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**SURFACE TRANSPORT NOISE STRATEGY FOR  
BRISTOL**

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## **Executive Summary**

This document provides Bristol's framework for dealing with road and rail noise throughout its area within the context of strategic planning, development control and environmental noise legislation.

It also provides the framework for action to control noise from these sources for the wider Bristol urban area within the context of the requirements of the European Environmental Noise Directive and the national legislation for England implementing that directive.

## **Strategy Aims**

The following are the main aims of this strategy:

- To integrate the planning, acoustic and environmental disciplines within Bristol and within the wider Bristol urban area defined as the Bristol agglomeration in the Environmental Noise (Identification of Noise Sources) (England) Regulations 2007.
- To provide the framework for the implementation of local noise action plans for the Bristol agglomeration.
- To reduce, where practicable, the exposure of the population to surface transport noise.
- To avoid significant adverse health effects from exposure to surface transport noise.
- To secure an appropriate level of priority for environmental noise to ensure that the above aims are achieved.

## **Key Objectives**

The key objectives of the strategy are:

- Integrate the noise strategy explicitly into other City Council strategic plans by June 2009.
- Development and adoption of a local noise action plan for the agglomeration of Bristol by the end of December 2009.
- Continuation of development of Bristol's noise mapping expertise and capability to support the action planning process and to inform other Council strategies, plans and similar documents.

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## 1 Introduction

This document details Bristol's strategy for managing environmental noise from surface transport sources, namely road and rail transport, within the Bristol City Council area. It is intended that in due course this document will be incorporated into a wider noise strategy for the city dealing with all environmental noise sources that affect the citizens of Bristol, including neighbour and neighbourhood noise, entertainment noise, commercial and industrial noise, and aircraft noise. The overall noise strategy will not however consider noise within the workplace.

This surface transport strategy also sets the broad framework for the development and adoption of local noise action plans and must be considered within the context of work being undertaken on behalf of central government's Department for Food and Rural Affairs (Defra) by the City Council with partners including neighbouring authorities for the greater Bristol urban area, described as the Bristol agglomeration, which encompasses parts of those neighbouring unitary authorities of Bath and North East Somerset Council, North Somerset Council and South Gloucestershire Council.

For the purposes of this document references to Bristol mean the area within the boundaries of the administrative area of Bristol City Council; and, any references to the Bristol agglomeration mean the area defined as such within the Environmental Noise (Identification of Noise Sources) (England) Regulations 2007.

## 2 European and National Legislative Context for this strategy

### 2.1 European Context

In 1996 the European Union (EU) published a Green Paper on noise which advised that, at the time, around 20 percent of the Union's population or close to 80 million people suffer from noise levels that scientists and health experts consider to be unacceptable, where most people become annoyed, where sleep is disturbed and where adverse health effects are to be feared. An additional 170 million citizens are living in so-called gray areas where the noise levels are such to cause serious annoyance during the daytime+[EC, 1996, p. 2].

At that time the EU comprised 15 member states but has since expanded to include a further 12 countries. The above population figures will thus be a significant under-estimation of the numbers of people throughout the union that are exposed to unacceptable noise levels, or levels which cause serious annoyance during the day.

In order to address the adverse impacts of this noise exposure, in 2002 the EU adopted Directive 2002/49/EC relating to the assessment and management of environmental noise, commonly referred to as the Environmental Noise Directive (END). The directive relates to noise from road, rail and air traffic, and from agglomerations and it defines environmental noise as meaning unwanted or harmful outdoor sound created by human activities, including noise emitted by means of transport, road traffic, air traffic, and from sites of industrial activity such as those concerning integrated pollution prevention and control.

The END places responsibilities on member states for strategic noise mapping, action planning, provision of information to the public and to the European Commission, and for determining the competent authorities within their areas to carry out the noise mapping and action planning processes. It also provides the timetables for completion and review of these noise maps and action plans. The overall aim is that member states ensure that the in noise.

competent authorities draw up and revise action plans to manage the above noise issues and their effects, including noise reduction if necessary.

Another important aspect of the directive is to require member states to protect quiet areas against an increase

Appendix 1 outlines the requirements of the END.

