project acronym)</td>
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<tr>
<td>CNG</td>
<td>Compressed Natural Gas</td>
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<td>DCI</td>
<td>Delivery Curfew Initiative</td>
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<td>DCLG</td>
<td>Department of Communities and Local Government</td>
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<td>DETR</td>
<td>Department of the Environment, Transport and The Regions</td>
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<td>DfT</td>
<td>Department for Transport</td>
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<td>ERN</td>
<td>Exempt Road Network</td>
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<tr>
<td>FIDEUS</td>
<td>Freight Intelligent Delivery of goods in European Urban Spaces (project acronym)</td>
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<td>FLTA</td>
<td>Fork Lift Truck Association</td>
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<td>FORS</td>
<td>Freight Operators Recognition Scheme</td>
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<td>FQP</td>
<td>Freight Quality Partnership</td>
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<td>FTA</td>
<td>Freight Transport Association (UK)</td>
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<tr>
<td>HEAVEN</td>
<td>Healthier Environment through the Abatement of Vehicle Emissions and Noise (project acronym)</td>
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<tr>
<td>HGV</td>
<td>Heavy Goods Vehicle</td>
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<td>HGVMS</td>
<td>Heavy Goods Vehicle Management Strategy</td>
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<tr>
<td>IMAGINE</td>
<td>Improved Methods for the Assessment of the Generic Impact of Noise in the Environment (project acronym)</td>
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<tr>
<td>ISO</td>
<td>International Organisation for Standardisation</td>
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<td>LA</td>
<td>Local Authority</td>
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<td>LFP</td>
<td>London Freight Plan</td>
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<td>LGV</td>
<td>Large Goods Vehicle</td>
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<td>LLCS</td>
<td>London Lorry Control Scheme</td>
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<td>LNC</td>
<td>Low-noise Night-time Compliant</td>
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<td>LPG</td>
<td>Liquefied Petroleum Gas</td>
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<td>MGW</td>
<td>Maximum Gross Weight</td>
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<td>MIRACLES</td>
<td>Multi-Initiative for Rationalised Accessibility and Clean Living Environments (project acronym)</td>
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<td>NAS</td>
<td>Noise Abatement Society (UK)</td>
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<td>PAFR</td>
<td>Pull Away From Rest</td>
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<td>RHA</td>
<td>Road Haulage Association</td>
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<td>SAFED</td>
<td>Safe And Fuel Efficient Driving</td>
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<td>SAG</td>
<td>Stakeholder Advisory Group</td>
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<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
<td>SILENCE</td>
<td>Quieter Surface Transport In Urban Areas (project acronym)</td>
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<tr>
<td>SILVIA</td>
<td>Silenda Via: Sustainable road surfaces for traffic noise control (project acronym)</td>
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<tr>
<td>SMMT</td>
<td>Society of Motor Manufacturers and Traders</td>
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<tr>
<td>START</td>
<td>Short Term Actions to Reorganise Transport of Goods (project acronym)</td>
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<tr>
<td>TRL</td>
<td>Transport Research Laboratory</td>
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<tr>
<td>UN-ECE</td>
<td>United Nations Economic Commission for Europe</td>
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<td>VOSA</td>
<td>Vehicle and Operator Services Agency</td>
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Executive summary

HGV movements in urban areas are often constrained during night-time and/or weekend periods by local regulations which have been put in place to minimise noise impacts. If such night-time delivery restrictions could either be relaxed or removed, where appropriate, there are significant potential benefits, primarily associated with reduced day-time congestion.

TRL has been commissioned by the Department for Transport (DfT) to

- Review the need for and the feasibility of a permissive low-noise certification scheme for HGVs and their operation.
- Prepare recommendations for the content of a future ‘quiet HGV’ permissive certification scheme and its operation

If such a scheme were to be introduced in the future and adopted, it is envisaged that a relaxation of delivery restrictions could potentially be granted by local authorities for operators using ‘quiet HGVs’ that complied with the scheme requirements.

This report comprises the following parts:

- A short evaluation of existing schemes, trials, initiatives and research associated with controlling and/or reducing the noise impacts of night-time freight movement. In addition to identifying the reasons for such activities, the resultant tools, products and lessons could potentially be used in the development of proposals for a ‘quiet HGV’ permissive certification scheme. The review also examined the low-noise vehicle and ancillary technologies which are currently available
- A summary of the views and opinions of a wide range of stakeholders potentially associated with the implementation and application of any future scheme in the UK, and the views of vehicle manufacturers
- Provisional recommendations for the content of a future ‘quiet HGV’ permissive certification scheme and its operation. This includes a consideration of the test methodologies necessary to identify ‘quiet HGVs’, and possible timescales and methods for the implementation of such a scheme
- Provisional considerations of how to promote and gain acceptance for any future ‘quiet HGV’ permissive certification scheme. For such a scheme to be introduced, the prior acceptance of relevant stakeholders and the general public will be necessary

Based upon the outcome of the study, DfT will take a decision as to whether any further development of such a scheme should be undertaken.

The main conclusions of the study can be summarised as follows:

Literature review

A literature review was undertaken to review existing schemes, trials, initiatives and research associated with the use of low-noise vehicles (and ancillary technologies) and night-time deliveries. It has identified a wide range of examples from both in and outside Europe. In most instances, these have resulted from either a general desire to reduce night-time noise disturbance or the need to reduce night-time noise impacts resulting from other policies/local circumstances. The main focus appears to be on tackling noise at delivery points rather than the noise generated during the journey from origin to destination.

It is concluded that there is no common certification scheme or methodology presently available for relaxing night-time restrictions. However, some of the examples have
developed procedures/technologies that could be incorporated within the proposals presented in this report.

An increasing number of low-noise ancillary technologies are becoming available which could be used by operators to reduce the noise impacts from their operations. However the only vehicle types that are currently considered to be less noisy than conventional vehicles are electric or hybrid vehicles and these are primarily limited to gross vehicle weights under 12 tonnes.

The views of stakeholders

The views of a wide variety of stakeholders (industry associations, operators and local authorities) were obtained both via a questionnaire survey and via direct discussions with a Stakeholder Advisory Group specially established for this project.

- The questionnaire revealed that in general, there is support for a ‘quiet HGV’ permissive certification scheme from all organisations. However local authorities indicated that the level of support for schemes for ‘quiet HGVs’ was significantly lower than that of industry associations and freight operators. In terms of the perceived need, effectiveness and level of uptake, the different organisations responded similarly. Whilst on average it was considered there is a slight need for such a scheme, they were unsure of the likely effectiveness and that the likely uptake (rated from extremely low to extremely high) would be slightly lower than moderate. All considered that there would be pros and cons. It should be noted that the overall response rate to the survey was very low, being only 10%. General comments submitted with the questionnaires suggested that operators are positive, providing that the benefits seen by them are common around the country and well-defined prior to them signing up to such a scheme or investing in appropriate technologies. Some local authorities were of the opinion that the benefits of night-time operations might be outweighed by the extra work required from the authority in relation to enforcement and dealing with complaints from residents

- The Stakeholder Advisory Group was supportive in principle of a scheme that would permit greater flexibility in deliveries. There was general agreement that this could lead to benefits including reduced peak congestion, cost savings for businesses, noise reduction benefits beyond the areas covered by noise restrictions, and the potential to shift some deliveries back to HGVs, reducing the current trend towards the use of vans. Potential barriers identified included the need to convince local authorities of the benefits and making the scheme applicable for a wide range of local conditions. It was considered that manufacturers and operators must be convinced of the market opportunities. Overall, it was considered that although there are many barriers to overcome, there are good reasons to think this is achievable and already sufficient incentives for such a scheme to be adopted. It was considered that developments in the industry show that a scheme could work in principle.

Vehicle manufacturers were also consulted. They confirmed that a range of technologies are available for reducing the noise impact of HGVs. However, it is considered that legislative drivers, a proven market and a stable economic climate will generally be necessary to stimulate or accelerate vehicle development beyond current levels. One manufacturer confirmed that they are already hoping to begin a ‘quiet HGV’ development programme.
Provisional recommendations for a future ‘quiet HGV’ permissive certification scheme

For any future scheme to successfully address noise impacts associated with all stages of the night-time delivery process, it is considered that it should comprise the following parts:

- **PART 1: Night-time delivery noise certification procedures**
  This part provides the procedures that local authorities would require freight operators to comply with, either partially or fully, depending on circumstances and the level of relaxation of any existing night-time freight movement restrictions. The procedures will comprise a number of test methods that can be conducted in order to assess the noise levels of important operations at all stages of the night-time delivery process, i.e. noise during the ‘A to B’ journey and noise associated with loading/unloading operations at the point of origin and final destination.

- **PART 2: Night-time noise impact reduction options**
  This part provides guidance on specifying the options for any relaxation of restrictions, compliance criteria and how compliance with relaxed night-time restrictions might be addressed and monitored. This part is considered only at a low level in the current document, since wider in-depth consultation with stakeholders will be required for its development and this falls outside of the scope of this phase of the project.

It is considered that Part 1 should include the following elements:

- **Tests associated with vehicle-based noise sources:**
  - *Vehicle noise I:* A stationary test based on rapid acceleration to governor run-out.
  - *Vehicle noise II:* An acceleration test based on pulling away from rest through the gears. At the present time there is insufficient data to distinguish whether the PIEK test (Dittrich *et al.*, 2008)\(^1\) or the TRL test where the driver selects the appropriate gears for the vehicle using the full RPM range (Ainge *et al.*, 2007)\(^2\) is the most suitable.
  - *Air brakes:* The test as prescribed within the PIEK programme.
  - *Low-noise tyres:* A visual inspection (valid from 2012) is considered sufficient.

- **Tests associated with other noise sources on the vehicle:**
  - *Ancillary technologies I:* The tests as prescribed within the PIEK programme for the following technologies
    - o Trailers/truck bodies (including walls, floors and stowage)
    - o Tail-lifts
    - o Refrigeration units
    - o Rollcages and containers (assessing both rolling noise and collision noise)
  - *Ancillary technologies II:* The tests as prescribed within the PIEK programme for the following technologies
    - o Fork lifts and pallet trucks
    - o Quiet-closing doors
    - o Auto-turn-off radios

- **Additional requirements**
  - o Vehicles should have a current service history
- Evidence must be provided of appropriate driver training
- Vehicles must comply with best practice on body noise


Abstract

HGV movements in urban areas are often constrained during night-time and/or weekend periods by local regulations which have been put in place to minimise noise impacts. If such night-time delivery restrictions could either be relaxed or removed where appropriate, there are significant potential benefits, primarily from reduced congestion.

TRL has been commissioned by the Department for Transport (DfT) to consider the need for and the feasibility of a permissive low-noise certification scheme for HGVs and their operation, with options for scheme operation. It is envisaged that a relaxation of delivery restrictions could be granted by a local authority for a certain operator using ‘quiet HGVs’ that met the requirements of such a scheme.

This report reviews existing restrictions on night-time goods deliveries, implemented schemes or research projects addressing the issue, the needs (if any) for a permissive certification scheme based upon consultations with relevant stakeholders, barriers to the future introduction of such a scheme as well as the likely benefits and likelihood of successes.

Provisional recommendations are set out for a scheme addressing vehicle, body and ancillary noise associated with both the transport of goods between the point of origin and final destination, and the actual collections/deliveries themselves. The roles of stakeholders and scheme managers and the issues related to the enforcement of such a scheme are also discussed.

1 Introduction

HGV movements in urban areas are often constrained during night-time and/or weekend periods by local regulations which have been put in place to minimise noise impacts. If such night-time delivery restrictions could either be relaxed or removed where appropriate, there are significant potential benefits, primarily from reduced congestion.

There is considerable enthusiasm on behalf of a wide range of stakeholders for increasing opportunities for out-of-hours deliveries. For example, in London, TfL consider that lifting restrictions on HGVs, delivery times and zones would be beneficial as it could result in a reduction in the number of light vans that are increasingly used for deliveries, thereby reducing day-time congestion and emissions associated with that congestion. TfL’s London Freight Plan encourages the undertaking of out-of-hours deliveries. Industry associations such as the SMMT and FTA are also in favour of introducing/maximising the opportunities for night time deliveries.

Local authorities would need to ensure that no adverse noise impacts would result prior to relaxing or changing any existing regulations. This suggests the need for a scheme to control noise from HGV operation beyond that required by the current Construction and Use (C&U) regulations. Such a scheme would be permissive rather than mandatory. A relaxation of delivery restrictions could be granted by a local authority for a certain operator using ‘quiet HGVs’ that met the scheme requirements. It is envisaged that such a curfew relaxation would only apply to that individual permitted HGV or vehicle (or vehicle type) and operator and only within a prescribed area and/or delivery site governed by the local authority.

A secondary benefit would be the creation of a vehicle market for noise reduction technologies and the uptake of low-noise HGVs.

TRL has been commissioned by the Department for Transport (DfT) to first consider the need for and the feasibility of a permissive low-noise certification scheme for HGVs and

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1 Feedback from the first meeting of the project’s Stakeholder Advisory Group in March 2009.
their operation and make appropriate recommendations. Options associated with the operation of such a scheme, such as test methodologies, provisional timescales, responsibilities, etc. are also to be considered. Based on the outputs from the research, DfT will take a decision as to whether further development of such a scheme should be undertaken.

Depending upon the outcome of this decision, a further stage would address the specific development of scheme criteria, e.g. noise reduction limit values, which could be used in the future as a basis for a ‘quiet HGV’ permissive certification scheme which facilitates the relaxation of delivery curfews where appropriate.

An outline for a permissive low-noise certification scheme addressing noise impacts during goods transport only, i.e. the ‘A to B’ journey, has already been reported as part of a study by Ainge et al. (2009). Other schemes, such as PIEK in the Netherlands (Dittrich et al., 2008), have focussed on noise from ancillary technologies associated with night-time loading/unloading operations. The use of the methodologies from such schemes will be considered as part of the current study.

The initial objective for the scheme proposal in this study, in terms of a definition for a ‘quiet HGV’, is an HGV which "may not generate any more noise in any of its operational modes (i.e. both normal driving and low-speed manoeuvring) than a 3.5t delivery van". It is considered that this objective might possibly be satisfied within the short term, i.e. the next 1-2 years.

### 1.1 Structure of the report

The document has been prepared to report on the outcomes of the demand and feasibility assessment, and is structured as follows:

- Chapter 2 reviews schemes, projects, trials and demonstrations that address the issues of night-time freight movement and which might allow the relaxation of current night-time delivery restrictions in the UK
- Chapter 3 evaluates the needs for a permissive certification scheme, based upon the results of consultations with the relevant stakeholders including freight operators, industry associations and local authorities. The potential benefits, barriers and likelihood of success are also discussed.
- Chapter 4 sets out recommendations for a future ‘quiet HGV’ permissive certification scheme, including test methods and associated factors, the roles of stakeholders and scheme managers and the issues related to the enforcement of such a scheme
- Chapter 5 presents the final conclusions and recommendations of the study
- The Appendices provide additional information on other European projects associated with freight movement but not addressing night-time noise and present the templates for the Stakeholder questionnaires used in the project survey
2 A review of existing schemes, trials, initiatives and technologies addressing night-time freight movement

This Chapter showcases examples of schemes, trials and initiatives, both completed and ongoing, to address the noise issues associated with night-time freight movement. It is considered that these might highlight the needs for and potential advantages of night-time freight movement while potentially providing tools, products and lessons which can be used for the development of proposals for a quiet HGV permissive certification scheme within the current project. The current availability of low-noise/reduced-noise technologies is also addressed.

2.1 Introduction

HGV movements in urban areas are often constrained during night-time and/or weekend periods by local regulations put in place to avoid noise impacts. It is important to recognise that noise associated with freight movement, not just during night-time hours, can be broadly considered as falling into two categories as follows:

- **Noise arising during the journey from point of origin to final destination, i.e. the ‘A to B’ journey:** This will primarily be noise generated by the vehicle itself or vehicle components, either while moving (e.g. engine or exhaust noise, tyre noise, body rattle, air brake noise) or idling (e.g. engine noise, ancillary equipment such as refrigeration units)

- **Noise arising from operations at the point of collection and/or delivery:** Some of this will be generated by the vehicle or vehicle components (e.g. engine noise, air brake noise, reversing alarms) whilst some will be generated by actions associated with the physical loading/unloading of vehicles (e.g. tail gate lifts, hydraulically operated cranes, roll cages) or the actions of the operators themselves (e.g. slamming doors, radios, verbal communication)

To successfully tackle these noise sources would require the collaboration of a wide range of stakeholders. In the absence of a formal framework of suitable control measures and/or guidance, the problem cannot be readily addressed. Subsequently, this prevents any advantage being taken of the potential benefits of night-time delivery operations, such as reduced congestion, reduced journey times and potentially fewer journeys.

In investigating the needs for and developing the fundamentals of a ‘quiet HGV’ permissive certification scheme, it is beneficial to review other experiences in this area. The following sections showcase examples of schemes, trials, initiatives and technologies that have been investigated or implemented to tackle some or all of these noise sources/issues. The methods used can be broadly categorised into five areas:

- **Reduced vehicle movements:** This is where the movement of HGVs during night-time hours is either completely blocked or restricted through the use of permit schemes

- **Low-noise technologies 1 – Modified vehicles:** These are considered to be low-noise technologies directly affecting the vehicle itself, e.g. the engine, air-brakes and exhaust

- **Low-noise technologies 2 – Ancillaries:** These include modified tail lifts, refrigeration units, low-noise treatments for the insides of trucks, any cages/trolleys/pallets on which the goods themselves are loaded, and also any modifications made at the delivery points themselves
Driver training: As well as training to improve driving, this can include training to modify driver behaviour at loading/unloading points with regards to, for example, volume of verbal communication, use of radios, operation of vehicle doors, etc.

Best practice and guidelines: These are generally broad guidelines, addressing both vehicles and operator behaviour, which do not have any formal legal basis, i.e. they are generally advisory rather than mandatory. The range of bodies issuing such guidelines varies considerably, including non-government organisations, stakeholders such as fleet operators, etc.

Figure 2.1 presents a simplified overview of how the examples showcased in the Chapter fall into these categories. The yellow block arrows denote parties who are responsible for the development of the different methods; green block arrows denote those parties responsible for applying/utilising the different methods. The orange linear arrows show how the different methods currently interact with one another. In the future it is hoped that the level and number of interactions will be greatly increased.

2.2 Examples of administration co-ordinated schemes, trials and demonstrations

Section 2.2.1 below addresses the general individual curfews commonly imposed at a local level as a result of local administration policy. Sections 2.2.2-2.2.8 present more
specific examples of curfews/controls both in the UK and elsewhere in Europe which
have been implemented or trialled as a result of wider local administrative policy. These
wider policies have either

- been introduced in an attempt to reduce the wide-scale impacts of night-time
  noise, or
- directly resulted in an increase in night-time vehicle movements

2.2.1 **Overview of typical curfews etc.**

In general, night-time curfews of one type or another are widely used to minimise
disturbance to residents in the vicinity of individual delivery points/retail premises such
as supermarkets, by restricting the hours in which goods can be delivered, e.g. bans on
deliveries between the hours of 20:00-06:00 Monday to Friday and all day on Sundays.

A survey by the British Retail Consortium of retailers found that from some 7000
respondents, over 1500 outlets (32%) are subject to such bans, with a 23:00-07:00 ban
accounting for 60% of stores (British Retail Consortium, 2005), while 15% of stores
were subject to restrictions at weekends and bank holidays. These curfews are
frequently implemented as part of local planning policy restrictions, traffic regulations,
noise abatement and environmental regulations, and in some instances as a result of the
Noise Abatement Notices being served to retail premises. For these four means of curfew
implementation, the BRC survey identified 31%, 29%, 25% and 11% of stores affected
respectively.

2.2.2 **London, United Kingdom: London Lorry Control Scheme (LLCS)**

The LLCS, which is administered by London Councils (formerly the Association of London
Government), was implemented in January 1986 in order to limit the environmental and
social damage/disruption caused by large goods vehicles (LGVs) travelling into London
whilst maintaining the economic advantages that the road freight industry brings to the
capital.

The scheme (Londonlorrycontrol.com, 2006) restricts the use of certain roads within
London Boroughs by LGVs over 18t maximum gross weight (MGW), typically on three
axles or more, during the following periods:

- Between midnight and 07:00 and between 21:00 and midnight on Mondays to
  Fridays inclusive
- Between midnight and 07:00 and between 13:00 and midnight on Saturdays
- All day on Sundays

Any vehicle less than or equal to 18t MGW can travel on the restricted roads at any time
without a permit. However, transport operators who wish to use large vehicles over 18t
MGW (typically on three axles or more) on restricted roads during controlled hours must
apply for an exemption permit. These permits are issued free of charge to a single
vehicle, and are issued based on the **need of an operator for his vehicles to travel**, i.e.
operators with essential business in the controlled areas (e.g. continuous process firms
such as steel stockholders who depend on night-trunking of supplied or early dispatch of
very bulky products, suppliers of fresh produce and other perishables to the London
market). Operators are not required to implement or demonstrate low-noise
technologies or practices to obtain a permit.

The scheme has been in operation since January 1986 and has been effective. However,
many aspects of transport in London have changed radically over the years, e.g. the
growth in the use of vehicles less than 18t, and the introduction of vehicles that are
quieter than when the scheme was introduced. Consequently, there have been calls for
these changes to be reflected in a relaxation of the controls imposed by the LLCS. A
review of possible options for change, including the use of in-service noise tests, has been reported by Ainge et al. (2009).

