



## Roads: traffic noise

Standard Note: SN/BT/347  
Last updated: 10 November 2010  
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Section: Business and Transport

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This Note outlines the various initiatives of successive government and the European Union to properly monitor and reduce road traffic noise and its associated impacts.

Information on other roads-related issues can be found on the [Roads Topical Page](#) of the Parliament website; information on other noise-related and noise pollution issues can be found on the [Pollution Topical Page](#) of the Parliament website.

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# 1 Traffic noise impacts

Since the early 1990s the Royal Commission on Environmental Pollution has published three reports which looked, wholly or in part, at the issue of traffic noise. The Commission's most recent report, on the urban environment, stated:

Roads, railways and airports are ... the main sources of ambient noise, which can affect the quality of people's lives. Around half the UK's population may be exposed to levels above the World Health Organization (WHO) guideline of 50-55 decibels which aims to protect the majority of people from serious annoyance during the daytime. However, the UK does not have national limits on ambient noise, although there are limits on individual aircraft and road vehicles. Local authorities can also impose local limits.<sup>1</sup>

The Royal Commission's first report that focused on transport and the environment was published in 1994, and updated in 1997. The 1994 report found that for the majority of people in the UK, transport was the most pervasive source of noise in the environment. In a survey carried out over a 24-hour period in 1990, noise from roads was recorded outside 92 per cent of a sample of dwellings in England and Wales and noise from motorways outside two per cent. A separate survey provided evidence that road traffic was the main source of noise outside more than 60 per cent of dwellings. In the survey of England and Wales referred to above, over half the sites were exposed to noise levels of more than 55dB<sub>L<sub>Aeq</sub></sub> from all sources and seven per cent to more than 68dB<sub>L<sub>Aeq</sub></sub>. The report also found that the level of noise produced by heavy traffic, while not usually sustained enough to cause hearing loss, almost certainly contributed to or aggravated stress-related health problems including raised blood pressure and minor psychiatric illness.<sup>2</sup>

In 2007 CE Delft published a report on traffic noise reduction in Europe. This put the 'social cost' of road traffic noise at €40 billion per annum (0.4 per cent of total GDP). The bulk of these costs (about 90 per cent) are caused by passenger cars and lorries.<sup>3</sup> The report also concluded that:

Traffic noise has a variety of adverse impacts on human health. Community noise, including traffic noise, is already recognised as a serious public health problem by the World Health Organization, WHO.

Of all the adverse effects of traffic noise the most widespread is simply annoyance.

There is also substantial evidence for traffic noise disturbing sleep patterns, affecting cognitive functioning (especially in children) and contributing to certain cardiovascular diseases. For raised blood pressure, the evidence is increasing. For mental illness, however, the evidence is still only limited.

The health effects of noise are not distributed uniformly across society, with vulnerable groups like children, the elderly, the sick and the poor suffering most.

In 2000, more than 44% of the EU25 population (about 210 million people) were regularly exposed to over 55 dB of road traffic noise, a level potentially dangerous to health. In addition, 35 million people in the EU25 (about 7%) are exposed to rail traffic noise above 55 dB. Millions of people indeed experience health effects due to traffic

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<sup>1</sup> RCEP, *The urban environment* (twenty-sixth report), Cm 7009, March 2007, para 2.34

<sup>2</sup> RCEP, *Transport and the environment* (eighteenth report), Cm 2674, October 1994; and: RCEP, *Transport and the environment – developments since 1994* (twentieth report), Cm 3752, September 1997

<sup>3</sup> CE Delft, *Traffic noise reduction in Europe: Health effects, social costs and technical and policy options to reduce road and rail traffic noise*, August 2007, pp21-23

noise. For example, about 57 million people are annoyed by road traffic noise, 42% of them seriously.

A preliminary analysis shows that each year over 245,000 people in the EU25 are affected by cardiovascular diseases that can be traced to traffic noise. About 20% of these people (almost 50,000) suffer a lethal heart attack, thereby dying prematurely.