A useful summary of the EU legal framework and recommendations for research can be found in Research for a Quieter Europe in 2020, September 2007, produced by the CALM II Network and available at: [http://www.calm-network.com/SP\\_2020\\_final07.pdf](http://www.calm-network.com/SP_2020_final07.pdf).

## 2.2 National Context

### 2.2.1 Transposition of the END into regulations for England

Within the United Kingdom, the provisions of the END have been implemented separately for England and for the devolved assemblies of Northern Ireland, Scotland and Wales. For the purposes of this document the legislative framework within England is relevant.

The END was transposed into legislation in England and came into force on 1<sup>st</sup> October 2006 as the Environmental Noise (England) Regulations 2006. These regulations define the competent authorities for noise mapping and action planning for the various noise sources as follows:

**Mapping:**

Roads, rail, designated airports and agglomerations - Secretary of State.

Non-designated airports - airport operators.

**Action Plans:**

Roads, rail and agglomerations - Secretary of State.

All airports - Airport operators.

Additional regulations, the Environmental Noise (Identification of Noise Sources) (England) Regulations 2007, have defined the 22 first round agglomerations within England to which the END applies and these include the urban area of greater Bristol, termed the Bristol agglomeration within the regulations. The urban areas included in the first round agglomerations are those with a population exceeding 250,000 and where the population density exceeds 500 person per square kilometre.

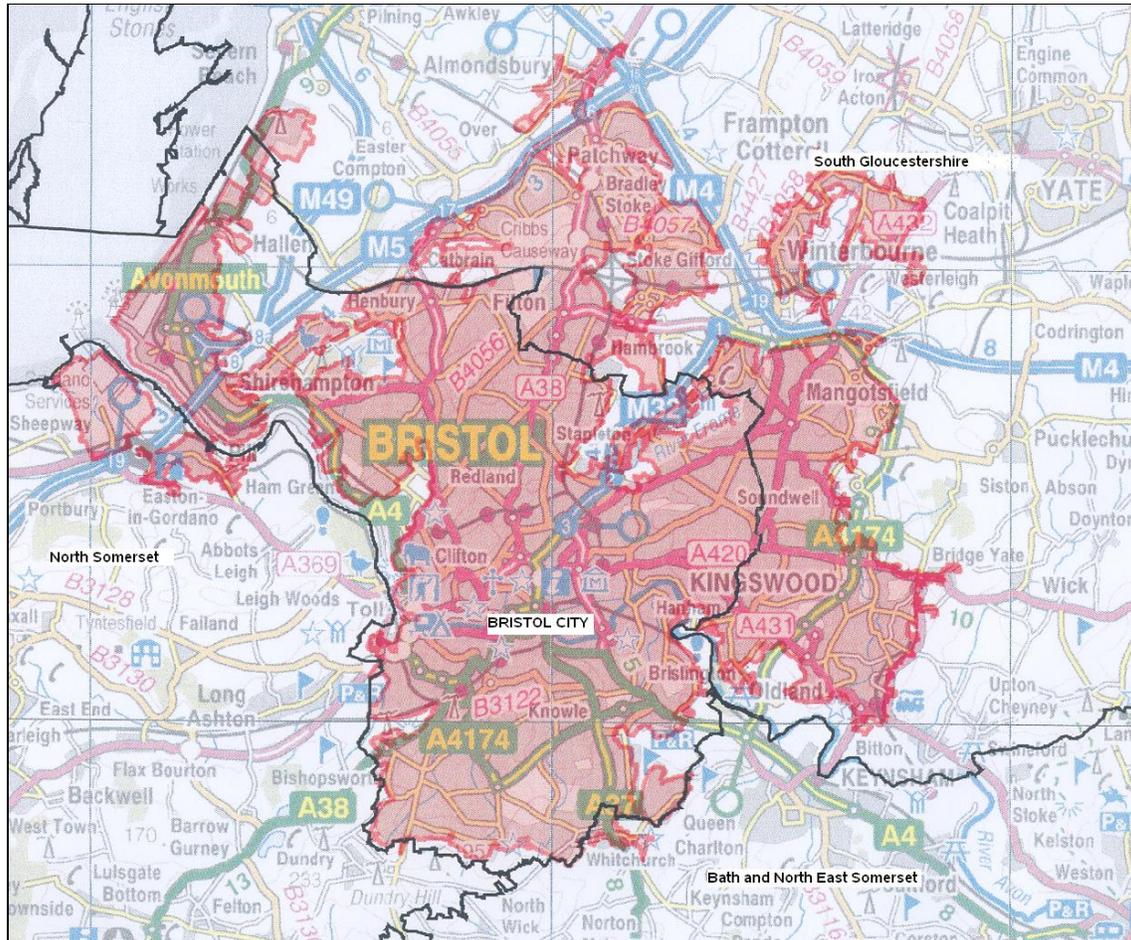
Figure 1 below shows the map of the Bristol agglomeration incorporating the boundaries of Bristol City Council and its neighbouring authorities. This agglomeration encompasses almost all of the City Council's area, which comprises 67.61% of the agglomeration. The remaining 32.39% falls within the neighbouring authorities (South Gloucestershire: 31.01%, North Somerset: 0.97%, and Bath and North East Somerset: 0.41%) . Source: Research into quiet areas . Recommendations for identification - September 2006. Department for Environment, Food and Rural Affairs (Defra) 2007.