2.2.3 Barcelona, Spain: Night-time delivery trials

The 1998 Barcelona Municipality Mobility Pact includes two goals associated with the delivery of goods within the city, namely

- to promote the use of less polluting fuels and control air and noise pollution and
- to achieve an agile and orderly distribution of goods and products

The majority of premises within the city have limited stock-holding facilities and no off-street loading facilities. Delivery-related congestion during the daytime is therefore a problem. The key issue is therefore that night-time deliveries cannot be avoided, so the emphasis has been placed on reducing the noise generated during the deliveries.

Pilot projects addressing quiet night-time deliveries were undertaken in 2003 by the municipality in collaboration with two supermarket operators, as part of an initiative entitled “quiet night deliveries – a complementary solution for the foods sector”. Details of these pilot projects are as follows:

- Over the course of 2003/04, trials using modified trucks (adapted to include a carpeted floor and low-noise pneumatic lifts) and driver training (to minimise verbal communication during the unloading) were carried out as part of the CIVITAS-MIRACLES project, focussing on deliveries during the hours 22:00-24:00. Exemption permits issued for these modified trucks are valid for six months. It was observed that unloading could be achieved with a negligible increase in ambient noise levels (only 0.3 dB(A)). It was concluded that up to seven peak-hour deliveries could be substituted by two night-time deliveries using the quieter truck (Iriarte, 2004). It was estimated that the costs for vehicle adaptation could subsequently be recovered within 3 years.

Trials were subsequently extended to another 4 locations within the city and up to 15 across metropolitan Barcelona. Eighteen months after the first trial, the operator had extended the system to 37 outlets across Spain (CIVITAS-MIRACLES, 2007a).

Based on the results of the pilot, the practice has since been extended to 115 outlets across Spain, although it is not clear whether this is as formal municipal policy or merely an extended trial.

- Further trials were conducted using smaller, similarly modified vehicles based on the recognition that not all local roads are accessible to large trucks. It was observed that the noise levels generated by the arrival of the truck often exceeded the noise levels during unloading. Similar benefits to the large vehicle trial, in terms of reduced delivery times and transport costs, were observed with an estimated cost recovery period of 18 months (Narváez and Morales i González, 2006).

- Further trials were conducted at 14 locations during 2007 within the SILENCE project. These demonstrated that in over 50% of cases, unloading actions (taken as comprising the arrival of the vehicle as well as the physical unloading of goods) exceeded reference guideline levels (it is not clear where these reference guideline levels are derived from). Maximum noise levels generally exceeded both ambient and reference levels, in part due to engine/braking noise. Further details on the SILENCE trials are reported in Section 2.6.6.

- As part of the FIDEUS project (Innovative Logistics for European Cities), further trials have been undertaken in Barcelona using Renault medium-size trucks equipped with a low-noise mode. The results indicate that the low-noise mode reduces truck noise compared to other trucks of the same category and overall,
the trial generated positive feedback from stakeholders and residents (Sonnabend, 2008)

2.2.4  **Dublin, Ireland: Low-noise solutions for night deliveries**

An HGV Management Strategy (HGVMS) was introduced by Dublin City Council in February 2007, following the opening of the Dublin Port access tunnel, to encourage maximum use of the Port Tunnel by port-related traffic and to enhance the city centre environment. The strategy provides a ban on 5+ axle vehicles between 07:00-19:00 seven days a week in a designated area and provides a limited permit scheme for 5+ axle vehicles that need to load/unload within the city centre. Outside of that period, all HGVs with 5+ axles are permitted to enter the restricted zone. HGVs with 4 axles or less are unrestricted at all times (Dublin City Council, 2009).

An Innovation Partnership to develop ‘low-noise solutions for night deliveries’ was initiated in 2005 to help address the increased noise levels that were expected to result from the increase in night-time deliveries caused by the proposed introduction of the HGVMS. The objective, led by Dublin Institute of Technology, was to encourage Irish companies to develop innovative products and materials for night delivery operations in urban areas. The research was designed to complement that of the Dutch PIEK experience since it had been established that no overall solution existed that was suitable for all circumstances and that there was the scope to develop niche applications for Dublin. The research has included the development of acoustic coatings to dampen noise in the interior of HGV trailers and on tail-lift platforms, and the application of “hush kits” to reduce noise from roll cages (Finlay, 2008).

2.2.5  **Berlin, Germany: HEAVEN Pilot trial**

Berlin was one of 6 cities which participated in the EU HEAVEN project (Healthier Environment through the Abatement of Vehicle Emissions and Noise) which concluded in March 2003. The objective of the project was to consider how traffic management measures such as speed limits, re-routing or banning traffic, might assist in complying with requirements to keep to EU threshold limits and to reduce noise pollution. As part of the trials in Berlin, a three-week ban on HGVs greater than 3.5 tonnes was imposed in Beusselstrasse in the Moabit district of the city. While the ban was not focussed only on night-time noise, night-time noise levels were found to have reduced by 1 dB(A) over the duration of the trial (SMILE, 2003). During the overall ban, there were 30% fewer goods vehicles using the road.

2.2.6  **UK Delivery Curfew initiative**

The UK Delivery Curfew Initiative (DCI) was a joint project led by the FTA and the Commission for Integrated Transport (Costello, 2003) and undertaken by a working group made up of representatives from local/national government, non-government organisations and industry. The aims of the initiative were threefold:

- To better understand the processes by which delivery restrictions are applied
- To investigate the scope for relaxation of delivery restrictions in exchange for adoption of quieter delivery practices and to develop a code of best practice
- To undertake pilot studies at selected locations and to monitor the results

The first pilot study was undertaken in Leeds. This required commitments from involved retailers and adherence to a code of practice which included the following items:

- *For the vehicle:* Use of gas-powered vehicles, auto-switch-off of radios and reversing bleepers, the turning off of refrigerated equipment, and driver training
• At the delivery point: The use of low-noise yard surfacings, shrouding of the delivery dock, electric shutters on loading banks, the use of low-noise mechanical handling equipment and training/education for unloading staff

A range of companies agreed to adhere to this Code of Practice, including major supermarkets (Sainsbury’s, Tesco, Asda and Safeway) and other large retailers (Boots and Marks & Spencer). The pilot study demonstrated benefits for the retailers in terms of vehicle utilisation and more timely deliveries. For the residents, whilst there were benefits in terms of reduced congestion, route selection and quieter and less polluting trucks, overall there was no noticeable difference in noise levels.

2.2.7 PIEK

The PIEK programme is an initiative sponsored by the Dutch government which aims at reducing noise during the delivery process. It started in 1998 after the amended and revised ‘Environmental Retail Trade and Traditional Crafts Decree’ (Detam) set maximum noise limit values for the loading and unloading of goods (PIEK, 2005).

A number of different projects were carried out with the aim of meeting the peak noise limit of 65 dB(A) between 19:00 and 23:00 and 60 dB(A) between 23:00 and 07:00 as measured at the outer wall of residential properties. These included tackling:

- Knowledge transfer
- Behaviour and training
- The design of loading and unloading locations
- Engine limiters and noise insulation on distribution vehicles < 7.5 tonnes
- Refrigerators, tractors, rolling containers and retro fitting on distribution vehicles > 7.5 tonnes
- Alternative, quiet refrigeration systems
- The noise from on-board forklifts
- The development of quiet rolling containers and pallet trucks
- The design and use of quiet shopping trolleys
- Electrically powered vehicles

Various innovations and new products illustrated the 60 dB(A) standard could be achieved in all areas except heavy-duty trucks and shopping trolleys, where 65 dB(A) was achievable. This resulted in an amendment to legislation such that truck propulsion noise had to meet a 65 dB(A) standard. It has been acknowledged that while meeting these noise limits is possible, sufficient incentive is required in order for manufacturers to invest in such technologies.

When testing new procedures and equipment, a reference distance of 7.5 m and a reference height of 1.2 m were chosen at which to measure noise levels. This enabled the development of a number of repeatable tests to measure the noise from various parts of the delivery process (Dittrich et al., 2008). These measurements act as a standard that defines quiet products and practices, although the 60 dB(A) level may not necessarily be achieved in practice since the distance of the outer wall of properties from the noise generated during delivery will vary.

Measurement methods have been developed to measure the peak noise of:

- Constant speed, acceleration and braking at low speed for trucks and vans
- Doors, hatches, hinged and roller doors of trailers, bodies and cabs
- Tailboards, body floors and walls of trucks and vans
- Shopping trolleys, goods carts and hand pallet trucks
- Fork lift trucks and mobile fork lift trucks
- Transport cooling units.

Examples of some of the technologies that have satisfied PIEK certification are included in Section 2.4.

As of 2009, the developers of PIEK have undertaken promotional activities and applications in the following European Member States: Ireland, UK, Germany, France, Belgium, Sweden, Denmark, Italy and Portugal.

### 2.2.8 London, UK: Freight operator recognition scheme (FORS)

FORS (Transport for London, 2007a) is an industry-led membership scheme, which is part of the London Freight Plan (LFP). The vision of the LFP is "the safe, reliable and efficient movement of freight and servicing trips to, from, within and, where appropriate, through London to support London’s economy, in balance with the needs of other transport users, London’s environment and Londoners’ quality of life” (Transport for London, 2007b). The LFP encourages the undertaking of out-of-hours deliveries. It is proposed that FORS will be the leading process for disseminating best practice in sustainable distribution to the freight industry servicing London and will build key partnerships with organisations across London to achieve a more consistent level of engagement with the freight industry.

The overall aim of FORS is to engage the freight industry in best practice and cost reduction through:

- Improvements in legal compliance
- Reductions in penalty charge notices
- Fuel efficiency improvements
- Reduction in the costs of vehicle collisions
- Enhanced operator safety systems
- Better management of occupational road risks

As such, the FORS scheme incorporates a training element aimed at promoting best practice in the fields of fuel efficiency, occupational road risk and delivery practices.

### Summary

The research, trials and schemes reviewed are the result of either a general desire to reduce night-time noise disturbance or the need to reduce increased night-time noise impacts resulting from other policy or local circumstances. In some instances, the successful results of the demonstrations/trials have led to a wider, national roll-out of the procedures/technologies.

### 2.3 Examples of commercial retail operator schemes, trials and best practice

In addition to general best practice adopted by some retail operators, several specific trials/schemes have been identified which have been undertaken to investigate reducing disruption by night-time delivery operations. Many of these use the commercially available technologies referred to in Section 2.4. The following are a selection of examples of retail operator actions that have been identified.
2.3.1 J Sainsbury Plc

Following the serving of a Noise Abatement Notice in 2001, the Sainsbury’s store at Wandsworth was unable to deliver between 00:00 and 06:00, which restricted abilities to reduce impacts on congestion, air quality and emissions. In 2007, these restrictions were lifted for a three-month period in order to demonstrate that night-time deliveries did not have a detrimental impact on residents and the local community, and to develop a blueprint for reducing noise to better engage with local authorities (FTA, 2008). The trial, undertaken in collaboration with the Noise Abatement Society and Wandsworth Borough Council was established following the production of the FTA Toolkit for undertaking night-time deliveries (see Section 2.5.1). Various other best practice guides were also used, including Sainsbury’s own independent noise reduction good practice guide “Respect Our Neighbours”, which was issued in February 2006 (see below). As well as best practice aimed at the vehicle drivers and store operatives, “dock curtains” were installed which cover the vehicle tailgate area when unloading, thereby reducing noise inside the trailer and noise from loading cages passing over the vehicle tailgate.

In terms of noise, the trial was considered very successful with no complaints received from residents during the trial. Furthermore, the most noticeable result was a reduction of 8-10 dB in the noise generated by unloading as a result of the use of the dock curtains. The trial also demonstrated benefits in terms of journey time reduction, a reduction in the number of journeys during the most congested periods, and reductions in emissions and fuel usage.

An independent good practice guide entitled “Respecting Our Neighbours” was issued by Sainsbury’s in February 2006. This document is issued to both stores and supply chains and is aimed at minimising noise and disturbance wherever possible. It includes guidelines on driver behaviour, e.g. use of cab radios, and store staff behaviour, e.g. when skips can be emptied (Sainsbury, 2006).

In 2008, Sainsbury’s trialled low-noise refrigeration units which successfully met PIEK noise limit values of 60 dB(A).

2.3.2 Waitrose plc

Waitrose have installed 15 m diameter HGV access turntables at three of their loading areas/service yards (Surbiton, Wallingford and Ampthill) (BTI, 2005; BTI, 2008). These turntables allow the use of small service yards by eliminating the need for vehicles to turn around, i.e. vehicles can drive straight into and straight out of service areas. The turntables, which can accommodate 44t articulated trucks, reduce noise annoyance (from both the vehicles and associated reversing alarms) for nearby residents by eliminating the need for complex manoeuvring procedures to line up with the loading bays. Exhaust emissions are also similarly reduced.

Similar turntables have also been installed for Marks and Spencer at two locations (BTI, undated #2)

More conventional noise mitigation measures have also been employed by Waitrose for some considerable time (Waitrose, 2002). For example,

- Vehicles are all fitted with “hush” kits - new vehicles are fitted with side skirts and enclosed catwalks to reduce gearbox and engine noise,
- Vehicles use quiet air suspension as warning devices instead of audible devices, in order to minimise noise
- Low-noise refrigeration systems are fitted on all trailers

2.3.3 Tesco plc

Tesco address noise impacts as part of their store design policy. They have introduced air curtains which encompass the lorry/loading bay and keep noise within the store.
Sound-absorptive acoustic fences are also generally installed around service areas to further minimise noise disturbance to residents (Tesco, 2008).

### 2.3.4 Asda

Asda has proposed to replace the diesel-fuelled fridges in its transport fleet with emission free, low-noise alternatives. The alternative ‘ecoFridge’, designed by Urkam Industries (see Section 2.4.2) runs off liquid nitrogen instead of diesel and is being trialled in seven articulated vehicles based at Asda’s Skelmersdale depot. If the trial is successful, Asda proposes to roll the ecoFridge out to its entire fleet of temperature controlled distribution trailers (ecoFridge, 2008).

### 2.3.5 Findings from a British Retail Consortium survey

The British Retail Consortium conducted a survey in 2005 to establish who is affected by delivery restrictions, the costs that are involved and who is applying best practice (British Retail Consortium, 2005). As noted in Section 2.2.1, based on responses from other 7000 retail outlets, it was found that 32% of retailers are affected by delivery curfews, while 31% of those are affected by planning policy and 25% by noise abatement and environmental regulations.

In relation to best practice, the survey found that 78% of respondents had implemented a range of best practice initiatives to reduce the restrictions imposed by delivery curfews. Of these, 48% had introduced codes of practice to improve the delivery process and 29% were involved in pilot projects throughout the country.

Of the 78%, all had implemented driver training while 86% were involved in measures to eliminate noise and emissions from the vehicles during transportation and over half were introducing methods to address noise and disturbance during the delivery process itself.

The survey concluded that while retailers are demonstrating good practice, there was scope for local government to impose delivery curfews on a case-by-case basis and also a case for more flexible curfews, with a relaxation of 1-2 hours either side of the existing curfew times.

#### Summary

The examples presented demonstrate that retail operators use a combination of best practice and commercially available technologies. They appear to achieve acceptable results without any formal in-service test being available, and without the specific development of low-noise vehicles.

Retail operators appear to be more concerned with tackling noise at the delivery points rather than noise generated during the journeys to delivery points. This is to be expected since they will most likely only receive complaints from residents in the vicinity of the delivery points and not from residents along the delivery routes.

### 2.4 Examples of manufacturer technologies for reducing noise impacts

Manufacturer technologies can be broadly grouped into three categories:

- Vehicle technologies (tractor units)
- Ancillary technologies (including trailer and body equipment/ modifications)
- Non-vehicular technologies.
The following sections provide a brief overview of some of the low-noise technologies that are currently commercially available or under development, either in Europe or in the UK.

2.4.1 Low-noise vehicle technologies

Presently, the only vehicle types which can be considered to be less noisy than conventional vehicles are electric or hybrid vehicles. Vehicles powered by alternative fuels (LPG or CNG) have, in previous studies (Watts et al., 2005), shown no consistent noise benefits across all modes of operation that would suggest they are suitable for use when attempting to reduce night-time noise impacts.

The following paragraphs provide examples of electric and hybrid vehicles that are currently available.

2.4.1.1 Electric vehicles

Modec (www.modeczev.com) is a UK manufacturer who has developed a range of zero emission (electric) vehicles, including a 5.5t box van (Modec, undated). Users include Tesco, UPS and FedEx.

Smith Electric Vehicles (www.smithelectricvehicles.co.uk) has developed a range of electric vehicles from 2.3t to 12t. The ‘Newton’ model is available in both box and refrigerated body types, with Gross Vehicle Weights of either 7.5, 10 or 12t (Smith Electric Vehicles, undated). Users of ‘Newton’ models include TK Maxx, DHL and TNT, the latter currently operating 150 7.5t vehicles.

2.4.1.2 Hybrid vehicles

Iveco has developed a diesel-electric hybrid version of its Eurocargo urban distribution vehicle, which is normally available with GVWs of 7-10t or 12.8t. The prototype is being trialled by Coca-Cola Enterprises during the first half of 2009 (Trucklocator, 2009).

It has been reported (BigLorryBlog, 2007) that Volvo will begin full production of a hybrid diesel-electric truck based on its FE chassis in 2009. A prototype refuse truck based on its FM chassis is currently running at 26t. Volvo is also planning to supply Veolia Proprete with four diesel hybrid refuse trucks for trial in London and Paris in Autumn 2009 (BigLorryBlog, 2008).

Gas-electric hybrid refuse vehicles have been operating in Gothenburg, Sweden since 2004 (SILENCE, 2008).

2.4.1.3 Reversing alarms and cameras

Brigade Electronics manufactures reversing alarms which emit white noise. These were trialled as part of the Sainsbury’s trial at Wandsworth (see Section 2.3.1). Brigade has also launched a range of self-adjusting reversing alarms which automatically adjust the volume to only 5-10 dB above the ambient noise level (Brigade Electronics, undated). They have been awarded an NAS-PIEK certificate for these products in the UK.

Groenevald produces the Greensight reversing system, a camera-based system, which includes a display in the vehicle cabin that uses light signals and sounds to warn the driver of obstacles and people outside of the field of vision (Groenevald, undated). This is intended to be used as an alternative to conventional external vehicle reversing alarms and was tested as part of the Dutch PIEK programme.

Other reversing alarm or camera systems tested within the PIEK programme are manufactured by Grootjebrink and Orlaco (PIEK 2005).
2.4.2 Ancillary technologies for trailers and trailer modification technologies

In this instance, we are considering HGV trailers and rigid truck bodies, together with the ancillary technologies which are routinely fitted or used.

2.4.2.1 HGV trailers and rigid truck bodies

Gray & Adams manufactures low-noise trailers incorporating low-noise floor surfaces (which reduce the noise of loading and unloading rollcages), low-noise tail lifts (manufactured, for example, by Dholandia – see below) and low-noise refrigeration units (manufactured, for example by Them o King – see below) (Gray & Adams, 2008). Gray & Adams has been awarded an NAS-PIEK certificate and has supplied trailers to Sainsburys and Tesco, and 18t rigid vehicles for Marks & Spencer. This technology can be used across a wide range of vehicle bodies.

2.4.2.2 Electric rear doors

One of the issues associated with roller doors on trailers is that just before closing, the weight of the door causes it to close with increased speed and therefore considerable noise. To overcome this, Transport Load Systems (www.tls-dronten.nl) has developed an electric shutter door which slows down when it reaches the maximum opening point and also when it falls shut. This shutter door has a PIEK noise level of only 57 dB(A). Furthermore, the door stops immediately when it encounters resistance, e.g. if a hand or package is in the closure (PIEK, 2005).

2.4.2.3 Modified trailer floor coatings and floor solutions

DVN has developed a product, ‘ClickIt’, for finishing both the floor and walls of trailers and which provides an alternative to conventional trailer floor systems. The product, which meets the PIEK 60 dB(A) standard, is a strong, durable composite moulded component (DVN, undated).

Kunststof Coatings Nederland (KCN) has developed a sprayable plastic floor coating, ‘Turboliner’ which is suitable for application to a range of different base surfaces (KCN, undated). A 5 mm thick layer is sufficient to both protect the floor and absorb sound, resulting in a floor on which noise caused by the rolling and sliding of transit cages, pallets, etc. falls below the PIEK 60 dB(A) limit.

In terms of poured floor coatings, products which meet the PIEK 60 dB(A) standard have been developed by Zepro and Rhiwa (PIEK, 2005). In the case of Rhiwa’s ‘Carfloor’ quiet floor, noise levels on the floor are as low as 54 dB(A).

As part of a project to develop a quiet refrigerated trailer, Schmitz Cargobull developed a grooved aluminium trailer floor (on which the grooves run lengthwise). Using aluminium means that the floor is smooth and therefore quiet, whilst the grooves ensure that the floor does not become slippery (PIEK, 2005).