The annual health loss due to traffic noise increased between 1980 and 2000 and is expected to increase up to 2020. In contrast, traffic safety has improved, following implementation of a variety of policy measures.<sup>4</sup>

As well as having an impact on people's health and quality of life, there is also some evidence that road traffic noise impacts on house prices. For example, a 2001 study for the Scottish Executive concluded that property prices were depressed by 0.2 per cent for each decibel increase in road noise.<sup>5</sup> A 2003 report by the same authors increased that estimate, finding that a one decibel increase in road traffic noise can wipe off between 0.3 per cent and 1.6 per cent of the selling price of a property, depending on submarket.<sup>6</sup>

## 2 The 'Hansard list'

In November 1999 the Labour Government published what is sometimes called the 'Hansard list' of road schemes deemed eligible for 'cost-effective noise mitigation', i.e. resurfacing by the Highways Agency.<sup>7</sup> This programme of noise mitigation is only funded to 2010/11. It is not yet clear if or how the Coalition Government intends to proceed with a noise mitigation programme on the major network after that date. It would appear likely that it will proceed on the basis of the noise mapping and action plans required by EU legislation (see section 3, below).

Section 282 of the [Highways Act 1980](#) gives the highway authority (the Highways Agency for trunk roads and local authorities for all other roads) power to execute works to mitigate the adverse effect of a highway. The decision on whether to take forward noise abatement measures in locations next to highways depends on the level of noise experienced locally. The Department for Transport document, *Calculation of Road Traffic Noise*, is the statutory method for determining entitlement to sound insulation.<sup>8</sup> Eligible schemes were put forward for consideration in accordance with criteria published in March 1999.<sup>9</sup> The then Transport Minister, David Jamieson, outlined the prioritisation process in terms of location in a March 2004 debate:

In March 1999, we announced sift criteria to identify the most serious and pressing cases and a ring-fenced budget of £5 million a year to deal with the most serious instances requiring practical and cost-effective noise-mitigation measures.

The hon. Gentleman referred to those criteria, but for the sake of clarity it would help to have them on the record. First, trunk roads must have opened before June 1988,

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<sup>4</sup> *ibid.*, p1; further information on noise costs can be found in a [2009 report](#) by the Australian Victoria Transport Policy Institute; and information on health effects can be found in a [2009 survey](#) in southern Sweden

<sup>5</sup> Bateman, Day, Lake and Lovett for the Scottish Executive, [The Effect of Road Traffic on Residential Property Values: A Literature Review and Hedonic Pricing Study](#), January 2001

<sup>6</sup> Bateman, Day, Lake and Lovett for UEA, [What price peace? A comprehensive approach to the specification and estimation of hedonic housing price models](#), 2003

<sup>7</sup> full list of schemes at: [HC Deb 11 November 1999, cc681-83](#)

<sup>8</sup> this document was published in 1988 and is not available electronically, however a summary is available in: Highways Agency, [Design Manual for Roads and Bridges, Vol. 11, Section 3, Part 7](#), August 1994

<sup>9</sup> [HC Deb 22 March 1999, cc50-51W](#)

although priority attention is given to locations affected by roads that have remained unaltered since October 1969, the qualifying date for the introduction of noise mitigation measures. Secondly, current—that is, 1998—noise levels immediately adjacent to the road must be at least 80 dB. If the hon. Gentleman wants a small lesson in logarithms and decibels, I will assist him for a small consideration.

It may be useful to point out that the M6 Preston bypass between junctions 30 and 32 was the first motorway. It opened in the late 1950s, although that was probably before the hon. Gentleman was born. The third criteria is that in the case of roads opened or altered after October 1969, noise levels must be at least 3 dB greater than predicted for the design when the road was planned. The aim is to address people's disappointment that noise levels mentioned during the planning process were different from those experienced when the road was eventually opened.