### 2.2.2 Noise Mapping under the Environmental Noise (England) Regulations 2006

In England the first-round noise mapping process is nearing completion although most noise maps have not yet been made public. At the present time the only published maps are those for major airports which are available on Defra's website at: <http://www.defra.gov.uk/environment/noise/ambient.htm#aviation> .

For the Bristol agglomeration area it is anticipated that the noise maps will be published early in 2008, and should then be available on the same website. These particular noise maps have been produced by consultants working on behalf of the Secretary of State without the involvement of Bristol City Council or its neighbouring authorities.

**Figure 1 Bristol agglomeration for the purposes of the END**



### 2.2.3 Action planning under the Environmental Noise (England) Regulations 2006

As indicated above action planning within England remains the responsibility of the Secretary of State. Action plans for the first round are required to be completed by June 2008. They will then have to be repeated on a five-year cycle, and reviewed and revised if necessary when a major development occurs affecting the noise situation. In order to assist the preparation of action plans Defra are producing guidance documents for the various noise sources and publication of these documents is expected in 2008. To date only the guidance for airport action plans has been provided in draft consultation form, on limited circulation, and this document has not yet been made publicly available.

Annex V of the END details the minimum requirements for action plans and is referenced in the above regulations. Annex V is repeated in Appendix 2 of this document.

There will be very close links between the aims of this strategy and action planning within Bristol for the purposes of the END. Once Defra have published their guidance for action

plans it is anticipated that this strategy will have to be reviewed to take into account information within that guidance.

Action planning in relation to Bristol City Council's area within the context of the Bristol agglomeration is considered in Chapter 9 of this document.

#### **2.2.4 Existing Planning Controls**

Prior to any development taking place planning consent must be obtained from the local planning authority under the Town and Country Planning Act 1990 (as amended). In certain cases involving larger scale development proposals an environmental impact assessment (EIA) must be undertaken to comprehensively consider all impacts, including noise, that the proposal may have on the environment, and these, together with appropriate mitigation, are included within an overall Environmental Statement for the development.

Whether the proposal falls within the normal planning application process or EIA procedures in either case noise is a material consideration from the perspective of:

- any potential impacts that noise sources in the locality may have on the development and its subsequent occupiers; and,
- any potential noise impact the development may have on the environment, and on persons living and working within the locality, and on other parts of the development.

In effect the planning system should ensure that, wherever practicable, noise-sensitive developments are separated from major sources of noise (such as road, rail and air transport and certain types of industrial development) and that new development involving noisy activities should, if possible, be sited away from noise-sensitive land uses.

The developer, or an agent acting on that person's behalf, must make a planning application to the local planning authority, Bristol City Council for the Bristol area, and include all necessary information to allow the application to be properly assessed.

The planning authority will then consult their noise control colleagues, to ensure that noise issues are properly dealt with prior to commencement of the development. In certain cases, where noise issues cannot be resolved, planning permission may be refused.