As part of the Dublin ‘Low noise solutions for night deliveries’ programme, CREST (Centre for Research in Engineering Surface Technologies) identified and developed an acoustic coating to dampen noise in the interior of delivery trucks. Once the most promising formulation was identified, it was tested for abrasion resistance, washability, hardness and impact resistance as indicated by market and standard requirements. The new material formulation has subsequently been licensed to an Irish coatings manufacturing company, although the identity of this company has still to be determined.
2.4.2.4 Refrigeration units:

Urkam Industries has developed ‘ecoFridge’ refrigeration units which run off liquid nitrogen instead of diesel. These units are currently being trialled by Asda (ecoFridge, 2008) (see Section 2.3.4). Urkam Industries has been awarded an NAS-PIEK certificate for this product.

Carrier Transicold has developed ‘Vector 1850 City’ low-noise refrigeration units which generate noise levels less than 60 dB, the average level being 57.5 dB. At the time of writing the company has commenced a 12 month demonstration programme to promote the units (Logistics Handling, 2009). Carrier Transicold has been awarded an NAS-PIEK certificate for this product.

Thermo King has developed the ‘CryoTech ST-TR’ truck range of cryogenic refrigeration systems (i.e. systems using CO₂ as the refrigerant) which not only meet the PIEK requirement of 60 dB, but exceed the requirement (Grocery Trader, 2009). Technical specifications indicate that the units generate noise levels of only 57 dB. Thermo King has been awarded an NAS-PIEK certificate for this product.

As part of the PIEK study, three types of low-noise refrigeration systems were investigated: cryogenic refrigeration systems (developed by Thermo King and Messer), truck-powered refrigeration systems (developed by Govers E.T.) and diesel refrigeration encapsulation (PIEK, 2005).

2.4.2.5 Cargo stowage

Securing systems are required in trailers carrying rolling containers to prevent the loads from shifting. Cargo stowage systems designed by Load-Lok were tested as part of the PIEK programme. The system comprises a robust bar which is secured in rails mounted on the trailer sides. While traditionally these systems are noisy due to being a metal-on-metal connection, both components of the Load-Lok system are treated with a coating which results in noise levels of only 58 dB(A), less than the PIEK 60 dB(A) limit (PIEK, 2005).

2.4.2.6 Tail lifts

Dhollandia has developed the DH-SKS ultra low-tail lift (Dhollandia, 2008). Dhollandia has been awarded an NAS-PIEK certificate for this product. Similar tail lifts, tested within the PIEK programme, have also been developed by Dautel, Mariba and STAMA (PIEK, 2005).

2.4.2.7 Fork lifts and pallet trucks

Manitou has developed an electric on-board forklift truck. Noise levels of 59 dB(A) were achieved for general operation whilst levels of 60 dB(A) were achieved when reconnecting the forklift to the lorry (PIEK, 2005).

Yale has developed the MP16S low-noise, powered pallet truck, which generates significantly reduced operating noise when running over cracks and uneven surfaces in floors. The truck incorporates a unique off-set third wheel and other noise reduction measures. Yale Europe has won the prestigious award for the Environment in the 2009 Fork Lift Truck Association (FLTA) Awards (Yale Europe, 2009).

BT (part of Toyota’s Material Handling Group) has developed a PIEK-certified silent model of the BT Orion LWE200 powered pallet truck.

BT has also developed a low-noise hand pallet truck, the BT Lifter Silent LHM230SI. Designed for very quiet handling of goods, the BT Lifter Silent generates noise levels that do not exceed 60 dB(A) and has been certified by the PIEK programme in the Netherlands (BT, undated).
2.4.2.8 Roll containers and pallet trucks

Rolling cages/containers called ‘Silent Compactainers’ developed by Hartwall (Finland) were tested as part of the PIEK programme. These cages included noise-absorbing wheels, noise-absorbing materials between metal parts to reduce noise caused by vibration and movement, as well as rubber bumpers on those points where the trailers come into contact when nested. (PIEK, 2005).

As part of the PIEK programme, HOZA developed rolling containers with both hard and soft wheels which met the PIEK 60 dB(A) standard (PIEK, 2005).

2.4.3 Non-vehicular technologies

In this instance, we are considering technologies that will be used at loading/unloading areas which are independent of the vehicles using the areas.

2.4.3.1 HGV access turntables

These turntables, manufactured by BTI (Bolton, UK) allow improved HGV access to loading/unloading depots by allowing vehicles to drive directly into and out of depots without the need for complex reversing manoeuvres, thereby reducing noise disturbance both from engine noise and reversing alarms (BTI, undated 1).

Summary

At the present time, other than electric or hybrid vehicles, there are currently no low-noise HGVs commercially available. Furthermore, in the absence of appropriate legislation, there is little incentive for vehicle manufacturers to provide low-noise vehicles although discussions have identified that such vehicles could be introduced onto the market if necessary.

Much of the emphasis, based on general research and in part driven by complaints from residents, has been placed on the development of low-noise technologies to reduce noise impact nuisance at loading/delivery points. The introduction of PIEK is considered to have accelerated this process based on the marketing benefits of certified products.

As part of the Dutch PIEK scheme a wide range of ancillary technologies and trailer modifications have been investigated, many of which have been certified as low-noise products under the PIEK scheme. In addition, products available in the UK have also been PIEK certified.

2.5 Examples of best practice guidelines and recommendations

The following are examples of best practice guidelines and recommendations that have been developed by a range of stakeholders. Whilst there are an increasing number of parties recognising and adopting these practices, there is not presently any formal framework in place to make such practices mandatory for all night-time goods deliveries.

2.5.1 Freight Transport Association (FTA)

The FTA was involved in the UK Delivery Curfew Initiative (see Section 2.2.6) which was initiated in 2004. As part of that initiative, the FTA prepared a toolkit for improving night-time deliveries (Freight Transport Association, 2004). This toolkit sets out a recommended methodology for retailers and suppliers to apply in order to withdraw from delivery curfews. It includes references, and limit values where appropriate, for the following guidelines and standards in relation to noise:

- PPG24: Planning and noise (Department of the Environment, 1994)
WHO Guidelines for community noise (Berglund et al., 2000)

More recently, the FTA’s Urban Freight Agenda (Freight Transport Association, 2008), identifies one of the key priorities for urban freight as being to make "urban areas more peaceful places to live by tackling noise pollution”.

2.5.2 Noise Abatement Society (NAS)

The NAS has been opposed to the lifting of night-time delivery restrictions in urban areas due to the levels of noise disturbance that would be likely created. It recognised that local authorities are under increasing pressure to relax restrictions to assist businesses whilst simultaneously protecting residents. As a first step towards achieving this balance, the NAS initiated a quiet night-time delivery scheme called “Silent Approach” in 2008 (Noise Abatement Society 2008a). This draws on the FTA delivery toolkit (see Section 2.5.1), results from Irish residential environmental impact studies and also the Dutch PIEK scheme equipment and vehicle standard (see Section 2.2.7).

‘Silent Approach’ requires collaboration between the local authority (LA), the store wishing to relax/remove its night-time delivery restrictions and NAS and is based upon the NAS approaching the local authority on behalf of the retail operator. A four week trial is conducted during which a 24 hour telephone noise complaint line is available to residents and unannounced site visits are made by the LA and the NAS to ensure that all recommendations are being adhered to. Noise levels are monitored both before and during the trial period. At the end of the trial period, a residential environmental impact survey is conducted to indicate the feasibility of carrying out night-time deliveries without disturbance. The Sainsbury’s Wandsworth trial (see Section 2.3.1) was used as the pilot for 'Silent Approach'.

In conjunction with the ‘Silent Approach’ scheme, the NAS has adopted the Dutch PIEK certification scheme for vehicles and equipment operating at noise levels of less than 60 dB; such equipment is suitable for night-time deliveries without causing disturbance. The UK scheme uses the same standards as the original Dutch scheme. At the launch in April 2008, products from five companies were awarded NAS-PIEK certificates (Noise Abatement Society 2008b).

2.5.3 Department for Transport (DfT)

DfT have produced several documents addressing good practice in relation to freight movement. These include:

- “Control of body noise from commercial vehicles” (Department for Transport, 2005); This guide is intended to help and advise all those responsible for the design, manufacture, maintenance and use of commercial vehicles.
- “Delivering the goods: Guidance on delivery restrictions” (Department for Transport, 2006); This provides guidance on both central and local government planning policy and presents an industry review on best practices that might be adopted to potentially relax delivery restrictions.

A good practice case study addressing freight quality partnerships (FQPs; partnerships between the freight industry, local government and other stakeholders) has also been published (Department for Transport, 2003); The objective of FQPs is to develop an understanding of freight distribution issues and to promote solutions which reconcile the
needs of businesses with environmental and social concerns. While the five example FQPs in the report are mainly focussed on local authorities improving parking restrictions and facilities, three recognise the need to minimise noise disturbance from freight movements.

### Summary

A wide range of stakeholders have prepared best practice recommendations and guidelines for reducing the impact of night-time delivery noise. Many of these appear to share common elements or draw on one another's content. It is therefore considered that the development of a common, all encompassing (as far as is possible) standard which could be used by the full range of stakeholders would be beneficial.

#### 2.6 Research projects addressing night-time goods deliveries

##### 2.6.1 Alternative methods for the management of night-time freight noise in London

TRL was commissioned by Transport for London (TfL) to undertake a review of the noise impacts of the London Lorry Control Scheme (LLCS; Section 2.2.2). Initially the work addressed whether amendments could be made to the LLCS which would significantly improve the environmental benefits achieved by the scheme whilst reducing costs. The use of alternative-fuelled vehicles was considered, together with proposals for redefining the Exempt Road Network (ERN; i.e. those roads not included in the scheme), methods for assessing vehicle eligibility and the inclusion of vehicles less than 18t.

A range of options for potential changes to the LLCS were identified, ranging from small changes (e.g. increasing the size of the ERN or more vigorous enforcement) to large changes (greater freedom for night-time deliveries for vehicles meeting specified noise criteria). It was concluded that the best approach was to focus on the identification and prohibition of noisy goods vehicles within the scheme rather than major modifications to the ERN itself.

Proposals for a voluntary in-service noise test were developed, following a small-scale test programme (Ainge et al., 2009). This test, which was focussed on the noise generated travelling from ‘A to B’ rather than loading/unloading noise, included a stationary vehicle noise test, a pull-away-from-rest (PAFR) vehicle noise test and checks on airbrake noise and body noise. The aim was that vehicles passing the test would be awarded a certificate and allowed to be used in London during the currently controlled hours as well as the current uncontrolled hours.

It is noted that these proposals were not adopted since the customer was not responsible for the control and operation of the scheme. It is considered that the proposals may be appropriate for consideration within the current research study.

##### 2.6.2 Austroads

Austroads consists of a collection of traffic authorities and transport departments from Australia and New Zealand, brought together to contribute to the improvement of roads and transport in the region. In 2006, faced with steadily increasing road freight, they commissioned a study to look at the management of the environmental impacts of night-time freight deliveries (Rare Consulting Pty Limited, 2007).

The most obvious impact of increased night-time freight movement was identified as possible sleep disturbance from an increase in discrete noise events. However the lack of meaningful limits attributed to discrete noise events was partially attributed to the need for further study on the link between noisy events and sleep disturbance.
Twelve strategies were identified as possible means of controlling the noise impact of increased night-time deliveries:

- Tighter noise emission standards for new heavy vehicles
- Regulations on engine exhaust brakes
- Tighter standards for commercial vehicle tyres
- Regulation of vehicle chassis/body noise
- The introduction of controlled access routes
- The introduction of environmental zones
- Improved land use planning practices
- The use of ‘quiet’ road surfaces
- The increased use of roadside attenuation techniques
- The introduction of noisy vehicle detections programs
- The establishment of an old vehicle replacement program
- The introduction of a noise labelling system.

The suitability of these measures was assessed with respect to:

- Local context
- Environmental effectiveness
- Urban amenity impacts
- Practicality
- Cost-benefit
- Ease of administration
- Legislative requirements
- Enforcement burden
- Industry acceptance
- Community acceptance.

This led to the recommendation of a three stage approach for dealing with increased night-time activity in Australia and New Zealand as follows:

- Firstly, the adoption of standards that help control the noise of delivery trucks was proposed as a possible short-term strategy. These included the introduction of regulations governing the noise generated by the bodies of heavy vehicles, based upon best practice guidelines produced in the UK (Department for Transport, 2005)

- It was also proposed that, in the medium-term, noise plans designed to minimise community exposure to noisy events should be put in place. It was envisaged that these would include noise mapping programs to identify affected areas and freight routes, environmental zones/controlled access corridors and noise management measures in affected areas. A noise labelling system, potentially granting different levels of access, was also suggested as a possible strategy

- Finally it was considered that an acceleration of the replacement of older, noisy vehicles was an important step in reducing the noise of the fleet
2.6.3 **University of Strathclyde research**

In 2004 the Hunter Centre for Entrepreneurship at the University of Strathclyde undertook a study to develop a clear understanding of the restrictions and curfews placed on logistics and distribution companies in the UK (HCFE, 2004). Through various stakeholder interviews, questionnaires and data gathering, the safety and environmental concerns of local authorities and delivery problems of road haulage organisations were summarised.

National regulations such as fuel duty, vehicle excise duty, congestion charges, working time directive and speed limits were highlighted alongside local restrictions covering rules on noise, vehicles operating times and parking. The importance of freight quality partnerships (FQPs) in bringing local government, freight operators and other interested parties together was stressed throughout the report. Noise pollution was given as the joint second most common reason for curfews imposed, level with road safety and behind pedestrian safety, and time restrictive curfews were adopted by 92% of responding local authorities. Recommendations from within the local authority area were given by 80% of respondents as the reason for triggering restrictions.

With respect to the freight operators there was a desire for an improvement in road infrastructure; night-time deliveries were also a ‘common request’. It was mentioned that designated parking areas might reduce complaints resulting from HGVs parking in residential areas. Outside of London, York was the most frequently mentioned authority in relation to applying delivery restrictions.

As a result of these findings three recommendations were put forward:

- A formal expansion of FQPs so that all distribution companies and local authorities can effectively resolve their issues
- The easing of yellow line parking restrictions for delivery during daylight hours
- Night-time delivery should be allowed for non-perishable goods

2.6.4 **BESTUFS (Best urban freight solutions; www.beststufs.net)**

BESTUFS is a European Commission Thematic Network which was established in 2000, with an initial duration of 4 years, with the objective of identifying and disseminating best practices with respect to urban freight transport. The principle of a thematic network is not to perform new research activities but rather to encourage cooperation and collaboration between experts and projects with existing and new experiences/expertise and to collate and analyses results from national and European projects. The project was extended in 2005, under the title BESTUFS II.

In respect of night-time deliveries, a workshop on urban aspects of night-time deliveries (BESTUFS, 2003) recognised that this requires a balance between economic, environmental and social objectives, as well as the development of low-noise handling equipment and vehicles. It was recommended that night-time delivery trials be undertaken with the collaboration of all associated stakeholders, that research into low-noise vehicles should be supported and that best practice guides should be prepared and disseminated.

Within the framework of BESTUFS II, a number of best practice handbooks have now been compiled. One of these addresses urban freight control schemes (Abel and Karrer, 2006), including some examples related to night-time freight movement. A good practice guide has also been produced (Allen et al., 2007). In relation to night-time deliveries, the guide recommends two types of night-time regulations:

- “Time regulations on deliveries and collections to and from a particular building (e.g. a retail outlet, office or factory)”
- “Regulations on goods vehicle movement in a part or the whole of an urban area”
The consequences of preventing night-time freight movement are outlined and the following points are highlighted for consideration in relation to night-time delivery regulations:

- "Restrictive night-time regulations can result in an increase in total costs within the supply chain. By being allowed to make night-time deliveries, some companies can improve the efficiency of their operations and improve sales"

- "Night time delivery regulations should mainly focus on noise issues”

- "Well defined noise standards for night-time operations could bring significant benefits to local residents increasing the acceptance of night-time transport operations”

2.6.5 NICHES (niches-transport.euregio.net)

NICHES+ is a 7th Framework European Project, the objective of which is to promote innovative measures for making urban transport more efficient and sustainable and to move them from their current "niche" position into a mainstream urban transport application.

Although the current programme does not include any work on noise or freight movement, NICHES+ builds on the work of the 6th Framework NICHES project which ran from 2004 to 2007. Within that programme, Working Group 2 (Innovative approaches in city logistics) addressed innovative concepts for inner-city night-time deliveries.

As an output from that Working Group, a policy note on inner-city night-time deliveries was prepared (Forkert and Eichhorn, 2007). This included a review of work in Barcelona, Dublin and PIEK (see Sections 2.2.3, 2.2.4 and 2.2.7), an overview of the benefits of night-time deliveries and the associated costs, identified the users and stakeholders, and highlighted the aspects that need to be considered prior to the implementation of night-time deliveries. The latter include public acceptance of night-time deliveries, consideration of public subsidies to encourage the purchase of low-noise equipment, existing (local/national/international) noise limits, and local access regulations.

The policy note identified the following factors necessary for night-time deliveries to be successful:

- A quality label indicating that quiet equipment is used
- Openness of the city authorities concerning alternative delivery schemes
- Research to develop low-noise equipment and improve organisation
- Shops must be able to receive goods during night-time (the situation can differ depending on the size of the shop and therefore different technical and/or organisational aspects are important)
- Adequate infrastructure must be provided around ramps, together with quiet loading and unloading locations and low-noise paving
- Training of drivers and ramp personnel
- Contracts between retailer/receivers and shippers ensuring that goods are transported with quiet equipment
- Co-operation between shippers and transporters ensuring that the transporters use quiet equipment

Potential solutions to these factors were identified in the following terms:

- Technology: LNG/CNG/hybrid/fuel cell; Low-noise trailers; Radio switches; Load restraints; New vehicle development; Treatment of the trailer floors with a noise-insulating material
• Organisation: Briefing drivers; training courses; additional staff at the shops for loading/unloading operations.

### 2.6.6 SILENCE (Quieter surface transport in urban areas; [www.silence-ip.org](http://www.silence-ip.org))

This was a European Commission Xth Framework project, the objective of which was to develop integrated methodology and technology infrastructure for urban surface transport. This included innovative strategies for action plans for urban traffic noise abatement, practical tools for their implementation, and tools, methodologies and input data for decision support systems, urban action plans and future noise scenarios. The project included links to previous European projects, namely SILVIA (Sustainable road surfaces for traffic noise control) and IMAGINE (Improved Methods for the Assessment of the Generic Impact of Noise in the Environment).

Low-noise night-time deliveries were addressed as one element of the project, expanding upon previous trials in Barcelona (see Section 2.2.3). Five of the city’s 10 districts, the municipal authorities and 3 private transport operators participated in the SILENCE trials, with 11 sites being monitored over a 10 month period from 2006-7. The trial enabled goods operators to gain exemption from the traffic regulations that limit on-street loading/unloading (08.00 – 20.00) provided that they could demonstrate that their activities did not exceed the ambient noise conditions. The results showed that operators were only partially successful (in 45% of cases) in unloading within the ambient noise conditions; it also identified the most important noise sources (truck arrival in 62% of cases, goods unloading in 15% of cases).

One of the final outputs from the project, a practitioner handbook for local noise action plans (SILENCE, 2008), includes a brief section on the benefits, costs, advantages and problems of night-time deliveries. The noise limits defined in the Dutch PIEK programme are recommended as guideline limits. The advantages and problems identified can be summarised as follows:

- **Advantages:** Improved delivery schemes for shops; reduced congestion caused by parking delivery vehicles during the day
- **Problems:** The necessity for good communication between shop owners, the municipality and residents when introducing night-time delivery schemes

The handbook also offers guidance on checks on noisy vehicles. Based on surveys of roadside noise in Japan, it was concluded that in-service noise controls can be an effective noise reduction measure but can be restricted to motorcycles and cars (this is on the basis that a very low percentage of trucks are fitted with replacement exhausts/silencers which are either modified or illegal).

The handbook also refers to the use of other low-noise transport modes including low-noise trams, quieter buses (in terms of regular renewal of the public transport fleet and low-noise waste vehicles. For the latter the handbook cites the use since 2004 of gas-electric hybrid waste vehicles in Gothenburg. Noise reductions of up to 25 dB(A) have been observed compared to conventional vehicles.

### 2.6.7 CIVITAS MIRACLES (Multi-initiative for rationalised accessibility and clean liveable environments; [www.civitas-initiative.net](http://www.civitas-initiative.net))

This was a project carried out under the CIVITAS umbrella (see Section B.1) involving four European cities, namely Rome, Barcelona, Winchester and Cork. The objective was to respond to the EC’s call for increasing the sustainability and efficiency of urban transport systems through radical strategies for clean urban transport.

New concepts for the distribution of goods were trialled in Barcelona (CIVITAS-MIRACLES, 2007a). This included investigating the feasibility of night-time deliveries using modified vehicles to reduce noise impacts (see Section 2.1.3)
One of the measures implemented in Winchester was the introduction of a range of alternative-fuelled vehicles into Hampshire County Council’s vehicle fleet, as well as Euro 3 buses (CIVITAS-MIRACLES, 2007b). The objectives of this were to improve air quality as a result of Winchester being designated an Air Quality Management Area (AQMA). Noise is not mentioned as an issue or a benefit.

Summary

A wide range of projects have recognised the need to address the issues associated with night-time delivery noise. A wide range of potential solutions and approaches have resulted. It is considered that knowledge and results from these projects can assist in the development of a ‘quiet HGV’ permissive certification scheme and associated best practice guidelines.