The hon. Gentleman will know that in November 1999, a list appeared in Hansard under cover of a letter from the chief executive of the Highways Agency, showing the most serious and pressing cases to be studied to ascertain the most practical and cost-effective solutions. That became familiarly known as the Hansard list, and by the time of the Government's 10-year plan, published in July 2000, the agency had been set the target of installing quieter surfaces on more than 60 per cent. of the trunk road and motorway network, including all concrete stretches, by 2010–11. That will benefit approximately 3 million people living within a third of a mile of such roads. Indeed, I believe that some of the hon. Gentleman's constituents have already benefited from resurfacing work on the M69 which has reduced noise. He looks curious, but if he ever takes that route, he will be able to see for himself how his constituents have already benefited from the Government's road noise reduction policy.

That policy over the period of the 10-year plan can be summarised as follows: a noise mitigation programme costing £5 million a year to address sites that meet the Hansard list criteria; resurfacing all concrete roads with quieter materials; and resurfacing black-top roads with quieter materials when normal maintenance is required. About 5 per cent. of the trunk road network at 70 different locations is constructed with a concrete surface. Clearly, given the scale of the problem, work cannot be completed overnight. Attempting to do so would not be practical because it would create a great deal of disruption on the network, so we shall phase in the work over 10 years. Concrete roads tend to be very robust, and often need resurfacing not because of deterioration but to ameliorate the effects of noise.

As part of the development of our road maintenance programme, the process of value management is applied to all major road renewal schemes to ensure that renewal schemes are technically robust and meet set standards. Proposed schemes are examined collectively to establish relative merits and priorities, and set criteria are used to assess schemes.<sup>10</sup>

The Highways Agency has a dedicated budget of £5 million per annum for the noise mitigation programme. In December 2007 the Transport Minister outlined how the Agency uses that budget:

Since 2000 the Highways Agency has been allocated £5 million per annum for noise mitigation measures to deal with the most serious and pressing cases, where practical and cost-effective measures can be provided. These measures are applied to the entire strategic road network including both motorways and trunks roads. This annual allocation for noise mitigation is scheduled to continue until the end of the period covered by CSR07.

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<sup>10</sup> [HC Deb 30 March 2004, cc423-424WH](#)

The Agency's expenditure in this area is not limited to this figure as noise mitigation measures are included in all the Agency's schemes, where warranted, as it is more cost effective to do this work concurrently with other scheme works. The cost of these works are subsumed within the overall cost of the individual schemes making it impossible to extract the exact figure spent on noise mitigation without incurring disproportionate costs.<sup>11</sup>

There have been no recent statements indicating how much of this programme was actually delivered between 2000 and 2010. In response to a WPQ in March 2007 the then Transport Minister stated that a total of 8,240 lane kilometres (lkms) of quieter surfacing were delivered between 2000-01 and 2005-06. The Highways Agency was forecast to deliver a further 1,100 lkms during 2006-07.<sup>12</sup> The estimated cost per mile of resurfacing each lane of concrete pavement on a motorway using quieter surfacing materials ranges between £200,000 and £1.9 million.<sup>13</sup>

### 3 Noise mapping and action plans

The EU Environmental Noise Directive ([2002/49/EC](#)) requires noise levels to be assessed from road traffic, railways, major airports and industry. The Directive was implemented in the UK by the *Environmental Noise (England) Regulations 2006* ([SI 2006/2238](#)). Regulation 7 requires the Secretary of State to make strategic noise maps for agglomerations, major roads, major railways and major airports. The first round of strategic noise maps was produced in 2007 and the second will be published in 2012. In the second round a larger number of the same type of noise sources will have to be mapped than in the first round. Subsequently, strategic noise maps will have to be made every five years.