2.7 General vehicle noise legislation

This section provides a short overview of UK and European legislation associated with the measurement of vehicle noise.

2.7.1 Road Vehicle (Construction and Use) Regulations 1986

The objective of this Regulation, made under the Road Traffic Act 1972, is to ensure that vehicles used in the UK are built to a high standard. The Regulations are also used to implement EU Directives.

Under the Regulations, there are a number of areas which address noise issues in different ways. The first deals with new vehicles which are controlled by type-approval limits. The second deals with equipment such as silencers which must not be altered in such a manner that the noise is greater than when it was first manufactured (and that replacement silencers for mopeds and motorcycles must comply with certain noise requirements which effectively imply that there is no increase in noise emissions compared with the original silencer). The third deals with maintenance, again ensuring that there is no increase in noise due to poor maintenance. Finally, there are regulations relating to the avoidance of excessive noise which includes the behaviour of the driver in operating the vehicle, including the use of audible warning signals.

2.7.2 Type-approval for new vehicles

The testing of noise emissions from vehicles is required under EU type-approval procedures. Type approval is a procedure whereby a manufacturer can obtain certification from a competent authority that the product meets the requirements of a certain European Directive.

The noise levels accepted for vehicle type-approval are laid down in Directive 70/157/EEC (European Commission, 1970) for motor vehicles (motorcycles are addressed within a separate Directive).

Directive 70/157/EEC also specifies the methodologies/requirements for measuring noise levels from vehicles (by means of a drive by test, which is a full-throttle acceleration test between two defined points), and exhaust systems/silencers (by means of a close-proximity (stationary) test). These are based on the UN-ECE Regulations (see next section)

Several amendments have been made to this Directive which have reduced permissible noise levels. The latest amendment is Directive 2007/34/EC (European Commission, 2007). Limit values for eight types of passenger and goods vehicles range from 74 dB(A) to 80 dB(A).
Another type of test, carried out with the vehicle stationary, is a test of a vehicle’s air brakes. EU Directive 92/97/EEC (European Commission, 1992) has set a limit for air brake noise of 72 dB(A) measured under stationary conditions at 7 m from the vehicle with a 1 dB(A) allowance for measurement tolerance.

Type-approval Directives are implemented into English Law by the Motor Vehicles (Type-Approval) (Great Britain) Regulations 1984 that is made under the Road Traffic Act 1972.

2.7.3 **UN-ECE Regulation 51**

This Regulation outlines the procedures to be adopted for the assessment of noise during the type approval of motor vehicles having at least four wheels. During the type approval process, the method detailed in ISO 362:2007 (ISO, 2007a) is used for the assessment. The result from this test is compared with that given in Directive 2007/34/EC to determine whether the vehicle has passed type-approval.

The procedure currently used for type approval, known as R51.02, is under review by the UN-ECE Working Group WP29. A revised procedure, R51.03, is currently being run in parallel with the existing procedure for any vehicles passing through type-approval in the period from July 2007 to June 2009. The new procedure in R51.03 contains two separate tests and is designed to be more representative of the noise level of vehicles in an urban environment.

A stationary test, to the method given in ISO 5130:2007 (ISO, 2007b) is also undertaken at type-approval. The result from this test is not used to determine whether a vehicle passes type-approval, but could be used by authorities to check in-service noise levels if made available.
3 Evaluating the need for a ‘quiet HGV’ permissive certification scheme

This Chapter presents an overview of current practice in the absence of a ‘quiet HGV’ permissive certification scheme and how that practice might potentially change following the introduction of such a scheme. The results of a consultation with a wide variety of stakeholders on the potential needs, benefits of and barriers to a potential permissive certification scheme are also presented. Furthermore, the outcomes of discussions with vehicle manufacturers and the developers of the Dutch PIEK scheme for reducing noise during the delivery process are also presented.

3.1 Current practice in the absence of a formal ‘quiet HGV’ permissive certification scheme

With the exception of some of the localised trials/schemes discussed in Chapter 2, where benefits have been offered to vehicle operators/retailers using current low-noise technologies and/or best practice, there is presently no recognised formal, common scheme in England which addresses the noise impacts from all aspects of night-time goods movement, i.e. during the ‘A to B’ journey and loading/unloading at the point of origin/destination.

Any current practice to relax night-time delivery restrictions can be considered in terms of the following five factors.

- **Motivation**: The drivers for relaxing or removing night-time delivery restrictions
- **Administration**: The changes to restrictions which are permitted by a local authority and the conditions attached to these restrictions. This also includes best practice adopted by the authority
- **Development**: The development of equipment which is intended to generate less noise in use than the conventional alternatives
- **Certification**: The evaluation and certification of equipment which is expected to lessen noise impacts when used in place of the conventional alternatives
- **Verification**: The work required to determine whether the changes to the restrictions have been successful

Such practice generally follows the route shown in Figure 3.1. It is perceived that there is a both a lack of focus and integrated thinking between the involved parties which would be addressed by the availability of a formalised ‘quiet HGV’ permissive certification scheme.

3.2 Anticipated practice under a formal ‘quiet HGV’ permissive certification scheme

It is considered that the introduction of a formal scheme would introduce a more focussed structure to Figure 3.1. This would also result in a more integrated approach which, once implemented would essentially lead to a perpetual cycle, i.e. in time, the successful relaxation of restrictions might lead to motivations for a further relaxation of restrictions. It is considered that this cycle would be as shown in Figure 3.2. The green boxes, STEP 1 and STEP 2 are discussed further in Section 5.5.
Figure 3.1: Process for relaxing/removal of night-time restrictions in the absence of a formal ‘quiet HGV’ permissive certification scheme

Figure 3.2: Anticipated process for relaxing/removal of night-time restrictions in the presence of a formal ‘quiet HGV’ permissive certification scheme
3.3 Consultation and feedback on the needs for and feasibility of a formal ‘quiet HGV’ permissive certification scheme

Although it is perceived that there is an increasing need for a ‘quiet HGV’ permissive certification scheme to encourage/allow the relaxation of night-time delivery restrictions, it was considered important to confirm this. Consultations have been carried out with a range of stakeholders who would make use of such a scheme as a regulatory tool, potentially be responsible for its operation, or be subject to undergoing and meeting the requirements of the scheme.

The objective was to gauge opinion not only on the need, but also on the potential benefits, obstacles and concerns, and potential success of such a scheme. This consultation has been carried out in the following manner:

- **Stakeholder Advisory Group (SAG):** The SAG was established comprising representatives from national and local government (DfT and TfL), standards agencies (VOSA), non-government organisations (NAS), industry associations (Road Haulage Association (RHA), the Society of Motor Manufacturers and Traders (SMMT) and FTA) and universities (University of Westminster). Some members of the SAG have already been involved in work in this field (e.g. FTA and NAS). It was considered that such a group would provide more rounded and informed opinion than through a questionnaire consultation (see below), since although the same questions might be asked, they are merely a starting point for wider discussion and provide the Project Team with a stronger starting point for developing proposals for a potential ‘quiet HGV’ permissive certification scheme.

  The first meeting of the SAG took place in early March 2009. The four questions posed to the SAG were
  
  o Do you think that there is a need for a ‘quiet HGV’ permissive certification scheme?
  o What are considered to be the potential barriers to the introduction and implementation of such a scheme?
  o What would be the potential concerns arising from such a scheme?
  o What is the likelihood of success of such a scheme?

- **Survey of local authorities, freight operators and industry associations:**

  The survey was undertaken by means of a questionnaire. It was considered that this would provide a broader, but less focussed response than the SAG since there was no guarantee that all contacted parties would respond and that the individuals completing the questionnaires would be the most relevant or informed parties within those organisations.

  The 155 local authorities included were all those LAs with the powers to influence or change traffic conditions/restrictions. The 75 industry associations and 293 freight operators were selected to represent a broad cross-section of the retail and freight-handling industries most likely to benefit or be affected by any changes to night-time delivery restrictions.

  The five primary questions on the survey were
  
  o Are you aware of any evening and/or weekend restrictions for HGVs that are currently in place?
  o Would you support a ‘quiet HGV’ permissive certification scheme?
  o Do you think that there is a need for such a scheme?
  o Do you think a scheme such as this would be effective?
  o What level of uptake do you foresee for such a scheme?
Appendix B includes copies of the questionnaire templates.

The outcomes of these consultations are reported in the following sections.

### 3.3.1 Qualitative feedback

This feedback is a summary of the responses from the questionnaire survey. Table 3.1 shows the level of response for each of the different target groups, based on respondents being given a period of three weeks in which to reply (this was then extended to 5 weeks following a low level of initial response).

#### Table 3.1: Response rate to the ‘quiet HGV’ permissive certification scheme survey questionnaire

<table>
<thead>
<tr>
<th></th>
<th>No. of questionnaires distributed</th>
<th>Level of response</th>
<th>Percentage of total responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Actual number</td>
<td>Percentage (to nearest 1%)</td>
</tr>
<tr>
<td>Freight operators</td>
<td>293</td>
<td>24</td>
<td>8</td>
</tr>
<tr>
<td>Industry associations</td>
<td>75</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Local authorities</td>
<td>155</td>
<td>18</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>523</td>
<td>53</td>
<td>10</td>
</tr>
</tbody>
</table>

It is considered that the level of response is disappointing. It was expected that the response rate would be of the order of 30%. However, this could be for a number of reasons, including the time of year that the survey was conducted (being both around Easter and the end of the financial year) and the current (2009) economic climate. The impact of the low response is discussed later.

It is noted that four questionnaires were returned after the five-week deadline and are not included in the table below or in the analysis presented in the following sections.

#### 3.3.1.1 Awareness of existing restrictions

Figure 3.3 shows the number of ‘yes’ and ‘no’ responses to the ‘awareness of restrictions’ question for each type of organisation. Twenty-one of the 24 freight operators stated that they were aware of current night-time or weekend noise restrictions that are in place. Similarly, seven of the nine responses from industry associations stated that they were aware of current restrictions. However only a minority (seven of 18) of local authorities were aware.

A Chi-Square test revealed that the relationship between the organisation and their likelihood of being aware of restrictions was statistically significant. While the majority of freight operators and industry associations were aware of restrictions, the majority of local authorities were not.

#### 3.3.1.2 Opinions on a permissive certification scheme

In the following paragraphs, average scores are presented on seven-point scales relating to individual questions asking opinions on a classification scheme for ‘quiet HGVs’. Average scores are presented for the three different types of organisation, and allow a comparison of possible differences of opinion between them. The error bars on graphs are 95% confidence intervals, which represent the range of scores in which 95% of the sample fall. This gives an appreciation of the variability in responses.
Figure 3.3: Frequency of response to “Are you aware of night time and weekend restrictions for HGVs that are currently in place?”

Level of support for a potential ‘quiet HGV’ permissive certification scheme: Figure 3.4 shows overall support for a scheme whereby any score above four demonstrates a level of support. Support is strongest from industry associations and freight operators. A one-way Analysis of Variance (ANOVA) followed by post-hoc Tukey’s HSD tests revealed that the difference in mean scores for these two organisation types, and the mean score given by local authorities, is statistically significant. The local authority mean score is suggestive of uncertainty (‘4’ being ‘maybe’ on the scale), while industry associations and freight operators both support the schemes.

Figure 3.4: Average (mean) score of support for a ‘quiet HGV’ permissive certification scheme
(Scale: 1 = ‘Definitely not’; 7 = ‘Definitely yes’)

The need for such a scheme: Figure 3.5 shows the mean rating scores for the perceived need question. All the types of organisation showed slight agreement with the need for schemes. The differences observed were not statistically significant, although this may be due to the small sample size (see Section 3.3.1.6).
Figure 3.5: Mean score of the perceived need for a ‘quiet HGV’ permissive certification scheme
(Scale: 1 = ‘Definitely not’; 7 = ‘Definitely yes’)

The effectiveness of such a scheme: Mean scores of responses to whether or not a ‘quiet HGV’ scheme would be effective, as shown in Figure 3.6, suggest that respondents were generally unsure. The differences observed were not statistically significant, although this may be due to the small sample size (see Section 3.3.1.6).

Figure 3.6: Mean score of the potential effectiveness for a ‘quiet HGV’ permissive certification scheme
(Scale: 1 = ‘Definitely not’; 7 = ‘Definitely yes’)

The level of uptake for such a scheme: Figure 3.7 shows the mean ratings of the level of expected uptake for a ‘quiet HGV’ scheme. Results suggest that the perceptions of the organisations surveyed are that there would be a slightly lower than moderate uptake of the scheme. The differences observed between organisation types were not statistically significant, although this may be due to the small sample size (see Section 3.3.1.6).
3.3.1.3 **Pros and cons to the scheme**

Respondents rated their agreement with a series of positive statements from ‘Strongly disagree (1)’ to ‘Strongly agree (5)’ and the mean responses are summarised in Figure 3.8 for each group.

![Figure 3.8: Mean score of participant responses to positive statements if a ‘quiet HGV’ permissive certification scheme was to be introduced. Each statement begins with: “A classification scheme for ‘quiet HGVs’ would...” (Scale: 1 = ‘Strongly disagree’; 5 = ‘Strongly agree’)
It would appear from the descriptive results that in general, all respondents agreed that the implementation of the scheme would have a positive effect for the issue covered by each statement (i.e. all means were above 3, which was 'neither agree nor disagree'). None of the differences in ratings of agreement between different types of organisation were statistically significant with the exception that local authorities agree less than the other two organisation types with the statement “A classification scheme for quiet HGVs would allow night-time deliveries”.

Similarly, respondents rated their agreement with a series of negative statements from ‘Strongly disagree (1)’ to ‘Strongly agree (5)’ and the overall responses are summarised in Figure 3.9. Again, there is a general agreement with the statements by all respondents suggesting that these negative factors should be considered along with the positive factors shown above. None of the differences in ratings of agreement between different types of organisation were statistically significant, although this may be due to the small sample size (see Section 3.3.1.6).

![Figure 3.9: Mean score of participant responses to negative statements if a ‘quiet HGV’ permissive certification scheme was to be introduced. Each statement begins with: “A classification scheme for ‘quiet HGVs’ would...” (Scale: 1 = ‘Strongly disagree’; 5 = ‘Strongly agree’)](image)

3.3.1.4 Responses to additional questions posed to freight operators

In addition to the core questions, freight operators and industry associations questionnaires had additional questions. Here the questions specifically answered by freight operators are summarised.

Freight operators were asked if they were currently affected by night-time and/or weekend noise restrictions. Of the 23 responses (one questionnaire had missing data on this question), 11 said that they were currently affected with 12 stating that they were not currently affected. Of the 11 who said that they were affected, 10 also rated how much the restrictions cost their operation and how much of a disturbance they were. As can be seen in Figure 3.10, it is clear that for these operators, there is a cost and disturbance to their operation due to the restrictions.
Freight operators were also asked if they would buy ‘quiet’ vehicles and be willing to pay extra for a ‘quiet’ vehicle compared to purchasing a standard one. Results indicate that operators would ‘maybe’ purchase ‘quiet’ vehicles (mean=3.96, standard deviation=1.8; scale: 1 = ‘Definitely not’; 7 = ‘Definitely yes’), with those currently affected by restrictions rating slightly higher (mean=4.18, standard deviation=1.6), although this is not a statistically significant difference. Fifty-nine percent (N=13) of operators said that they were unwilling to pay extra for a ‘quiet’ vehicle compared to a standard one, although 64% (N=7) of those who were currently affected by restrictions said they would be willing to pay extra.

Fifty-eight percent (N=11) of operators said they would not be willing to retrofit existing vehicles, and 50% (N=4) of those currently affected said that they would consider it.

### 3.3.1.5 Responses to additional questions posed to industry associations

In addition to the core questions, industry associations were asked if they agreed or disagreed with evening and/or weekend noise restrictions for HGVs. Figure 3.11 shows that half of the associations who responded agreed with noise restrictions, with a further 20% neither agreeing nor disagreeing. The small number of responses must be considered when discussing the representativeness of these results.
3.3.1.6 Caveat regarding the lack of observed differences between ratings in many of the questions set

A caveat is necessary regarding the lack of observed differences between ratings in many of the questions set. Because the sample sizes are very low, it is highly likely that a lack of statistical power may be to blame for such differences not being statistically significant. In short, statistical power is required to be at an acceptable level before null-findings can be accepted as reflecting the genuine lack of differences of opinion rather than an insufficient sample size. Further survey work into the classification schemes for HGVs should aim to sample a much higher number of organisations.

Summary

Local authorities showed less awareness of restrictions than industry associations and freight operators. The majority of the latter two organisation types were aware of restrictions, while the majority of local authorities were not.

In general there is support for a ‘quiet HGV’ scheme from all organisations. However, local authorities indicated that the level of support for schemes for ‘quiet HGVs’ was significantly lower than that of industry associations and freight operators.

In terms of the perceived need, effectiveness, and expected level of uptake of such schemes, the three organisation types did not differ in their ratings. All organisation types, on average, thought there was a slight need for such a scheme, that they were unsure of its likely effectiveness, and that the level of uptake (rated from extremely low to extremely high) would be slightly lower than moderate.

All organisation types thought there would be pros and cons to classification schemes, with no differences between the types of organisation except that local authorities agreed less that such schemes would allow for night-time deliveries.

Freight companies thought that there is some cost and disturbance to their operations due to restrictions. Approximately 60% of operators stated that they would be unwilling to pay additional money for a ‘quiet’ vehicle compared to a standard one, or retrofit existing vehicles. Of those operators currently affected by restrictions, 64% said that they would be prepared to pay extra for ‘quiet’ vehicles and approximately half would consider retrofitting existing vehicles.

The majority of industry associations agreed, or neither agreed nor disagreed, with noise restrictions, although the sample for this type of organisation is very low.

Note. A caveat is necessary regarding the lack of observed differences between ratings in many of the questions set. This is a result of the sample sizes being very low. Further survey work into the classification schemes for HGVs should aim to sample a much higher number of organisations.

3.3.2 Qualitative feedback:

Table 3.2 – Table 3.6 compile the feedback from the meeting of the SAG, specifically in relation to the questions set out at the beginning of Section 3.3 which formed the main focus of the discussions.

In additions, the Tables include selected general comments taken from the questionnaire survey forms. These comments are not related to the specific questions asked in the survey, but are the personal views and opinions of individual respondents. Where there are no comments for an organisation type, none were received that were related to the topic in question.
### Table 3.2: Selected views and opinions on the need for (and perceived benefits from) a ‘quiet HGV’ permissive certification scheme

<table>
<thead>
<tr>
<th>Stakeholder Advisory Group</th>
<th>Industry associations (selected comments)</th>
<th>Freight operators (selected comments)</th>
<th>Local authorities (selected comments)</th>
</tr>
</thead>
</table>
| Industry representatives are supportive in principle of a scheme that would permit greater flexibility in deliveries. It is considered that this would offer the following benefits:  
  - Reduced peak congestion, with associated benefits including reduced emissions  
  - Cost savings for businesses through being able to fulfill deliveries with fewer vehicles if deliveries can be spread throughout a longer period of the day  
  - Noise reduction benefits beyond the areas covered by noise restrictions as ‘quiet HGVs’ penetrate the marketplace  
  - The potential to shift some deliveries back to HGVs, reducing the current trend towards the use of vans | The scheme would have benefits particularly on the fringes of certain cities and towns and could help improve the quality of residential areas that have and will continue to suffer as a result of HGV movements. [IND055]  
The scheme would have some real values for the CrossRail project where we are engaged to develop the logistics strategy. [IND007] | Although the scheme would not apply to our business, it could help in more urban areas. However modern trucks are relatively quiet, but it is often the physical presence of an HGV that generates the negative reaction from the public. [FRT007]  
Deliveries to major customers are predominantly to purpose-built distribution centres in non-residential areas. I am aware though that our customers, grocery retailers, do need to make deliveries to their retail outlets and greater flexibility around operating patterns would be of value to them. [FRT291]  
The possibility of further night-time deliveries is an interesting one and could open further opportunities for a number of hauliers, and possibly make their operation more efficient and profitable. [FRT172] | The council area includes Felixstowe Port which has extensive HGV movements. Many inland warehouses and areas of the docks are restricted in the times they may operate. Quiet HGVs would have a significant impact in this respect, assuming loading operations would not present a problem. Existing planning permissions would of course need to be varied in each case. [LA090]  
We agree with the principle of Quiet HGVs with the option of allowing exemptions from restrictions for operators. Any exceptions would need careful consideration on a case-by-case basis. We can certainly see the benefits for the city centre. [LA048] |
### Table 3.3: Selected views and opinions on the potential barriers to the introduction/successful implementation of a ‘quiet HGV’ permissive certification scheme

<table>
<thead>
<tr>
<th>Stakeholder Advisory Group</th>
<th>Industry would need to have better information on the likely market for Quiet HGVs.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Local authorities would need to work together to ensure common standards are adopted.</td>
</tr>
<tr>
<td></td>
<td>There are a number of different parts of Government with relevant responsibilities whose involvement would be needed e.g. changes to restrictions imposed as conditions through planning process involves DCLG as well as DfT.</td>
</tr>
<tr>
<td></td>
<td>Coordination is also needed at EU level, potentially including EU competition rules if foreign operators are disadvantaged.</td>
</tr>
<tr>
<td></td>
<td>A practicable and affordable test is needed so that monitoring can be achieved, overcoming the wide range of different circumstances in which noise can be created by vehicles in use and the highly subjective nature of individual perceptions of noise nuisance.</td>
</tr>
<tr>
<td></td>
<td>The extent to which noise is perceived to be a nuisance is very dependent on the nature of the locality, e.g. whether there is already a high background noise level from traffic, night time social activities, etc., leading to large differences between urban centres and suburbs etc.</td>
</tr>
<tr>
<td></td>
<td>Local authorities will always find it easier to say ‘no’ to anything involving night-time deliveries, so they will need to be persuaded that there are benefits in having a quiet noise scheme and that its enforcement is practicable and affordable (ideally not involving any extra burdens on the LA). If the standard is set and encouraged by national Government then it is more likely to be accepted.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Freight operators (selected comments)</th>
<th>The key will be to have really intelligent and knowledgeable people involved in setting up the regulations - the cost and difficulty in implementing the scheme will be directly determined by how much red tape is involved.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[FRT107]</td>
</tr>
</tbody>
</table>
Table 3.4: Selected views and opinions on the potential concerns arising from a ‘quiet HGV’ permissive certification scheme

| Stakeholder Advisory Group | Manufacturers would be unwilling to invest in new technology and designs unless they were sure there was a sufficient market. Similarly, operators would be unwilling to purchase such vehicles and adopt the associated operational standards unless the costs were justified by commercial benefits. The size of the potential market is presently unknown, which will discourage industry from taking a commercial risk. The scheme would not work if there are different standards in different locations, i.e. if different local authorities adopt different requirements. This would increase compliance costs as well as reducing the market for any individual compliant product. Ideally a standard would be pan-European, reflecting the international nature and location of manufacturers and haulage operations. Different standards might be developed independently in different countries unless action is taken to ensure that all development is coordinated. European competition rules might affect a scheme that only applied in the UK. The standard must be defined in terms of performance, i.e. requiring the industry to meet defined objectives in noise reduction rather than defining a particular technological solution. Monitoring may be an issue in terms of how it is carried out, the costs and who would pay. It was generally accepted that a ‘type approval’ approach would not work as there are also operational requirements that require ongoing monitoring. For public acceptance there needs to be a mechanism for making individual complaints about noise. |
| Freight operators (selected comments) | Any scheme must take into consideration that much noise can be generated also by the local actions of the driver and not just the specification of the vehicles and its equipment. How will the scheme assess these factors? Any scheme must take into consideration that much noise can be generated also by the local actions of the driver and not just the specification of the vehicles and its equipment. How will the scheme assess these factors? [FRT335. Note: Questionnaire was returned by a Freight Operator but must have been forwarded by an Industry Association] The issue is not necessarily a truck design issue, but one of the whole delivery system, tail-lifts, cages, fridges, empty trailer resonance. Residents will aim to restrict the loading/unloading whether quiet or not. If there is a move for quieter delivery systems it must be coupled with a general sign-up by local authorities/environmental health departments. It requires working with the industry instead of against it. [FRT126] We already adopt a number of features as standard across our fleet which is reflected in the very low level of complaints that we have to deal with. We are willing to invest in new technology if the solutions are good value for money but only if changes in the restrictions provide a window of opportunity that benefits all parties concerned. [FRT073] A quiet HGV is a good idea, but commercial considerations will determine its viability. The more expensive the vehicles, then the greater the transport costs. May be more effective to operate from an alternative site with no restrictions. [FRT095] It is not only the vehicles that make noise on delivery, particularly in urban areas. Also areas to target would be the premises being delivered to for noise generated by doors, pallet trucks, fork trucks, etc. [FRT003] |
### Table 3.4: Selected views and opinions on the potential concerns arising from a ‘quiet HGV’ permissive certification scheme (continued...)

| Local authorities (selected comments) | As an authority we have no existing scheme and we receive few complaints regarding nuisance caused by deliveries. Introducing so-called quiet HGVs could encourage more businesses to start making out-of-hours deliveries that could give rise to a problem. [LA123] HGV noise is only a part of the problem. Low-noise HGVs would still generate vibration and intrusion problems, encourage other non-low-noise vehicles to chance it and generate the need for a much more complex enforcement regime. [LA113] |

### Table 3.5: Selected views and opinions on the likelihood of success of a ‘quiet HGV’ permissive certification scheme

| Stakeholder Advisory Group | Although there are many barriers to overcome there are good reasons to think this is achievable. Developments in the industry, including experience from the PIEK programme, has shown that the proposed standard, "no more noise than a van" is achievable in principle. The Wandsworth ‘Silent Approach’ trial and similar schemes have shown that a practicable enforcement regime can be developed that will have public acceptability. Concerns about the increasing use of vans and associated contribution to traffic levels gives local authorities a strong incentive to participate in the scheme. The adoption of PIEK by a growing number of European countries suggests that an EU-wide consensus is possible. |

### Table 3.6: Selected miscellaneous views and opinions on a ‘quiet HGV’ permissive certification scheme

| Freight operators (selected comments) | There should be mention here of the use of electric vehicles. These currently achieve the stated aims, etc. [FRT238] We would like to be aware of the scope of any proposed scheme before making any further comments. Our operations involve the use of both articulated vehicles and smaller vehicles. We believe that in the case of vehicles affecting deliveries, consideration should be given to the overall noise nuisance caused. [FRT133] Continuing advances in technology lead to quieter and quieter vehicles. A current model of lorry is many, many times quieter and far less polluting than one built only 8 years ago (Euro 3), never mind than a Euro 1 or pre-Euro model. I would venture that there are plenty of current vehicles which are already quieter than a 6-year-old van. [FRT028] |
| Local authorities (selected comments) | Such a scheme would be useful in certain circumstances but the noise created by freight operations is not limited to emissions from vehicles. For quieter working to be achieved the full spectrum of related activities must be addressed. This should include working practises, driving style and the infrastructure provided for the loading and unloading of goods. These (often easily solved) issues can outweigh any benefits arising from improvements in vehicle standards. Sainsbury’s trial at its Wandsworth store as summarised in an FTA case study gives some useful examples. [LA040] |
Summary: Stakeholder Advisory Group

The need for/benefits of a ‘quiet HGV’ permissive certification scheme: Industry representatives on the SAG are supportive in principle of a scheme that would permit greater flexibility in deliveries. There was general agreement that this could lead to benefits including reduced peak congestion, cost savings for businesses, noise reduction benefits beyond the areas covered by noise restrictions, and the potential to shift some deliveries back to HGVs.

Potential barriers to such a scheme: Local authorities would need to be convinced of the benefits of such a scheme and encouraged to work together to ensure common practices. Careful design of the scheme would be required to make it widely suitable for different local conditions. Coordination will be required at EU level to avoid problems with European competition rules.

Potential concerns arising from such a scheme: Manufacturers and operators must be convinced of the market opportunities. The scheme must be designed so that it becomes a common standard, preferably pan-European. The scheme must specify noise reduction objectives rather than recommending specific technological solutions. Monitoring and public acceptance will also require consideration.

Likelihood of success: Although there are many barriers to overcome there are good reasons to think this is achievable and already sufficient incentives for such a scheme to be adopted. It was considered that developments in the industry show that a scheme could work in principle, especially considering schemes such as PIEK, which also suggests that EU-consensus is possible.

Summary: Stakeholder questionnaire survey

The need for/benefits of ‘quiet HGV’ permissive certification scheme: It was considered that the introduction of such a scheme could provide improved flexibility/opportunities for hauliers, and offer benefits on the fringes of towns/cities and in urban areas where HGV noise might be an issue.

Potential barriers to such a scheme: Local authorities would need to be convinced of the benefits of such a scheme

Potential concerns arising from such a scheme: Manufacturers and operators must be convinced of the market opportunities. Collaboration between all stakeholders is required.

Miscellaneous comments: The lack of detail in the questionnaire in describing a potential scheme, caused confusion for some respondents, resulting in a failure to understand that the proposed scheme would tackle vehicle noise and ancillary noise associated both with loading/unloading and the journey from A to B. Some respondents highlighted the potential benefits of using existing technology and stressed the need to consider all noise impacts associated with night-time goods transport and delivery.

3.4 Consultation and feedback on the potential for developing low-noise vehicle technologies

In addition to the stakeholder consultations focussed on the needs, application and potential success of a ‘quiet HGV’ permissive certification scheme, an essential part of the current study was to determine the current state-of-play with regards to the vehicle industry (the one aspect of night-time delivery noise that has been least addressed to date). The views of those parties involved with the design and manufacture of the low-noise vehicles are integral to the success of any future scheme and also assist in the
design of the necessary test procedures and the selection of target noise limits to be achieved by low-noise vehicles.

Whilst development of lower-noise vehicles will be an ongoing part of the vehicle development process, in the absence of other legislation, or indeed a significant market, the focus is solely on meeting the noise requirements of vehicle type approval.

Discussions have been held with selected vehicle manufacturers. This is based on 2006/07 information held by SMMT for vehicles operating in London. These manufacturers have been established as producing the best selling makes of delivery-type vehicles that would be affected by any future ‘quiet HGV’ permissive certification scheme. Without suitable low-noise technology vehicles, any potential scheme would be restricted to relaxation of restrictions based solely on the availability of low-noise ancillaries.

The discussions focussed on the following questions:

- What technologies are available or could be developed for reducing vehicle noise?
- What would be the timescale for the introduction/implementation of these technologies onto the market? This will define when any potential ‘quiet HGV’ permissive certification scheme addressing all vehicle noise aspects could be fully implemented.
- What are the potential concerns of the vehicle manufacturers regarding the development and/or implementation of these technologies?
- What are the issues that need to be overcome for the successful introduction of low-noise technology vehicles into the market?

### 3.4.1 Results of discussions with Manufacturer 1

A meeting was held with Manufacturer 1 in March 2009. The following is a summary of the main points of the discussion.

The general consensus was that a Europe-wide certification programme for ‘quiet HGVs’ is a good idea, but it is one that needs to be driven by customer need. The manufacturer has existing technologies available that could be implemented on vehicles within 1-3 years, although these are not sufficient to achieve the target aim of an HGV that “makes no more noise than a van”. However, it was commented that in the present (mid-2009) economic climate, vehicle manufacturers are selling fewer vehicles than compared to previous years.

In order to determine what is required to develop a ‘quiet HGV’, it is necessary to define the current position in respect of new vehicles currently on the UK network (bearing in mind that trucks used within mainland Europe may possibly be noisier due to their specification and configuration). Although the vehicle manufacturers have noise level data relating to type approval, noise levels for any test as part of a ‘quiet HGV’ permissive certification scheme will be different (assuming, in accordance with Ainge et al. (2007), that the type approval measurement method is unsuitable). Furthermore, the vehicle manufacturers will need to be informed of the corresponding noise levels for small (3.5t) delivery vans, the long-term target for the scheme proposed in this report.

Any vehicle noise test proposed as part of the current study, or any follow-on phases, would have to be approved by vehicle manufacturers to confirm that it is practical and appropriate to the technological measures envisaged. Vehicle manufacturers would then incorporate the test into their development and design processes along with the type-approval test. All new low-noise HGVs would then be supplied having passed and complied with the requirements of the certification scheme.

In relation to the specific questions listed previously, the comments from Manufacturer 1 are presented in Table 3.7.
Table 3.7: Stakeholder views on the development of low-noise goods vehicles: Manufacturer 1

<table>
<thead>
<tr>
<th>What technologies are available or can be developed for reducing noise?</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Engine management systems (Technology under development/Technology available but may not be low-noise)</td>
</tr>
<tr>
<td>• Enclosure of the engine (Technology under development)</td>
</tr>
<tr>
<td>• Electronically controlled disc brakes (Technology available but may not be low-noise)</td>
</tr>
<tr>
<td>• Electronically controlled gear box (Technology available but may not be low-noise)</td>
</tr>
<tr>
<td>• Quiet exhaust systems (Technology available)</td>
</tr>
<tr>
<td>• Air brake silencers (Technology under development/available)</td>
</tr>
<tr>
<td>Note. A tractor unit fitted with these systems has already been used within the PIEK programme to demonstrate that it is feasible to achieve the upper PIEK limit of 65 dB(A).</td>
</tr>
<tr>
<td>• Hybrid drive systems (Technology under development)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Timescale for implementation of new technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Within 1-3 years using already developed technologies, depending upon the legislative drivers that are in place</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Manufacturer concerns?</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The downturn in the market due to the current economic crisis is a significant concern. Manufacturers are already selling significantly fewer vehicles than normal.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Issues to be overcome?</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Development outside of the manufacturer’s existing programmes and the introduction of ‘quiet HGVs’ onto the market will be customer driven. Legislative drivers will therefore require to be in place at an early stage.</td>
</tr>
</tbody>
</table>

3.4.2 Results of discussions with Manufacturers 2a & 2b

Meetings were held with Manufacturer 2a and Manufacturer 2b in March 2009. The following is a summary of the main points of the discussion.

As with Manufacturer 1, Manufacturers 2a & 2b are positive about any potential ‘quiet HGV’ permissive certification scheme, again stressing the need for a Europe-wide approach; different standards for different countries are problematic for vehicle manufacturers.

The issue of determining the necessary certification scheme noise levels for both the current position in respect of new HGVs and small (3.5t) delivery vans currently on the UK (and European) network was highlighted.

The specifics of any noise test, e.g. details of speeds, gear changes, etc. define the operational parameters that vehicle manufacturers work and design to. As above, it is recognised that such tests would be carried out in addition to current type approval procedures. It was noted that any ‘quiet HGV’ permissive certification scheme would be voluntary and not mandatory.

Manufacturers 2a & 2b are already committed to the concept of a ‘quiet HGV’ permissive certification scheme in that they have already sought approval to develop a ‘quiet HGV’ over and above what is already on going within their vehicle development programme. They are presently waiting for confirmation of approval (if it is given, development would start in July 2009 for a period of 3 years). It was considered that the only way development of a ‘quiet HGV’ will be driven quicker is if one of their competitors is likely to achieve the goal within a similar time or quicker.
It was stressed that any test that might be developed by TRL or others must be compatible with Euro 6 class vehicles.

For any ‘quiet HGV’ developed using their existing technologies, Volvo are currently looking at noise reductions of 5 dB(A) relative to their current vehicles. It is recognised that this reduction is sufficient to meet the initial target of an HGV that “may not make any more noise than a 3.5t van”.

In relation to the specific questions listed previously, the comments from Manufacturer 2a & 2b are presented in Table 3.8.

### Table 3.8: Stakeholder views on the development of low-noise goods vehicles: Manufacturers 2a & 2b

<table>
<thead>
<tr>
<th>What technologies are available or can be developed for reducing noise?</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Engine management systems (Technology under development/Technology available but may not be low-noise)</td>
</tr>
<tr>
<td>• Engine encapsulation (Technology under development)</td>
</tr>
<tr>
<td>• Automatic gearboxes (Technology available but may not be low-noise)</td>
</tr>
<tr>
<td>• Common rail diesel injection (Technology available but may not be low-noise)</td>
</tr>
<tr>
<td>• Improved exhaust systems (Technology available but may not be low-noise)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Timescale for implementation of new technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Within 1-5 years, depending upon the legislative drivers that are in place.</td>
</tr>
<tr>
<td>• It is considered that the initial focus should be on the development/introduction of quiet distribution vehicles (e.g. 40 tonnes)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Manufacturer concerns?</th>
</tr>
</thead>
<tbody>
<tr>
<td>• There are concerns over potential revenue because the costs associated with development and manufacture are high and significant sales and/or higher vehicle purchase costs may be required to recoup these costs.</td>
</tr>
<tr>
<td>• The legislation and introduced technologies are unlikely to be applied to all goods vehicles, so there may be a narrow specification.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Issues to be overcome?</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The introduction of low-noise vehicles must be seen to be commercially viable.</td>
</tr>
<tr>
<td>• Legislative drivers are required to be in place in order for approval to spend R&amp;D budgets. The technologies should also be capable of being demonstrated before full development is undertaken due to the level of internal costs required.</td>
</tr>
<tr>
<td>• Exhaust emission legislation is seen as unhelpful – it will be necessary to strike a balance between noise and emissions.</td>
</tr>
<tr>
<td>• It is recognised that if Manufacturers 2a &amp; 2b’s competitors pursue development of low-noise vehicles and technologies, Manufacturers 2a &amp; 2b will be required to undertake similar development to remain competitive within the market.</td>
</tr>
</tbody>
</table>

**Summary**

A range of technologies are available for reducing the noise impact of HGVs, including engine encapsulation, engine management systems and improved exhaust systems.

Appropriate ‘quiet HGV’ permissive certification scheme reference noise levels for current HGVs on the UK network and target levels based on current generation small (3.5t) vans will be required by the manufacturers to give them a focus for development.
The timetable for the introduction of vehicles with lower noise generation than current models is of the order of 1-5 years. Volvo consider the noise reductions with this technology to be of the order of 5 dB(A) below current levels.

Legislative drivers, a proven market and a stable economic climate will generally be necessary to stimulate or accelerate development beyond current levels. However, Volvo are already hoping to begin a ‘quiet HGV’ development programme.

### 3.5 Consultation with Senternovem (developers of PIEK)

As already noted elsewhere in this report, a significant step towards the implementation of a ‘quiet HGV’ permissive certification scheme addressing all aspects of the night-time freight transport and delivery has been achieved through the work of the Dutch PIEK programme (see Section 2.2.7). This is an increasingly supported scheme within Europe, and many current examples of best practice make reference to the scheme, including those in the UK. As such, it was considered essential to the current study that the developers of the PIEK should be consulted. The following paragraphs report on the outcome of discussions with Senternovem, the developers of the PIEK programme.

As noted in Section 2.2.7, PIEK has defined noise limits of 65 dB(A) $L_{A\text{max}}$ between 19:00 and 23:00 and 60 dB(A) $L_{A\text{max}}$ between 23:00 and 07:00, at the façade. These were derived based on noise limits at facades in Dutch legislation. Whilst the focus on PIEK has largely been on ancillary technologies, the 65 dB(A) limit is also defined as the acceptable noise limit for a low-noise vehicle. This is too low a level to be achieved with current vehicle technologies. It is noted that measurements performed by TRL using an electric 3.5t delivery vehicle (for a pull-away-from-rest test) resulted in a noise level of only 70 dB(A).

Measurements are taken at a reference distance of 7.5 m and a height of 1.2 m regardless of the technology being evaluated, i.e. vehicles and ancillary technologies are all tested using the same microphone position. This position was selected to ensure that no façade is subject to higher levels, since facades will generally be further away than 7.5 m.

As demonstrated in Section 2.4, a wide range of commercially available ancillary technologies have already been certified to the PIEK standard. The Noise Abatement Society has already awarded a UK (NAS-PIEK) certificate to several products in use in the UK. It is therefore preferable that any future ‘quiet HGV’ permissive certification scheme adopts the PIEK standard and test procedure for all ancillary technologies.

Since current vehicles cannot meet the 65 dB(A) PIEK limit, no HGVs or other goods delivery vehicles are currently certified to the PIEK standard.

It is perceived by the developers of PIEK that a key missing tool is a common standard suitable for use both in the UK and Europe. This common standard is considered to comprise

- A common method of measurement and pan-European noise level limit values for low-noise HGVs and goods vehicles in the short-medium term. In the long-term the limit value should be the 65 dB(A) recommended by PIEK (although this may be dependant upon the size of the vehicle)
- Formal pan-European adoption and acceptance of PIEK procedures and noise limits for ancillary technologies.

Where PIEK has investigated noise levels from goods vehicles, this was predominantly associated with manoeuvring in delivery yards and not with the ‘A to B’ journey,

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2 The PIEK Guidance on measurement (Dittrich et al., 2008) includes measurement methods to assess four different types of vehicle noise: constant speed pass-by noise, acceleration noise, braking noise and reversing noise. Further details are included in Chapter 4.
although it will cover some aspects of road noise reduction when on the road. It is therefore preferable that any test developed/proposed by TRL should be representative of both the 'A to B' journey AND low-speed manoeuvring.

It is accepted that if the proposed TRL test is different to that in PIEK, then the TRL test could formally replace the current PIEK tests as it will address all modes of operation.

It is noted that the measurements will all be based on $L_{A\text{max}}$ noise levels (since these are best representative of disturbance from single events). As part of any further work, it will be necessary to clarify the relationship between $L_{A\text{max}}$ values and the $L_{\text{den}}/L_{\text{night}}$ noise levels required for noise mapping and action plans under the European Directive on the Assessment and Management of Environmental Noise (European Commission, 2002).

**Summary**

The PIEK test method and noise limits for ancillary technologies should be retained in any TRL proposal for a 'quiet HGV' permissive certification scheme.

The PIEK test for low-noise vehicles focussed predominantly on low-speed manoeuvring in delivery yards. The test for low-noise HGVs to be proposed by TRL must address both the 'A-B' journey and low-speed manoeuvring. It would be acceptable for this test to potentially replace the one defined in PIEK.

There is a need for a pan-European standard for low-noise vehicles and ancillaries which would see formal adoption of the PIEK (and TRL) limit values and test methods.
4  Provisional recommendations for a future ‘quiet HGV’ permissive certification scheme

This Chapter describes provisional recommendations for a ‘quiet HGV’ permissive certification scheme that would address the noise levels of important operations at all stages of the night-time delivery process, i.e. noise during the ‘A to B’ journey and noise associated with loading/unloading operations at the point of origin and final destination.