In March 2010 Defra published noise action plans; there was a specific plan for road traffic noise outside agglomerations (i.e. specific urban areas). This explains how Defra has identified 'important areas' and 'first priority locations', where it will work with the relevant highways authorities to investigate how best to deal with noise impacts at those locations. The process from this point onwards is explained as follows:

For each Important Area, the highway authority will identify proposed actions that will meet the objective set out in paragraph 1.03 above or state why, in their view, no further action can or needs to be taken in order to meet this objective.

In forming their view about possible action, the relevant highway authority should take account of any benefit that might also be achieved for any other noise sensitive premises in the vicinity of the Important Area being investigated. In addition, the relevant highway authority should take account of any impacts that might occur for any other noise sensitive premises or locations. Furthermore, consideration should be given to integrating noise management actions at an Important Area with the concurrent implementation of other environmental or related initiatives.

It is expected that these deliberations will result in four general outcomes:

- a) It is possible to be able to implement an action and there are financial resources immediately available to do so;
- b) It is possible to be able to implement an action but there are no immediately available financial resources to do so;

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<sup>11</sup> [HC Deb 13 December 2007, c791W](#)

<sup>12</sup> [HC Deb 13 March 2007, cc196-197W](#)

<sup>13</sup> [HC Deb 2 December 2009, c766W](#)

- c) It is not possible to implement any action because there is no scope for doing so (e.g. reasonable sound insulation already exists at the affected dwelling, or a noise barrier at its optimum size and location already exists), or there is some overriding technical issue that prevents implementation (e.g. ground conditions do not allow a barrier to be erected); or
- d) It is not possible to implement any action because there would be large adverse non-acoustics effects that could not be accommodated by the proposed measure. Such non acoustic effects could include an adverse effect on safety, or a significant adverse air pollution impact, or an unacceptable increase in congestion or journey times.<sup>14</sup>

These preliminary stages are expected to be complete by April 2011 at which point the “relevant highway authorities implement or secure budget for actions, this will also include liaison with stakeholders”.<sup>15</sup>

Further information, including local maps and charts, is available on the [Defra noise mapping website](#).

## 4 Noise mitigation measures

The March 2010 noise action plan for road traffic noise outside agglomerations sets out the measures available to highway authorities to alleviate road traffic noise impacts:

### Control of Noise at Source

Noise from individual vehicles is controlled under mandatory EU noise emission standards which apply to all new road vehicles. These have been implemented in regulations made under the Road Traffic Acts. These requirements must be met by all models, or in the case of heavier vehicles, by engine types, before vehicles are permitted to enter into service. In addition, once in service, silencers and exhaust systems are required to be maintained in good condition and not altered so as to increase noise. Noise made by the contact of tyres with road surfaces when in motion is also controlled through an EU directive which since 2005 has mandated noise limits that all tyres fitted to newly manufactured vehicles have to meet. This directive has also been implemented in regulations made under the Road Traffic Acts. By 2011 through a phased introduction, all replacement tyres will have to meet the same noise limits as tyres fitted to newly manufactured vehicles. Further reductions in tyre noise limits will take effect from 2016 under new legislation.

### Planning controls

When proposing the construction of a new road, or an additional carriageway to an existing road, a noise impact assessment must be carried out. For large scale projects, an Environmental Impact Assessment is required by law, which would include a noise impact assessment. In addition, the Highways Agency requires a noise impact assessment to be undertaken if there is an expected increase of 1 dB LA10,18h as a result of any works it carries out on its network, including maintenance. The process which tends to be followed is set out in the Design Manual for Roads and Bridges. Mitigation such as optimising the route alignment and the use of noise barriers, either through landscaping or purpose built walls or fences, is included in the design to minimise any adverse noise impact. This process also has regard to the protection of tranquil areas in general through consideration of the impact on landscape.