4.1  Scheme overview

It is considered that a full ‘quiet HGV’ permissive certification scheme should comprise two parts as shown in Figure 4.1:

- **PART I: Night-time delivery noise certification procedures:** This part provides the procedures that local authorities would require freight operators to comply with, either partially or fully, depending on circumstances and the level of relaxation of any existing night-time freight movement restrictions.

  The procedures comprise a number of test methods that can be conducted in order to assess the noise levels of important operations at all stages of the night-time delivery process, i.e. noise during the ‘A to B’ journey and noise associated with loading/unloading operations at the point of origin and final destination. Limit values will be assigned which will define when equipment/technologies are considered to be sufficiently quiet for use under relaxed night-time operating restrictions.
PART II: Night-time noise impact reduction options: This part deals with specifying potential level of relaxation of restrictions, compliance criteria and how compliance with relaxed night-time restrictions might be addressed, assessed and monitored.

This part is considered only at a low level in the current document, since wider, in-depth consultation with stakeholders would be required for its development. This falls outside the scope of this phase of the project. As, such the information presented can be considered as a series of broad guides and options, where the level and degree of implementation would be dependent on the requirements of individual local authorities and the specific conditions under which a relaxation of night-time restrictions would be applied.

4.2 Part I: Night-time delivery noise certification procedures

This section addresses the identification and recommendation of test procedures for assessing the noise from the HGV itself, noise from ancillary technologies and additional requirements which do not involve physical testing.

Noise measurements for the purpose of certifying low-noise night-time operation have been considered as part of both the PIEK programme (Dittrich et al., 2008) and research addressing night-time delivery noise in London (Ainge et al., 2007). These two pieces of research form the basis from which suitable test processes will be derived and recommended. Further issues which would require consideration prior to any implementation of Part 1 are also discussed.

4.2.1 Noise from vehicle-based sources

It is important that any recommended procedures assess the noise levels generated by the vehicle itself at all stages of the night-time delivery process, i.e. noise during the ‘A to B’ journey and noise associated with loading/unloading operations at the point of origin and final destination.

The following sections consider the certification of the different parts of the vehicle.

4.2.1.1 Noise from the goods vehicle

Previous studies for the evaluation of engine noise

Appropriate methods for assessing the noise generated by the vehicle itself during its various modes of operation are not clear cut. The previous research which is being used as the basis for the current study has assessed a wide variety of methods, which can be summarised as follows:

- Methods evaluated and recommended for use within PIEK: Research within PIEK focussed primarily on vehicle noise associated with manoeuvring in delivery yards and not with the ‘A to B’ journey. The following test methods are recommended for use by Dittrich et al. (2008). It is noted that laden vehicles with a load of 50 kg/kW are measured; the load on vans is up to their empty weight plus 50% of the load weight. In the case of the acceleration tests, the maximum level generated from the two tests is used for the certification. It is also noted that braking noise tests are prescribed in PIEK. These are considered later in this Section.
  
  o Acceleration test I: Pull away from rest in 1st gear up to a speed of 20 km/h over a course of 10 m (no other gear changes).
  o Acceleration test II: Pull away from rest through the gears over a course of 20 m. The method includes specifications as to when each change in gear should be made (corresponding to maximum engine RPM)
Steady-speed pass-by test: Assessed at 20 km/h over a 20 m course.

- Reversing test: Assessed over a 20 m course

- Methods evaluated by TRL: The work by Ainge et al. (2007) was focussed on vehicle noise associated with the journey from ‘A to B’ and not with vehicle noise during manoeuvring/loading/unloading. The following tests were evaluated as part of the study:
  - Acceleration test I: Full throttle acceleration test between two points as prescribed in Regulation 51 type approval procedures
  - Acceleration test II: Pull away from rest through the gears in sequence, keeping the RPM in the ‘green’ (economy) band
  - Acceleration test III: Pull away from rest through the gears, with the driver selecting the appropriate gears for the vehicle, keeping the RPM in the ‘green’ (economy) band
  - Acceleration tests IV: Pull away from rest through the gears, with the driver selecting the appropriate gears for the vehicle, using the full RPM range. This is similar to the PIEK acceleration test II, except the choice of gears will be based on the vehicle type and the driver's expertise and the point at which gear changes occur may not correspond to the maximum engine RPM. This was found to generate the highest noise levels of the five acceleration tests considered
  - Acceleration test V: Pull away from rest in 1st gear up to a speed of 20 km/h (no other gear changes). This is equivalent to the PIEK acceleration test I, although the course distances may be different

Steady-speed pass-by test: Conducted at a range of speeds from 40-80 km/h

Stationary test: Rapid acceleration to governor run-out

The final recommendations were that the stationary test and one of the acceleration tests, either II, III, IV or V, should be adopted. Further investigations were recommended to make a final choice of acceleration tests.

Recommendations for procedures to evaluate engine noise

The fundamental objectives which a viable ‘in-service’ test procedure should satisfy can be summarised as follows:

- The test should offer a high degree of repeatability. This generally means the test should be as simple to carry out as possible. Overly complex tests tend to produce difficulties in achieving repeatable results. They also tend to be more expensive to carry out

- The test should provide reproducible results. This means the test when carried out on the same vehicle at different locations with different equipment and personnel should give acceptably similar results. Clearly, this objective also points to a relatively simple test but also involves other issues such as the standardisation of the test site. This, of course, has implications for in-service testing and vehicle certification applications where fully standardised test site conditions may be difficult to achieve

- The test should be representative of real road conditions. This objective refers to the need to ensure that the results obtained relate closely to the noise generated by vehicles when operating in-service. A close correlation with in-service noise will help to ensure that reducing limit values under the test will have a corresponding benefit in terms of reducing noise impact from traffic. It is
potentially the most difficult of the primary objectives and to some extent achieving a representative test will tend to increase difficulties regarding repeatability and reproducibility. The key to achieving this objective is to ensure that the mode of operation of the vehicle is sufficiently representative of on-road conditions and that the measurement positions and analysis procedures employed provide a reasonable assessment of the total noise that is generated during the test.

A further general point that needs to be considered follows from the need to ensure that the test focuses on a mode of operation that relates as closely as possible to the noise impact caused during normal operation on the network. Previous work on this topic has confirmed the importance of focussing on particularly loud events especially when these events occur relatively frequently (Watts et al., 2005). This would suggest that when choosing, for example, a rate of acceleration or an engine speed, for a test a rate or speed higher than the most frequent should be considered.

Ideally any candidate test procedure should also:

- Provide a clearly defined noise level for the whole vehicle that can be used to discriminate between noisy and quiet vehicles in a given category
- Help identify noisy components on a vehicle
- Provide data that can help to establish appropriate levels/limits which could be applied to applications

The advantages and disadvantages of the different methods are summarised in Table 4.1.

<table>
<thead>
<tr>
<th>Test description</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pull away from rest</td>
<td>• Measures noise under load</td>
<td>• Only captures the noise from 1st gear</td>
</tr>
<tr>
<td></td>
<td>• Repeatable</td>
<td>• Doesn’t capture the noise of gear changes</td>
</tr>
<tr>
<td></td>
<td>• Highlights differences between vehicles</td>
<td></td>
</tr>
<tr>
<td>Pull away through the gears</td>
<td>• Measures noise under load</td>
<td>• Not the loudest operation of the vehicle</td>
</tr>
<tr>
<td></td>
<td>• Reasonable repeatability</td>
<td>• Not necessarily how the vehicle will usually be operated</td>
</tr>
<tr>
<td></td>
<td>• Measures noise from gear changes</td>
<td></td>
</tr>
<tr>
<td>Pull away under normal operating conditions</td>
<td>• Measures noise under load</td>
<td>• Not very repeatable</td>
</tr>
<tr>
<td></td>
<td>• Reflects normal operation of vehicle</td>
<td>• High level of driver responsibility</td>
</tr>
<tr>
<td></td>
<td>• Loudest condition observed under load (Ainge et al., 2007)</td>
<td></td>
</tr>
<tr>
<td>Stationary test</td>
<td>• Provides an upper limit on noise levels</td>
<td>• Doesn’t measure noise under load</td>
</tr>
<tr>
<td></td>
<td>• Very repeatable</td>
<td>• Doesn’t measure the noise of gear changes</td>
</tr>
<tr>
<td></td>
<td>• Captures the largest rev. range</td>
<td>• Not necessarily representative of normal operation</td>
</tr>
<tr>
<td>Pass-by test</td>
<td>• Best representation of vehicle in transit</td>
<td>• Not the loudest condition</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Requires large test area</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Potential repeatability issues with different surfaces</td>
</tr>
</tbody>
</table>
It must be noted that the test data from the previous studies was collected from a limited number of vehicles. As such, the following recommendations for the tests that should be included in a potential ‘quiet HGV’ permissive certification scheme will require confirmation with a larger scale test programme (see Section 5.5).

**Stationary testing:** It is recommended that a stationary test should be included in the proposed scheme, since this test is relatively quick and simple to carry out and produces a high degree of repeatability and reproducibility.

**Acceleration testing:** Based upon the available test data and discussions with vehicle manufacturers, it is recommended that an acceleration test based on pulling away from rest *through the gears* should be included in the proposed scheme, i.e. PIEK test II or TRL test IV.

The recommendation for such an acceleration test is made on the basis that pulling away through the gears under normal conditions generates slightly higher noise levels than pulling away in a single gear because there is noise associated with the actual gear changes themselves.

The effects of gear changes have also been shown to be important when conducting drive cycle testing. To illustrate this, Figure 4.2 presents the sound power level (black line), vehicle speed (red line) and engine speed (blue line) as a function of time for a city-centre drive cycle performed by an 18t truck on a laboratory dynamometer (Peeters, 2006). Whilst noise measurements in the acceleration test will be a measurement of sound pressure level rather than sound power level, the measured levels as a function of time will follow the black curve (albeit at a lower level). The zone of interest in relation to the current study is highlighted in the Figure.

Independent drive cycle tests made by Volvo have shown maximum values comparable to those measured during the TRL noise tests.

In addition, while noise levels will be higher than would be measured during a steady speed pass-by test, the relationship between noise level and engine speed is comparable for both the acceleration test and the steady speed test. This negates any requirement to undertake a steady-speed pass-by test (which if required would restrict the number and suitability of potential test locations).

As already noted, while the PIEK and TRL tests are similar, the PIEK test is specific as to precisely when the gear changes must occur, while the TRL test requires the driver to determine when to change gear. As such, it is considered that the TRL test provides test conditions that are most representative of normal driving conditions, but may not be as repeatable or reproducible as the PIEK test.

However, at the current time, there is insufficient data to make a definitive recommendation as to which of the two tests should be adopted. This is discussed further in Section 5.5.

It is noted that one issue which has not been addressed within the study is the effect of load on the noise levels measured during the acceleration test i.e. whether a vehicle should be tested empty, partially laden, fully laden or under all three conditions. When a vehicle is fully laden, the load exerted on the engine during the pull-away-from rest test will be far greater than when the vehicle is empty. PIEK testing was undertaken with the vehicle load based on 50 kg/kW of engine power. The measurements undertaken by Ainge et al. (2007) using an unladen vehicle. It is recommended that this be further investigated in any future development of the scheme.
4.2.1.2 **Recommendation for procedures to evaluate brake noise**

A procedure for assessing noise from air brakes has already been proposed within the PIEK programme (Dittrich *et al.*, 2008). It is considered that this should be adopted as part of the current proposal.

4.2.1.3 **Recommendation for procedures to evaluate tyre noise**

The dynamic tests recommended in previous studies will be dominated by engine/propulsion noise. It is acknowledged that the majority of people who will be affected by night-time freight noise will be in areas where HGVs are restricted to speeds of 40 mph or less, so the contributions from tyre/road noise will be relatively low.

However, following the recent European Parliament’s industry committee vote for a comprehensive labelling system for tyres, from 2012 vehicle operators will be able to
purchase tyres which display ratings for noise, energy efficiency (rolling resistance) and safety (wet grip). ‘Low-noise truck tyres’ will be those which have a noise emission level below 70 dB(A). It is recommended that a visual inspection, to determine whether a vehicle is fitted with low-noise tyres, should be included within the proposed certification procedures, for implementation from 2012. However, any specification for their use as part of a relaxation of night-time delivery restrictions will be the responsibility of those local authorities defining the compliance requirements for such relaxation.

It is not proposed that any measurements of tyre/road noise should be included as part of the certification procedures.

### Recommendations for the certification of quiet vehicles

The following tests are recommended for inclusion in a ‘quiet HGV’ permissive certification scheme:

**Engine noise:**

A stationary test based on rapid acceleration to governor run-out, as tested by Ainge et al. (2007).

An acceleration test based on pulling away from rest through the gears. At the present time there is insufficient data to distinguish whether the PIEK test (Dittrich et al., 2008) or the TRL test, where the driver selects the appropriate gears for the vehicle using the full RPM range (Ainge et al., 2007), is the most suitable.

**Air brake noise:** The test method and measurement position proposed in the PIEK scheme (Dittrich et al., 2008).

**Low-noise tyres:** A visual inspection for low-noise tyres (valid from 2012, when mandatory labelling of tyres will be required by the EC).

**Note 1:** At the present time, it is recognised that the noise limit values for vehicles recommended in the PIEK scheme cannot be met using existing technology vehicles. Appropriate limit values will require to be determined as part of further research.

**Note 2:** It is recommended that the effects of load on the certification procedure noise levels also need to be investigated as part of further research.

### 4.2.2 Noise from ancillary equipment and technologies

The PIEK programme investigated the noise from a wide range of ancillary equipment and its application, defining measurement procedures for all systems whereby noise levels are measured at a common reference distance of 7.5 m and height of 1.2 m (Dittrich et al., 2008). The ancillaries considered within PIEK and relevant to a ‘quiet HGV’ permissive certification scheme can be grouped as follows:

- Doors, hatches, hinged and roller doors of trailers, bodies and vehicle cabs
- Tail-lifts, tailboards, body floors and walls of trucks and vans (this also includes rolling noise on tailboards and floors, collision noise from impacts with walls and floors, and load stowage)
- Goods carts, roll cages and hand pallet trucks (including both rolling noise and collision noise)
- Fork lift trucks and mobile fork lift trucks
- Refrigeration units

As reported elsewhere in this document, a wide range of commercially available ancillary technologies have already been certified to the PIEK standard. In the UK, the Noise
Abatement Society has already awarded a UK equivalent (NAS-PIEK) certificate to several products. Any deviation from the PIEK assessment of ancillary technologies may be therefore prove difficult to implement in these light of existing, acknowledged procedures.

**Recommendations for the certification of ancillary equipment**

It is considered that the test methods, measurement positions and limit values proposed in the PIEK scheme (Dittrich et al., 2008) should be adopted for inclusion in a ‘quiet HGV’ permissive certification scheme.

### 4.2.3 Additional requirements

In addition to the physical test procedures discussed in previous sections, it is considered that there are a number of other requirements that should be incorporated in any ‘quiet HGV’ certification scheme. These can be summarised as follows:

**Vehicle service records:** Any vehicle undergoing the certification procedure should have a current service history which must be produced at the time of certification.

**Driver training:** Fleet operators should be required to demonstrate that drivers have undergone appropriate training. Such training should ideally address two elements:

- *Driving best practice:* This would address how to minimise excessive noise levels through improved vehicle operation and would provide other non-acoustic benefits such as reduced fuel usage, reduced emissions, etc.
- *How to avoid excessive noise when loading and unloading.* This could include training on how to assess which activities generate which noise levels, examples of best practice, and guidance on general operator behaviour, e.g. opening/closing doors, the use of in-vehicle radios and communications equipment, minimising verbal communication during actual loading/unloading processes.

Within the PIEK programme, a specific project was set up to inform drivers, planners and managers of the practical implications of the scheme and included the preparation of a CD-ROM educational package. The need for driver training was also highlighted by Ainge et al. (2007). Examples of driver training schemes already in use in England include the DfT SAFED (Safe and Fuel-Efficient Driving) initiative and the scheme operated as part of FORS (see Section 2.2.8).

**Body rattle:** Vehicles must comply with ‘best practice guidance on body noise’, for example, that guidance published by DfT (Department for Transport, 2005).

**Recommendations for additional requirements in a ‘quiet HGV’ permissive certification scheme:**

- Vehicles should have a current service history
- Evidence must be provided of appropriate driver training
- Vehicles must comply with best practice on body noise

### 4.2.4 Summary of a proposals for night-time delivery noise certification procedures

Based on the information presented in the previous sections, Table 4.2 summaries the proposals, which address all potential noise sources associated with night-time freight
movement at all stages of the delivery process, i.e. loading at the point of origin, the journey between the point of origin and the final destination, and unloading at the final destination.

It is noted that ancillary equipment and ancillaries have been separated into two categories, ‘primary’ and ‘secondary’ based on their importance to the overall night-time noise impact scenario.

### Table 4.2: Summary of recommended night-time delivery noise certification procedures

<table>
<thead>
<tr>
<th>Vehicle evaluation procedure</th>
<th>Stationary test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>o Free acceleration to governor run-out (GRO)</td>
</tr>
<tr>
<td></td>
<td>o Identical to a Regulation 51 stationary vehicle test</td>
</tr>
<tr>
<td></td>
<td>Pull Away From Rest test</td>
</tr>
<tr>
<td></td>
<td>o Pull away from rest through gears 1-4, driving vehicle as if under normal operation</td>
</tr>
<tr>
<td></td>
<td>Airbrake test (in accordance with PIEK)</td>
</tr>
<tr>
<td></td>
<td>Low-noise tyres (visual inspection - only performed if fitted to vehicle)</td>
</tr>
</tbody>
</table>

| Ancillary I (primary) evaluation procedure | Trailer/body (in accordance with PIEK) |
|                                          | o Includes walls, floors and stowage |
|                                          | Tail-lift (in accordance with PIEK) |
|                                          | Refrigeration units (in accordance with PIEK) |
|                                          | Rollcages and containers (in accordance with PIEK) |
|                                          | o Assess both rolling noise and collision noise |

| Ancillary II (secondary) evaluation procedure | Fork lifts and pallet trucks (in accordance with PIEK) |
|                                               | o Free acceleration to governor run-out (GRO) |
|                                               | o Identical to a Regulation 51 stationary vehicle test |
|                                               | Quiet closing doors (in accordance with PIEK - only performed if fitted to vehicle) |
|                                               | Auto-turn-off radios (in accordance with PIEK - only performed if fitted to vehicle) |

| Additional requirements | Vehicle must comply with ‘best practice’ on body noise (see ‘Control of body noise from commercial vehicles’; Department for Transport, 2005) |
|                        | Fleet operator must provide evidence that drivers have undergone appropriate driver training |
|                        | Vehicle must have a current service history |
|                        | Operators must comply with best practice outlined in ‘quiet HGV’ permissive certification scheme best practice guidelines |

### 4.2.5 Practical issues and options to be considered prior to any introduction of night-time delivery noise certification

The previous sections address the test methods that could be used in the certification of quiet vehicles. However, it is not sufficient to consider only the practicalities of the tests. Table 4.3 summarises all of the key issues which require to be addressed for a successful implementation of this part of the proposed ‘quiet HGV’ permissive certification scheme.
Table 4.3: Issues and options to be considered for Part 1 of a ‘quiet HGV’ permissive certification scheme

<table>
<thead>
<tr>
<th>Part 1: Night-time delivery noise certification options</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Night-time delivery noise certification procedures</strong></td>
</tr>
<tr>
<td>• Vehicle noise <em>(Limit values to be defined)</em></td>
</tr>
<tr>
<td>• Ancillary I (primary) <em>(PIEK limits to be used)</em></td>
</tr>
<tr>
<td>• Ancillary II (secondary) <em>(PIEK limits to be used)</em></td>
</tr>
<tr>
<td>• Additional requirements</td>
</tr>
</tbody>
</table>

4.2.5.1 Limit values for certification

**Limit values for vehicles:** One of the key issues which will require further investigation is the noise levels that will be used to define what qualifies as a ‘quiet’ HGV. It must also be determined whether a single set of limit values is applicable for all vehicle categories, or whether limits will be defined for individual vehicle types/categories.

It is envisaged that there would be a phased introduction of limit values for vehicles. Figure 4.3 presents a hypothetical timeline for how these limit values might be introduced. Precise timescales will depend on vehicle manufacturer investment, market demand, etc.

- **1st interim limit value:** As noted already, manufacturers predict that existing, already developed technologies will allow the next generation of vehicles to be 5 dB(A) quieter than the newest vehicles currently on the market. It is considered that this would probably result in HGVs that “generate no more noise in any of operational modes (i.e. both normal driving and low-speed manoeuvring) than a typical, current 3.5t delivery van”. Depending on legislative drivers and appropriate market demand, these HGVs could be commercially available within the next 1-5 years.

  It is therefore recommended that the first interim limit value be based on that 5 dB(A) reduction.

- **2nd interim limit value:** The next target limit value might be based on HGVs which generate, for example, 10 dB(A) less noise than current HGVs. This target is proposed, based on previous studies of noise levels achieved by DAF in 2001 on their PIEK demonstration vehicle. In addition, studies by TRL have demonstrated this reduction to be similar to that achieved using a 3.5t **electric** van.

- **Final limit value:** The final, longer-term objective would be for limit values of 60 or 65 dB(A) as already specified within the PIEK scheme. As noted in Table 3.7, a prototype modified tractor unit has already demonstrated the feasibility of meeting the 65 dB(A) PIEK limit. This vehicle has been taken no further than a prototype at the current time.

**Limit values for ancillaries:** For ancillaries, it is recommended that the current PIEK limits, i.e. 65 dB(A) between 19:00 and 23:00 and 60 dB(A) between 23:00 and 07:00, should be adopted for use in the scheme.
4.2.5.2 Timescales for introduction/implementation

Having established the test methods, the next fundamental part of the process is to consider a provisional timetable for when certification procedures could be effectively applied. This depends partly on the availability of appropriate technologies and partly on the availability of appropriate limit values.

It is not considered necessary to implement all the certification procedures in one go, since it is perceived that some night-time noise reduction benefits could be achieved in the absence of low-noise vehicles. Therefore, where technologies are unavailable, a phased introduction of the scheme could be implemented.

This would also depend on the perceived benefits of relaxed night-time restrictions being recognised by local authorities.

In addition, any scheme will only be successful if all local authorities adopt, in advance, a common, declared policy in relation to relaxation of night-time restrictions and the corresponding terms of compliance. Examples of levels of relaxation are included in Section 4.3.2.

Figure 4.4 presents a hypothetical timeline for the phased introduction of the proposed certification procedures for quiet vehicles, as follows.

- Ancillaries: Based on the work undertaken in the PIEK programme and associated/subsequent development by manufacturers, many low-noise ancillary technologies are already readily available on the commercial market (and are PIEK certified), so the ancillary parts of the certification procedures are considered to be suitable for immediate introduction and implementation.
• **Additional requirements**: Since these are not based on technological advances, all of the recommendations for service history, training and best practice are considered to be suitable for immediate introduction and implementation.

• **Vehicles**: The PIEK programme and other studies have already demonstrated that current vehicle technologies are incapable of meeting either the PIEK 65 dB(A) target or the proposed target of the ‘quiet HGV’ permissive certification scheme outlined in this study that an HGV should “make no more noise than a van”. The vehicle certification procedures are not suitable for immediate introduction or implementation.

The discussions with the vehicle manufacturers reported in Section 3.4 suggest that, depending on the potential market and the economic climate, it could be 1-5 years before lower noise HGVs are available. Vehicle certification would therefore need to be a phased implementation as shown in the Figure.

Visual inspections for quiet tyres will not be suitable for implementation until the compulsory labelling of tyres is introduced by the EC in 2012.

### 4.2.5.3 Frequency of certification testing

Based on the views of the manufacturers, it is expected that once a situation is reached where limits have been agreed and a common, preferably pan-European, night-time noise certification procedure agreed, then all new, ‘low-noise’ HGVs would be expected to be issued with a ‘low-noise night-time compliant’ certificate by the manufacturers. It is considered that these would be valid for twelve months from the date of purchase of the vehicle.
Any low-noise HGV to be used for night-time operations which did not have a valid certificate would then require to be certified in accordance with the agreed procedures and, if successful, would then be awarded a certificate which would be valid for twelve months.

Ancillary equipment that is already PIEK certified would be issued with a PIEK certificate valid for twelve months from the date of purchase. Any ancillary product to be used for night-time operations which did not have a valid PIEK certificate would then require to be certified in accordance with the agreed procedures and, if successful, would be awarded a low-noise compliant certificate which would be valid for twelve months.

Where both vehicles and ancillary equipment are regularly used for night-time operations, it is considered that these would be required to undergo re-certification every twelve months.

4.2.5.4 Bodies responsible for testing and certification

This is an issue that will have to be decided if the proposals for a ‘quiet HGV’ permissive certification scheme presented in this report are taken forward by DfT. It is considered that VOSA could be responsible for issuing low-noise compliant certificates for vehicles, with accredited test laboratories/organisations undertaking the actual testing. NAS are already issuing NAS-PIEK certificates for low-noise ancillary equipment on sale in the UK; it is considered that one option could be for this to continue under a future ‘quiet HGV’ permissive certification scheme.

4.2.5.5 Costs and benefits

At the present time, it is considered that the details of the proposed ‘quiet HGV’ certification procedures are not sufficiently finalised to undertake a meaningful cost-benefit analysis.

Summary

Limit values: Limit values for HGVs still require to be derived. The limit values specified by PIEK are the long-term objective. It may be appropriate to introduce interim limit values within 1-5 years to take advantage of lower-noise HGVs that may be available at that time. It is proposed that the PIEK limit values should be adopted for ancillary technologies.

Timescales for implementation: The following potential timescales are envisaged:

Ancillaries: It is considered that certification testing for ancillary technologies could be implemented immediately, as there are already a range of products on the market which have been certified to PIEK standards.

Additional requirements: All recommendations are considered to be suitable for immediate implementation.

Vehicles: Current HGV technologies are incapable of meeting either the long-term expectations of PIEK or the expectations of the scheme proposed in this report in the immediate future. The vehicle certification procedures are therefore not suitable for immediate introduction or implementation.

Manufacturers suggest that depending upon market conditions, vehicles which are of the order of 5 dB(A) quieter than the newest vehicles currently on the market could be available with 1-5 years. Vehicle certification would need to be a phased implementation.
**Frequency of testing:** It is considered that 'low-noise night-time compliant' certificates for vehicles would be valid for a twelve month period. Similarly, PIEK certificates would be valid for twelve months. Where vehicles and ancillaries are used regularly for night-time operation, it is considered that these would require re-certification every twelve months. Vehicles and ancillary products certified as low-noise prior to purchase would be issued with low-noise compliant/PIEK certificates valid for 12 months from the date of purchase.

**Bodies responsible for certification:** This would need to be decided for vehicles, although it is possible that this could be undertaken by VOSA, with accredited laboratories/organisations performing the actual test. NAS current certify ancillaries in accordance with PIEK and this could be continued.

**Costs and benefits:** At the present time, it is considered that the details of the proposed 'quiet HGV' permissive certification scheme are not sufficiently finalised to undertake a meaningful cost-benefit analysis.

### 4.3 Part 2: Night-time noise impact reduction options

As noted at the beginning of this Chapter, it is considered that a 'quiet HGV' permissive certification scheme should comprise not only the methods and limit values for the certification of low-noise vehicles and ancillary technologies, but also include options, procedures and guidelines for monitoring, policing and other issues associated with the process of relaxing night-time delivery restrictions. This section address this part of the scheme. Table 4.4 presents an overview of the details which require to be considered.

**Table 4.4: Options for consideration in Part 2 of a ‘quiet HGV’ permissive certification scheme**

<table>
<thead>
<tr>
<th>Stakeholders requiring vehicle noise certification</th>
<th>Basis for vehicle noise certification requirements</th>
<th>Monitoring impact reduction</th>
<th>Policing impact reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>• DfT • Local authorities</td>
<td>• Minor relaxation of night-time restrictions: Ancillary I &amp; II requirements only • Major relaxation of night-time restrictions: All ‘quiet HGV’ certification elements required</td>
<td>• Authorised bodies • Local authorities • NAS • Methods • No. and type of complaints • Noise monitoring</td>
<td>• VOSA • NAS</td>
</tr>
<tr>
<td>• Planning regs. • Traffic regs. • Noise and/or environmental regs.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 4.3.1 Stakeholders requiring vehicle noise certification

It is considered that the primary stakeholder requiring operators to undertake the scheme's delivery noise certification procedures would be those local authorities seeking to relax night-time delivery restrictions and who therefore would need operators to demonstrate that they could comply with LA conditions for night-time operation. However, for acceptance and take-up of 'quiet HGV' permissive certification scheme on a larger scale, the involvement of DfT is considered paramount.
4.3.1.1 **Support and promotion of a future ‘quiet HGV’ permissive certification scheme by DfT**

Take up, acceptance and promotion of any future ‘quiet HGV’ permissive certification scheme by DfT would offer significant benefits which would help to achieve a successful and structured implementation. These advantages can be summarised as follows:

- A DfT-supported scheme would have nationwide applicability and widespread promotion/recognition
- It would provide a means of independent assessment for both operators and local authorities if certification were the responsibility of DfT/VOSA
- DfT support could help in bringing together all the disparate trials and guidelines currently in use into a common, unified system
- A ‘quiet HGV’ permissive certification scheme could be used as a common tool by local authorities for assessing night-time noise nuisance and in developing Noise Action Plans, as required by the EU Environmental Noise Directive
- It would provide DfT with the necessary information on CO₂ reduction from this change in modal operation

4.3.1.2 **Local authority acceptance**

A fundamental requirement for any future ‘quiet HGV’ permissive certification scheme to be successful would be the acceptance and uptake by local authorities and other bodies who are responsible for imposing and regulating night-time noise restrictions. One of the comments made by the SAG was that “local authorities will always find it easier to say ‘no’ to anything involving night time deliveries, so they will need to be persuaded that there are benefits in having a quiet noise scheme and that its enforcement is practicable and affordable (ideally not involving any extra burdens on the LA). If a standard is set and encouraged by national Government then it is more likely to be accepted.”

Unless LAs provided operators with an indication that they are willing to consider relaxing night-time restrictions, then it is considered that there would be little incentive for operators to invest in low-noise vehicles and ancillaries. This in turn means that there would be less of market to provide incentive to vehicle manufacturers. The existence and increasing acceptability within Europe of the PIEK scheme is considered to ensure continual development of low-noise ancillary technologies.

Educating stakeholders as to the potential benefits of reducing night-time restrictions is therefore an important part of introducing a future ‘quiet HGV’ permissive certification scheme. These benefits are likely to include reduced day-time congestion, reduced traffic volumes overall (if an HGV is used to replace multiple deliveries by smaller vans), improved air quality, etc.

A key part of the education process would be to promote the need for a common, declared policy in relation to relaxation of night-time restrictions and the corresponding terms of compliance for those LAs who signed up to the scheme.

**The use of voluntary accreditation schemes**

There may be potential for promoting a future ‘quiet HGV’ permissive certification scheme through purely voluntary accreditation schemes, building on existing ‘green’ fleet initiatives such as the ‘Eco-Stars’ low emission fleet recognition scheme now operating in Sheffield. ECO (Efficient and Cleaner Operations) Stars helps commercial fleet operators to gain public recognition for their commitment to improving efficiency, reducing fuel consumption and reducing emissions. Each organisation signing up to the scheme has their vehicles and their operations assessed using ‘star rating’ criteria for levels of operational and environmental performance. Approved operators display windscreen...
decals to publicise their environmental credentials and bespoke action plans are developed for each scheme member to help them progress to higher ratings levels. Although purely voluntary, participating fleets are expected to benefit commercially from improved publicity and compliance with corporate environmental policies. This provides a mechanism for encouraging the uptake of environmentally beneficial technology and practices without the need for new regulations and, if such schemes were expanded to include noise, would help to expand the potential market for Quiet HGVs beyond those areas affected by noise restrictions.

The Eco Stars scheme provides a useful model of how local authorities and fleet operators can work together on the promotion of environmental improvements and suggests that in some areas there may be advantages in promoting a future ‘quiet HGV’ permissive certification scheme as part of a wider package of environmental measures.

4.3.1.3 Freight operator acceptance

Based on the findings of the Stakeholder Advisory Group and the feedback from the surveys, it would appear that the freight operators are in favour of such a scheme, providing that the benefits seen by the operator are common around the country and well defined prior to signing up to such a scheme or investment in appropriate technologies.

4.3.1.4 Public acceptance

In addition to local authority participation, it would be necessary to gain public acceptance for a ‘quiet HGV’ permissive certification scheme and the relaxation of night-time restrictions and curfews. This could only be achieved by promotion of the scheme and benefits that could be achieved without adverse effects on the local populace. The use of nationally publicised demonstration schemes could play an important part in improving public perception.

4.3.2 Options for relaxing night-time restrictions

As part of the education process, it is considered that guidance would need to be provided to LAs as to the potential, common options that might be available for relaxation of curfews and restrictions, and the associated requirements for compliance with the relaxation. Other considerations, such as the number of vehicles, light disturbance, etc. would also have to taken into account by LAs but are outside the scope of this project.

This guidance will be particularly important if there is to be a phased introduction of certification testing and/or interim limit values.

The following examples, which consider Monday-Friday only, assume a scenario where the current restriction prevents in the first instance, deliveries to a supermarket between 22:00-07:00 Monday to Friday, and in the second instance, a full ban on lorry movement in the local area between 22:00-07:00 Monday to Friday

- **Delivery restrictions/curfews**: Where only low-noise ancillaries are available to operators to reduce noise impact, e.g. for the next 1-2 years prior to the availability of lower-noise HGVs, a LA might relax the restrictions to only prevent deliveries to the supermarket between 23:00-06:00 on Monday to Friday. Where an operator has access to low-noise vehicles and ancillaries, further relaxation might be possible depending on local circumstances

- **Lorry bans**: In 2-5 years time, when HGVs which are of the order of 5 dB(A) than current types are available, a LA might relax the full ban on lorry movement to between 23:00-06:00 on Monday to Friday. When HGVs are available which meet the PIEK limits, it may be feasible to lift the ban altogether
One of the biggest potential issues that would need to be addressed is that operators are likely to seek guarantees from LAs that restrictions/curfews will definitely be relaxed if they invest in low-noise technologies. This means that careful evaluation of relaxation schemes and potential changes will need to be undertaken prior to any implementation. One potential way of addressing this problem might be to have nationally publicised small-scale demonstration schemes which could be used to promote a ‘quiet HGV’ permissive certification scheme.

4.3.3 Monitoring and policing noise impact reduction

It would also be necessary to establish who would be responsible for monitoring and policing the noise impact reductions at locations where restrictions are relaxed. LAs are less likely to agree to a relaxation of restrictions if they are to be responsible (either financially or in terms of manpower) for monitoring and policing.

The precise methods for monitoring and policing would also need to be determined. For example, as part of the Wandsworth trial (see Section 2.3.1), local residents were provided with a 24-hour telephone helpline for reporting complaints. Promotion of trial schemes will assist in improving public awareness. Other potential methods include monitoring the level of complaints and long-term noise monitoring.

### Summary

**Support from DfT:** Acceptance and support of a potential ‘quiet HGV’ permissive certification scheme from DfT would offer benefits in terms of nationwide applicability, independent assessment for both operators and local authorities and provide common tools for local authorities for assessing night-time noise nuisance and in developing Noise Action Plans.

**Acceptance by local authorities:** Local authorities (and other stakeholders) may require to be educated as to the benefits of reducing night-time restrictions and curfews and provided with guidance on the types of relaxation and compliance requirements. Nationally publicised demonstration schemes could play a major part in this.

**Freight operator acceptance:** Based on the findings of the Stakeholder Advisory Group and the feedback from the surveys, it would appear that the freight operators are in favour of such a scheme, providing that the benefits seen by the operator are common around the country and well defined prior to signing up to such a scheme or investment in appropriate technologies.

**Public acceptance:** It would be necessary to garner public acceptance for a ‘quiet HGV’ permissive certification scheme and the relaxation of night-time restrictions and curfews. This would only be achieved by promotion of the scheme and benefits. The use of nationally publicised demonstration schemes could play an important part in improving public perception.

**Monitoring and policing:** It would also be necessary to establish who would be responsible for monitoring and policing the noise impact reductions at locations where restrictions are relaxed and the methods to be used, e.g. telephone helplines, noise monitoring, etc.

**Costs and benefits:** At the present time, it is considered that the details of the implementation of the scheme are not sufficiently finalised to undertake a meaningful cost-benefit analysis.
Summary, conclusions and recommendations

HGV movements in urban areas are often constrained during night-time and/or weekend periods by local regulations which have been put in place to minimise noise impacts. If such night-time delivery restrictions could either be relaxed or removed, where appropriate, there are significant potential benefits, primarily associated with reduced day-time congestion.

TRL has been commissioned by the Department for Transport (DfT) to

- Review the need for and the feasibility of a permissive low-noise certification scheme for HGVs and their operation.
- Prepare recommendations for the content of a future ‘quiet HGV’ permissive certification scheme and its operation

If such a scheme were to be introduced in the future and adopted, it is envisaged that a relaxation of delivery restrictions could potentially be granted by local authorities for operators using ‘quiet HGVs’ that complied with the scheme requirements.

This report includes:

- A short evaluation of existing schemes, trials, initiatives and research associated with controlling and/or reducing the noise impacts of night-time freight movement. In addition to identifying the reasons for such activities, the resultant tools, products and lessons could potentially be used in the development of proposals for a ‘quiet HGV’ permissive certification scheme. The review also examined the low-noise vehicle and ancillary technologies which are currently available
- A summary of the views and opinions of a wide range of stakeholders potentially associated with the implementation and application of any future scheme in the UK, and the views of vehicle manufacturers
- Provisional recommendations for the content of a future ‘quiet HGV’ permissive certification scheme and its operation. This includes a consideration of the test methodologies necessary to identify ‘quiet HGVs’, and possible timescales and methods for any implementation of such a scheme
- Provisional considerations of how to promote and gain acceptance for any future ‘quiet HGV’ permissive certification scheme. For such a scheme to be introduced, the prior acceptance of relevant stakeholders and the general public will be necessary

Based upon the outcome of the study, DfT will take a decision as to whether any further development of such a scheme should be undertaken.

The main conclusions of the study can be summarised as follows:

5.1 Literature review

A literature review was undertaken to review existing schemes, trials, initiatives and research associated with the use of low-noise vehicles (and ancillary technologies) and night-time deliveries. It has identified a wide range of examples from both in and outside Europe. The following is a summary of the findings:

- Administration-coordinates schemes, trials and initiatives: The research, trials and schemes reviewed are the result of either a general desire to reduce night-time noise disturbance or the need to reduce increased night-time noise impacts resulting from other policy or local circumstances. In some instances, the successful results of the demonstrations/trials have led to a wider, national roll-out of the procedures/technologies
• **Schemes and trials by commercial operators:** Retail operators use a combination of best practice and commercially available technologies. They appear to achieve acceptable results without any formal in-service test being available, and without the specific development of low-noise vehicles. Retail operators appear to be more concerned with tackling noise at the delivery points rather than noise generated during the journeys to delivery points. This is to be expected since they will most likely only receive complaints from residents in the vicinity of the delivery points and not from residents along the delivery routes.

• **Manufacturer technologies for reducing noise impacts:** At the present time, other than electric or hybrid vehicles, there are currently no low-noise HGVs commercially available. Furthermore, in the absence of appropriate legislation, there is little incentive for vehicle manufacturers to provide low-noise vehicles although discussions have identified that such vehicles could be introduced onto the market if necessary. Much of the emphasis, based on general research and in part driven by complaints from residents, has been placed on the development of low-noise technologies to reduce noise impact nuisance at loading/delivery points. This has, in part, been driven by the Dutch PIEK programme. A range of PIEK-certified products are now on the market, some of which have been certified for use in the UK.

• **Best practice and guidelines:** A wide range of stakeholders have prepared best practice recommendations and guidelines for reducing the impact of night-time delivery noise. Many of these appear to share common elements or draw on one another's content. It is therefore considered that the development of a common, all encompassing (as far as is possible) standard which could be used by the full range of stakeholders would be beneficial.

• **Research projects addressing night-time delivery noise:** A wide range of projects have recognised the need to address the issues associated with night-time delivery noise. A wide range of potential solutions and approaches have resulted. It is considered that knowledge and results from these projects can assist in the development of a 'quiet HGV' permissive certification scheme and associated best practice guidelines.

The general conclusion is that while there are a variety of schemes, systems and technologies that have been trialled/implemented, there is presently no common certification scheme or methodology available for relaxing night-time restrictions.

### 5.2 The views of stakeholders

The views of a wide variety of stakeholders (industry associations, operators and local authorities) were obtained both via a questionnaire survey and via direct discussions with a Stakeholder Advisory Group specially established for this project.

• The questionnaire revealed that in general, there is support for a ‘quiet HGV’ permissive certification scheme from all organisations. However local authorities indicated that the level of support for schemes for ‘quiet HGVs’ was significantly lower than that of industry associations and freight operators. In terms of the perceived need, effectiveness and level of uptake, the different organisations responded similarly. Whilst on average it was considered there is a slight need for such a scheme, they were unsure of the likely effectiveness and that the likely uptake (rated from extremely low to extremely high) would be slightly lower than moderate. All considered that there would be pros and cons. It should be noted that the overall response rate to the survey was very low, being only 10%. General comments submitted with the questionnaires suggested that operators are positive, providing that the benefits seen by them are common around the country and well-defined prior to them signing up to such a scheme or investing in appropriate technologies. Some local authorities were of the opinion that the
benefits of night-time operations might be outweighed by the extra work required from the authority in relation to enforcement and dealing with complaints from residents.

- The Stakeholder Advisory Group was supportive in principle of a scheme that would permit greater flexibility in deliveries. There was general agreement that this could lead to benefits including reduced peak congestion, cost savings for businesses, noise reduction benefits beyond the areas covered by noise restrictions, and the potential to shift some deliveries back to HGVs. Potential barriers identified included the need to convince local authorities of the benefits and making the scheme applicable for a wide range of local conditions. It was considered that manufacturers and operators must be convinced of the market opportunities. Overall, it was considered that although there are many barriers to overcome, there are good reasons to think this is achievable and already sufficient incentives for such a scheme to be adopted. It was considered that developments in the industry show that a scheme could work in principle.