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<sup>14</sup> Defra, *Noise Action Plan Major Roads (outside first round agglomerations)*, March 2010, paras 7.11-7.13

<sup>15</sup> *ibid.*, p4, diagram 1.1

Once the basic data regarding the potential impact of the proposals has been obtained (including predicting the noise from the new network), an estimate of the likely numbers of people to be affected is made. In addition, through the Transport Appraisal Guidance, the noise impact is monetised as a means of evaluating the overall merits of the proposal.

Through the operation of the land use planning system, a noise assessment would normally be carried out for any proposed residential development that may be affected by road traffic noise. Planning Policy Guidance 24 provides guidance regarding the suitability or otherwise of the site for such development. Guidance is also given about the type of mitigation that might be needed in order to achieve appropriate internal noise levels within homes. The approaches used to achieve these levels include designing appropriate façade insulation or optimising the proposed layout of the buildings.

[...]

### **Compensation and insulation**

For new or improved highways, the Land Compensation Act 1973 allowed regulations to be promulgated to provide compensation for dwellings affected by increased noise. These regulations are the Noise Insulation Regulations 1975, as amended 1988. If certain criteria are met, the highway authority must offer secondary glazing and alternative ventilation for habitable rooms of dwellings so affected.

In addition, Part 1 of the Land Compensation Act provides for monetary compensation to those home owners affected by the new or improved highway recognising any loss in value of the home that has occurred by the opening of the new or improved highway. This assessment is purely subjective, carried out by surveyors, and claims have to be made within a certain time period.

### **Maintenance**

It is the Highways Agency's current policy that when a length of highway requires a replacement road surface (due to wear and tear) the opportunity is often taken to lay a low noise road surface, one that assists in reducing the noise generated by the tyre/road interface. Other highway authorities adopt a similar policy to varying extents.

### **Specific Initiatives**

From time to time a highway authority will undertake a specific noise abatement initiative. Arguably the most notable example is the work being carried out by the Highways Agency, where it is addressing sites on the motorway and trunk road network that have been identified as having the most pressing noise problems. Around 60 sites across that network have benefited from additional noise mitigation either through the application of low noise road surfaces or by the use of noise barriers since around 1999/2000. Additional sites are already under consideration for noise abatement works during the next few years.

### **Limit values**

There are no relevant formal noise limit values in force in England with regard to environmental noise levels from major roads. However, the Noise Insulation Regulations 1975 (as amended in 1988) define a threshold level as part of the eligibility criteria. Furthermore, there are guideline levels to be found in Planning Policy

Guidance 24 that provides guidance on land use with respect to noise from road traffic.<sup>16</sup>

One of the most popular noise mitigation measures is noise barriers. Highway authorities have the power to implement noise barriers where traffic will cause excessive noise. The locations in which barriers are erected are determined by their eligibility to be put forward for consideration and prioritisation by the Highways Agency, following testing of the noise at the location. Once a site has been selected, however, it is down to the highway authority's interpretation of the (non-statutory) *Design Manual for Roads and Bridges* as to how and where exactly the barrier will be located.<sup>17</sup> The manual sets out the statutory obligations of the highway authorities in cases where noise pollution is an issue:

Under the respective legislation, occupiers of property within 300m of a new road are entitled to be offered appropriate insulation if the noise from traffic on it reaches a specified level at the property. The entitlement to insulation is governed by the Noise Insulation Regulations which refer to the method of noise prediction to be used [...]

The occupier of a property may also claim monetary compensation for any loss in value of the property caused by the presence of the road. Compensation may be payable even where the noise at a property does not reach the qualifying level and whether or not it is situated within 300m of the road. Careful consideration of road alignment options and mitigation measures can avoid noise and visual intrusion on properties, with consequential savings in compensation costs.

Highway authorities are empowered to carry out "works for mitigating any adverse effect which the construction, existence or use of a highway has or will have on its surroundings". They are also given the power to acquire land additional to that needed for construction of the road itself to permit landscaping or the creation of earth mounds. The interpretation of "works" in this context is fairly broad and includes amenity treatment such as grassing and planting of trees and shrubs on landscape areas. In this context both noise and visual intrusion are adverse effects which can properly be mitigated by the use of earth mounds, barriers and planting.