Vehicle manufacturers were also consulted. They confirmed that a range of technologies are available for reducing the noise impact of HGVs. However, it is considered that legislative drivers, a proven market and a stable economic climate will generally be necessary to stimulate or accelerate vehicle development beyond current levels. One manufacturer confirmed that they are already hoping to begin a ‘quiet HGV’ development programme.

5.3 Provisional recommendations for a future ‘quiet HGV’ permissive certification scheme

For any future scheme to successfully address noise impacts associated with all stages of the night-time delivery process, it is considered that it should comprise the following parts:

- **PART 1: Night-time delivery noise certification procedures**
  This part provides the procedures that local authorities would require freight operators to comply with, either partially or fully, depending on circumstances and the level of relaxation of any existing night-time freight movement restrictions. The procedures will comprise a number of test methods that can be conducted in order to assess the noise levels of important operations at all stages of the night-time delivery process, i.e. noise during the ‘A to B’ journey and noise associated with loading/unloading operations at the point of origin and final destination.

- **PART 2: Night-time noise impact reduction options**
  This part provides guidance on specifying the options for any relaxation of restrictions, compliance criteria and how compliance with relaxed night-time restrictions might be addressed and monitored. This part is considered only at a low level in the current document, since wider in-depth consultation with stakeholders will be required for its development and this falls outside of the scope of this phase of the project.

It is considered that Part 1 should include the following elements:

- **Tests associated with vehicle-based noise sources:**
  - **Vehicle noise I**: A stationary test based on rapid acceleration to governor run-out.  
  - **Vehicle noise II**: An acceleration test based on pulling away from rest through the gears. At the present time there is insufficient data to distinguish whether the PIEK test (Dittrich et al., 2008)\(^1\) or the TRL test where the driver selects the appropriate gears for the vehicle using the full RPM range (Ainge et al., 2007)\(^2\) is the most suitable.
Air brakes: The test as prescribed within the PIEK programme.

Low-noise tyres: A visual inspection (valid from 2012) is considered sufficient.

- **Tests associated with other noise sources on the vehicle:**

  Ancillary technologies I: The tests as prescribed within the PIEK programme for the following technologies
  - Trailers/truck bodies (including walls, floors and stowage)
  - Tail-lifts
  - Refrigeration units
  - Rollcages and containers (assessing both rolling noise and collision noise)

  Ancillary technologies II: The tests as prescribed within the PIEK programme for the following technologies
  - Fork lifts and pallet trucks
  - Quiet-closing doors
  - Auto-turn-off radios

- **Additional requirements**
  - Vehicles should have a current service history
  - Evidence must be provided of appropriate driver training
  - Vehicles must comply with best practice on body noise

5.4 Issues to be considered for successful implementation of any future ‘quiet HGV’ permissive certification scheme

Whilst, the basic structure for a future scheme can be provisionally defined, the following items will need further consideration in order to achieve a successful implementation. It is noted that these are based upon the status-quo in mid-2009, and that there is presently no commitment at local or national level within the UK to formally introduce a ‘quiet HGV’ permissive certification scheme.

- Issues associated with Part 1

  Limit values: Limit values for HGVs still require to be derived. The limit values specified by PIEK are the long-term objective. It may be appropriate to introduce interim limit values within 1-5 years to take advantage of lower-noise HGVs that may be available at that time. It is proposed that the PIEK limit values should be adopted for ancillary technologies.

  Timescales for implementation: The following potential timescales are envisaged:
  - Ancillaries: It is considered that certification testing for ancillary technologies could be implemented immediately, as there are already a range of products on the market which have been certified to PIEK standards
  - Additional requirements: All recommendations are considered to be suitable for immediate implementation
  - Vehicles: Current HGV technologies are incapable of meeting either the long-term expectations of PIEK or the expectations of the scheme proposed in this report in the immediate future. The vehicle certification procedures are therefore not suitable for immediate introduction or implementation

  Manufacturers suggest that depending upon market conditions, vehicles which are of the order of 5 dB(A) quieter than the newest vehicles currently on the
market could be available with 1-5 years. Vehicle certification will need to be a phased implementation.

*Frequency of testing:* It is considered that ‘low-noise night-time compliant’ certificates for vehicles meeting the scheme criteria would be valid for a twelve month period. Similarly, PIEK certificates would be valid for twelve months. Where vehicles and ancillaries are used regularly for night-time operation, it is considered that these would require re-certification every twelve months. Vehicles and ancillary products certified as low-noise prior to purchase would be issued with certificates valid for 12 months from the date of purchase.

*Bodies responsible for certification:* This would need to be decided for vehicles, although it is possible that this could be undertaken by VOSA, with accredited laboratories/organisations performing the actual tests. NAS currently certify ancillaries in accordance with PIEK and this could be continued.

*Costs and benefits:* At the present time, it is considered that the details of this part of the ‘quiet HGV’ permissive certification scheme are not sufficiently finalised to undertake a meaningful cost-benefit analysis.

- **Issues associated with Part 2**

  *Support from DfT:* Acceptance and support of a potential ‘quiet HGV’ permissive certification scheme from DfT would offer benefits in terms of nationwide applicability, independent assessment for both operators and local authorities and provide common tools for local authorities for assessing night-time noise nuisance and in developing Noise Action Plans.

  *Local authority acceptance:* Local authorities (and other stakeholders) may need to be educated as to the benefits of reducing night-time restrictions and curfews and provided with guidance on the types of relaxation and compliance requirements. Nationally publicised demonstration schemes could play a major part in this.

  *Freight operator acceptance:* Based on the findings of the Stakeholder Advisory Group and the feedback from the surveys, it would appear that the freight operators are in favour of such a scheme, providing that the benefits seen by the operator are common around the country and well defined prior to signing up to such a scheme or investment in appropriate technologies.

  *Public acceptance:* It would be necessary to garner public acceptance for any future ‘quiet HGV’ permissive certification scheme and the relaxation of night-time restrictions and curfews. This would only be achieved by promotion of the scheme and benefits. The use of nationally publicised demonstration schemes can play an important part in improving public perception.

  *Monitoring and policing:* It would also be necessary to establish who would be responsible for monitoring and policing the noise impact reductions at locations where restrictions are relaxed and the methods to be used, e.g. telephone helplines, noise monitoring, etc.

  *Costs and benefits:* At the present time, it is considered that the details of the implementation of the scheme are not sufficiently finalised to undertake a meaningful cost-benefit analysis.

### 5.5 Supplementary work items

The following items have been identified as being sufficiently important to have been included in the design of the original project specification. As such, costs for undertaking this work have already been determined.
Vehicle programme: The objective of this programme, described as Step 2 in Figure 3.2, will be to apply the proposed ‘quiet HGV’ certification procedures developed in Section 4.2.1.1 to a greater number and range of goods vehicles than was previously investigated by Ainge et al. (2009). This programme serves the following purpose:

- To identify typical noise levels and upper/lower limits for HGVs in the current vehicle fleet. This will allow the setting of realistic limit values based upon 2009 data. This data would also then be used by vehicle manufacturers as a starting point for research and development (manufacturers only currently hold type approval limit values and noise data, which as explained in Section 3.4 will be different to ‘quiet HGV’ certification limit values)
- To similarly identify typical noise levels and upper/lower limits for 3.5t vans in the current vehicle fleet (on the basis that the target for noise reduction is to “make an HGV no noisier than a 3.5t van”)
- To establish the effects of payload on noise levels from vehicle-based sources

The test data will also provide the following:

- Validation information on the repeatability and reproducibility of the proposed acceleration (pull-away-from-rest) test
- Confirmation of the final number of vehicle test modes required in the night-time delivery noise certification procedures, i.e. whether both a stationary and acceleration test are required

5.6 Proposals for additional work

During the preparation of this report, additional work items have been identified which would enhance or accelerate the development and implementation of any future ‘quiet HGV’ permissive certification scheme. No provision has been made for these items in the current programme.

- Preparation of an education package for local authorities and fleet operators: This is identified as ‘Step 1’ in Figure 3.2. This will address both the benefits of relaxed night-time restrictions and ways in which restrictions might be relaxed. It is considered that this could be in the form of both a handbook as well as a CD-ROM package, similar to that used in PIEK

- Selection of a final vehicle acceleration test: As described elsewhere in this report, there is currently insufficient test data to make a formal recommendation on the acceleration test that should be included within the ‘quiet HGV’ permissive certification scheme proposal. It is suggested that Manufacturer 2a be approached to compare drive cycle data and the PIEK/TRL tests on their internal dynamometer facility to distinguish which of the two tests is more representative of real world driving. It is noted that this is not currently a costed option within the project.

- Cost-benefit analysis: It is recommended that a full cost-benefit analysis should be undertaken once all of the components of any future ‘quiet HGV’ permissive certification scheme are finalised
Acknowledgements

The work described in this report was carried out in the Noise and Vibration Group of the Transport Research Laboratory. The authors are grateful to Marcus Jones who carried out the technical review and auditing of this report. The assistance of Su Buttress, Neale Kinnear and Shaun Helman in the development and analysis of the stakeholder question survey is gratefully appreciated.

The cooperation of the following external parties is also acknowledged: the project’s Stakeholder Advisory Group, Robert Goevers, Jack Martens and Rien Klaasse, Bengt Thompson, Per-Uno Sturk and Kaj Bodlund, and Ray Cattley.

References


http://www.btindustrial.co.uk/documents/Datasheet_Red_01.pdf

http://www.btindustrial.co.uk/documents/BTF238_Vehicle-Turntables.pdf

http://www.btindustrial.co.uk/october-2005.html

http://www.btindustrial.co.uk/april-2008.html


http://www.bestufs.net/download/Workshops/BESTUFS_I/Budapest_Jan03/BESTUFS_Budapest_Jan03_Costello_FTA.pdf


http://www.dft.gov.uk/pdf/pgr/freight/sustainable/freightqualitypartnerships2

http://www.dft.gov.uk/pdf/pgr/roads/vehicles/controlofbodynoisefromcommercialvehicles4544


Appendix A  Other European projects associated with freight movement

The following European projects are associated with freight movement, but do not specifically address night-time deliveries or night-time noise due to freight movement.

A.1 CIVITAS (Cleaner and better transport in cities; www.civitas-initiative.net)

The CIVITAS programme commences in 2002 and is currently in its third phase, CIVITAS PLUS. The objectives of the programme are threefold, namely

- To promote and implement sustainable, clean and (energy) efficient urban transport measures
- To implement integrated packages of technology and policy measures in the field of energy and transport in 8 categories of measures
- To build up critical mass and markets for innovation

These objectives are to be achieved through the undertaking of demonstration projects within partner cities. To date there have been 13 of these demonstration projects. Although urban goods transport is one of the eight key measures being addressed, there appears to be relatively little in the programme associated with night-time noise and night time freight movement outside of the MIRACLE. The scheme in Barcelona (see Section 2.2.3) is referred to.

A.2 START (Short Term Actions to Reorganise Transport of goods; www.start-project.org)

The START project was a three year project which concluded at the beginning of 2009 and was a collaboration between the cities of Gothenburg, Bristol, Ravenna, Riga and Ljubljana to develop efficient access restrictions, consolidation of deliveries, and incentives to make the distribution of goods more efficient and environmentally friendly. Whilst the project looked at consolidating deliveries and the use of alternative-fuelled vehicles, noise and night-time deliveries were not addressed. (START, 2009).

A.3 FIDEUS (Freight Intelligent Delivery of goods in European Urban Spaces)

This was a three year project, running from 2005-2008, aiming to provide a complementary set of vehicle solutions to support innovative approaches to the organisation of freight transport. It promoted a coordinated approach involving the automotive industry, logistics companies and city authorities. The project proposed three complementary types of delivery vehicle, namely an innovative “clean” goods carrier, an adapted 3.5t van and an adapted 12t truck. Based on the weights listed here, HGVs were not addressed; however the solutions did include low-noise vehicles.

For example, Renault developed a 12t prototype urban distribution vehicle, based on an existing Renault model (Renault, undated.). As part of the design, noise levels have been reduced (the vehicle is 3 dB(A) below current regulatory levels; in the trials in Barcelona average noise levels were 6 dB(A) less than those of similar vehicles), and the vehicle was tested in Lyon by DHL and in Barcelona by Condis under day-time and night-time delivery conditions.
Appendix B  Stakeholder questionnaires

The following pages present the templates for the questionnaires used for the stakeholder survey. Although the major parts of the questionnaire were the same for all parties consulted, the introduction was tailored as appropriate to be suited to each of the three main target groups, i.e. freight operators, industry associations and local authorities. As such, three templates are presented.
B.1 Questionnaire for freight operators

‘quiet HGV’ Permissive Certification Scheme Study

In some local authority areas, the use of HGVs can be subject to restrictions at certain times to reduce noise and disturbance to local communities. If a ‘quiet HGV’ were available, defined as ‘making no more noise than a van’, then such night-time delivery restrictions could be relaxed, with potentially significant benefits for businesses undertaking and receiving deliveries in those areas.

The Department for Transport has asked TRL to investigate the feasibility of a scheme that would allow local authorities to introduce exemptions from restrictions for operators using certified ‘quiet HGVs’ that met the scheme requirements.

TRL would like to hear your views on this proposal.

It would be appreciated if you could complete the following survey and return it to us in the pre-paid envelope enclosed. All responses are anonymous and the data collected will be handled in line with the Data Protection Act (1998).

We would first like to ask some questions about your awareness of current noise restrictions and how they affect your operations.

Section 1 - Night time and weekend noise restrictions

Q1.1 Are you aware of any night time or weekend restrictions for HGVs that are currently in place?

(please tick) Yes [ ] No [ ]

Q1.2 Are you currently affected by night time or weekend restrictions placed on HGVs?

(please tick) Yes [ ] No [ ]

(QGo to next question) (Go to Section 2)

Q1.2a If you ticked yes, please rate how much you think the restrictions cost your operation?

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Q1.2b If you ticked yes, please rate how much the restrictions are a disturbance to your operation?

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We would now like to seek your views on the proposal for a ‘quiet HGV’ exemption scheme and how you might respond to a scheme if it were introduced.

### Section 2  -  ‘quiet HGV’ classification scheme

**Q2.1**
Please rate whether you think your company would support a scheme such as this.

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**Q2.2**
Do you think there is a need for a scheme such as the one described above?

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**Q2.3**
Do you think a scheme such as this would be effective?

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**Q2.4**
Please rate what level of uptake you think there would be for a scheme such as this.

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**Q2.5**
If there was a classification scheme such as the one described above, would you purchase ‘quiet’ vehicles instead of standard vehicles?

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</tbody>
</table>
Q2.6
Would you be willing to pay extra for a ‘quiet’ vehicle compared to a standard one?
(please tick) Yes [ ]  No [ ]

Q2.7
Would you consider retrofitting existing vehicles to comply with the classification scheme?
(please tick) Yes [ ]  No [ ]

Q2.8-2.19
Please rate whether you agree or disagree with the following statements:

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<tr>
<th>A classification scheme for ‘Quiet HGVs’ would...</th>
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</tr>
</tbody>
</table>
Q2.20
Would you like us to contact you for further discussion?
(please tick)  Yes [  ]  No [  ]
If yes, please give your preferred contact details:
Name: ________________________________
Email: ________________________________
Telephone: ____________________________
Mobile: ________________________________
Address: __________________________________
__________________________________
Please write here any other comments about the scheme or this questionnaire.
Thank you for your response.
B.2 Questionnaire for industry associations

‘Quiet HGV’ Permissive Certification Scheme Study

In some local authority areas, the use of HGVs can be subject to restrictions at certain times to reduce noise and disturbance to local communities. If a ‘quiet HGV’ were available, defined as ‘making no more noise than a van’, then such night-time delivery restrictions could be relaxed, with potentially significant benefits for businesses undertaking and receiving deliveries in those areas.

The Department for Transport has asked TRL to investigate the feasibility of a scheme that would allow local authorities to introduce exemptions from restrictions for operators using certified ‘quiet HGVs’ that met the scheme requirements.

TRL would like to hear your views on this proposal.

It would be appreciated if you could complete the following survey and return it to us in the pre-paid envelope enclosed. All responses are anonymous and the data collected will be handled in line with the Data Protection Act (1998).

We would first like to ask some questions about your awareness and opinion of night time restrictions.

Section 1 - Night time and weekend noise restrictions

Q1.1 Are you aware of any evening and/or weekend restrictions for HGVs that are currently in place?

(please tick) Yes [ ] No [ ]

Q1.2 Please rate whether you agree or disagree with evening and/or weekend noise restrictions for HGVs.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither agree or disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>
We would now like to seek your views on the proposal for a ‘quiet HGV’ exemption scheme and how you might respond to a scheme if it were introduced.

Section 2  -  ‘quiet HGV’ classification scheme

Q2.1
Please rate whether you think your association would support a scheme such as this.

<table>
<thead>
<tr>
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<th>1</th>
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<th>6</th>
<th>7</th>
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<tbody>
<tr>
<td></td>
<td>Definitely Not</td>
<td>Maybe</td>
<td>Definitely Yes</td>
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</table>

Q2.2
Do you think there is a need for a scheme such as the one described above?

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Q2.3
Do you think a scheme such as this would be effective?

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Q2.4
Please rate what level of uptake you think there would be for a scheme such as this.

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</table>
### Q2.5-2.16
Please rate whether you agree or disagree with the following statements:

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<tr>
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### Q2.17
Would you like us to contact you for further discussion?

(please tick)  Yes [  ]  No [  ]

If yes, please give your preferred contact details:

Name: ____________________________________________
Email: __________________________________________
Telephone: ______________________________________
Mobile: _________________________________________
Address: _______________________________________
Please write here any other comments about the scheme or this questionnaire.

Thank you for your response.
B.3 Questionnaire for local authorities

‘quiet HGV’ Permissive Certification Scheme Study

In some local authority areas, the use of HGVs can be subject to restrictions at certain times to reduce noise and disturbance to local communities. If a ‘quiet HGV’ were available, defined as ‘making no more noise than a van’, then such night-time delivery restrictions could be relaxed, with potentially significant benefits for businesses undertaking and receiving deliveries in those areas.

The Department for Transport has asked TRL to investigate the feasibility of a scheme that would allow local authorities to introduce exemptions from restrictions for operators using certified ‘quiet HGVs’ that met the scheme requirements.

TRL would like to hear your views on this proposal.

It would be appreciated if you could complete the following survey and return it to us in the pre-paid envelope enclosed. All responses are anonymous and the data collected will be handled in line with the Data Protection Act (1998).

We would first like to ask some questions about your awareness and operation of noise restrictions.

Section 1 - Night time and weekend noise restrictions

Q1.1 Are you aware of any evening and/or weekend noise restrictions for HGVs that are currently in place?
(please tick)  Yes [ ]  No [ ]

Q1.2 Does your local authority have any evening and/or weekend noise restrictions for HGVs currently in place?
(please tick)  Yes [ ]  No [ ]

If yes, can you briefly describe what restrictions are in place (e.g. – evening and/or weekend; times of restrictions)

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
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__________________________________________________________________________
We would now like to seek your views on the proposal for a ‘quiet HGV’ exemption scheme and how you might respond to a scheme if it were introduced.

Section 2  

‘Quiet HGV’ classification scheme

Q2.1
Please rate whether you think your authority would support a scheme such as this.

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Q2.17
Would you like us to contact you for further discussion?

(please tick) Yes [ ] No [ ]

If yes, please give your preferred contact details:

Name: ______________________________
Email: ______________________________
Telephone: __________________________
Mobile: _____________________________
Address: ____________________________
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__________________________________
Please write here any other comments about the scheme or this questionnaire.

Thank you for your response.
A future ‘quiet HGV’ permissive certification scheme – phase 1 report

HGV movements in urban areas are often constrained during night-time and/or weekend periods by local regulations which have been put in place to minimise noise impacts. If such night-time delivery restrictions could either be relaxed or removed where appropriate, there are significant potential benefits, primarily from reduced congestion.

TRL has been commissioned by the Department for Transport (DfT) to consider the need for and the feasibility of a permissive low-noise certification scheme for HGVs and their operation, with options for scheme operation. It is envisaged that a relaxation of delivery restrictions could be granted by a local authority for a certain operator using ‘quiet HGVs’ that met the requirements of such a scheme.

This report reviews existing restrictions on night-time goods deliveries, implemented schemes or research projects addressing the issue, the needs (if any) for a permissive certification scheme based upon consultations with relevant stakeholders, barriers to the future introduction of such a scheme as well as the likely benefits and likelihood of successes.

Provisional recommendations are set out for a scheme addressing vehicle, body and ancillary noise associated with both the transport of goods between the point of origin and final destination, and the actual collections/deliveries themselves. The roles of stakeholders and scheme managers and the issues related to the enforcement of such a scheme are also discussed.

Other titles from this subject area

- PPR216  An innovative dynamometer: free running rollers to provide a potential cheap representative roadside emission procedure. S Latham. 2007
- PPR262  Primary NO₂ emissions from road vehicles in the Hatfield and Bell Common Tunnels. P G Boulter, I S McCrae and J Green. 2007
- PPR269  The links between micro-scale traffic, emission and air pollution models. P G Boulter and I S McCrae. 2007
- PPR270  Scoping study on the potential for instantaneous emission modelling: summary report. T J Barlow, P G Boulter and I S McCrae. 2007