Properties affected by new roads may in extreme cases be acquired at the discretion of the highway authority where mitigation cannot prevent living conditions becoming intolerable either during construction or after the road is opened. In certain circumstances affected properties (within 100m of the centre line) may be acquired in advance of construction.<sup>18</sup>

Since 1999, it has been the Highways Agency's policy to use low-noise surfacing materials for all new roads and when resurfacing existing roads.<sup>19</sup> Volume 7 of the manual gives information as to road surfaces and noise reduction. It states:

Where traffic speeds are lower than 50 km/hr, traffic noise is mainly attributable to engine, transmission and exhaust noise, especially from lorries. Where speeds are higher, the major component of traffic noise comes from the tyre/road interface. This noise comes from, amongst other things, vibration of the tyre wall, compression of air within the contact area of the tyre, and the snapping out of the tread blocks as they

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<sup>16</sup> *ibid.*, paras 3.03-3.13

<sup>17</sup> Highways Agency, *Design Manual for Roads and Bridges, Vol. 1, Section 0, Part 1*, August 1997, paras 1.14-1.17

<sup>18</sup> *ibid.*, paras 2.7-2.10; the full guidance on the location and construction of motorway noise barriers is contained in the *DMRB, Vol. 10, Section 5, Part 1*

<sup>19</sup> [HC Deb 25 March 2008, c93W](#)

leave the road surface. The quality of the road surface, tyre design and vehicle speeds all have an effect on tyre noise.<sup>20</sup>

## 5 Compensation

The *Land Compensation Act 1973*, as amended, specifically excludes the claiming of compensation where there has been intensification of use of an existing road although it **can** provide for compensation to be paid where the value of a property is adversely affected by physical factors, such as noise, vibration, smell, fumes, smoke and artificial lighting. There is no statutory requirement for compensation to be paid to those who live next to public works, such as roads and railways, purely because traffic has increased. The view is taken that those who purchase property near existing roads or railways do so in the knowledge that traffic can change in composition or volume, and that it would not be right to require the relevant authorities to pay compensation solely because traffic patterns have altered in this way.

When a new road is built a calculation is made of future noise levels. The highway authority then offers those eligible help with insulation. It may also install sound barriers to help avoid reaching the projected levels and these may be used in conjunction with earth mounding to hide traffic as it is recognised that continuous passing traffic can be stressful. The rules state that a dwelling within 300 metres of road works would be eligible for help if it is calculated that within 15 years from the opening of the new or altered road:

- the traffic noise level at one or more facades will increase by at least 1dB(A) and will be not less than the specified level of 68 dB(A) L10 (18 hour);<sup>21</sup> and
- noise caused or expected to be caused by traffic using the new or altered section of road will contribute at least 1dB(A) to the noise level.

The Highways Agency's general view is that if a property was eligible for compensation under the 1973 Act then noise levels would have been taken into account and any further noise mitigation once compensation has been settled would be double counting. For this reason it will not install acoustic fencing on motorways that have already been completed. However, in exceptional circumstances help may be given to those suffering from noise under section 282 of the 1980 Act, usually by the construction of noise barriers on the highway as opposed to insulating an individual's property.

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<sup>20</sup> Highways Agency, *Design Manual for Roads and Bridges, Vol. 7, Section 5, Part 1*, November 2006, para 5.1; information on the merits of different types of road surfacing, such as porous asphalt and 'whisper' concrete can be found in: *DMRB, Vol. 7, Section 5, Parts 1-3*

<sup>21</sup> L10 is the noise level in dB(A) - decibels measured by reference to human hearing - which is exceeded for 10 per cent of a given period of time; in the regulations, L10(18 hour) is the arithmetic average of all hourly L10 values during the period 06.00-24.00 on a normal working day