The requirements, referred to above, in relation to environmental impact assessment are implementation of EC Directive 85/337/EEC (as amended by Directive 97/11/EC) and are transposed into national legislation as the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999.

Schedules 1 and 2 of these regulations detail the types of proposals that are subject to EIA procedures. (see <http://www.communities.gov.uk/documents/planningandbuilding/pdf/157989> and <http://www.communities.gov.uk/documents/planningandbuilding/pdf/146937> respectively)

An examination of these two schedules, particularly Schedule 2, reveals that many developments within an urban authority the size of Bristol will require an EIA. An extract of that schedule is shown below in Table 1. Officers from the City Council's Pollution Control Team, who deal with noise control matters, will work with their development control colleagues and the applicant to ensure that noise issues are adequately addressed within the Environmental Statement for the development.

#### **2.2.5 Noise Insulation Schemes**

Within the UK there are statutory requirements for the provision of noise insulation in specified circumstances, in respect of noise from roads, railways and near to airports.

### **2.2.5.1 Road Traffic Noise**

Under the Noise Insulation Regulations 1975 the appropriate highway authority will provide insulation in the form of secondary glazing to the windows and glazed doors, of dwellings and other buildings used for residential purposes, or payment of grants for this purpose, where such properties are not more than 300 m from the nearest point of a new highway, including an additional carriageway added to an existing highway, or an alteration affecting the line or level of an existing highway. The provision of insulation or grant is subject to there being a measured, or predicted increase in noise within the next 15 years, of at least 1 dB(A), at 1m from an eligible façade of the property, which is attributable to the traffic on the new or altered highway from that prevailing before construction started, provided the level exceeds 68  $L_{A10,18hr}$ . Noise levels are calculated, or measured, in accordance with guidance contained within Calculation of Road Traffic Noise, 1988, HMSO.

However, sound insulation schemes do not apply where dwellings are affected by noise from a general increase in traffic flows on existing, unaltered roads even if that increased flow arises from traffic management changes, or re-routing of traffic from elsewhere.

### **2.2.5.2 Railway Noise**

Under the Noise Insulation (Railways and Other Guided Transport Systems) Regulations 1996 an authority responsible for constructing a new railway, tramway or other guided transport system, or for adding to an existing system, has a similar duty to provide insulation for dwellings and other buildings used for residential purposes, or to pay grant for insulation for buildings within 300 metres. Noise levels are calculated, or measured, in accordance with guidance contained within Calculation of Railway Noise (as amended), 1995, HMSO.

Noise insulation schemes under any of the above statutory provisions are subject to qualifying dates: they are not open-ended.

### **2.2.5.3 Highways Authority – Statutory Duty**

Section 41, Highways Act 1980, places a responsibility on Bristol City Council, as highway authority for its area, to maintain, at the public expense, all adopted highway within the city. This amounts to 1191 kilometres of road, ranging from major dual-carriaged-way roads, such as the A4 Portway, to narrow urban and suburban streets.

### **2.2.5.4 Other legislation covering noise from roads and streets**

In addition local authorities have statutory powers to deal with noise from vehicles, machinery and equipment in the street under nuisance provisions within the Environmental Protection Act 1990 (as amended) and can deal with certain aspects of noise in the street under the Control of Pollution Act 1974.

These are considered to be neighbourhood noise issues and as such are not covered by this document. It is anticipated however that these matters will be incorporated into Bristol's overall noise strategy when this is developed in due course.

**Table 1 Extract of Schedule 2, The Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations**

Column 1 Description of development	Column 2 Applicable thresholds and criteria	Column 3 Indicative thresholds and criteria
<b>10. Infrastructure projects</b>		
b) Urban development projects, including the construction of shopping centres and car parks, sports stadiums, leisure centres and multiplex cinemas;	The area of the development exceeds 0.5 hectare	In addition to the physical scale of such developments, particular consideration should be given to the potential increase in traffic, emissions and noise ..
d) Construction of railways, (unless included in Schedule 1);	The area of the development exceeds 1 hectare	For linear transport schemes, the likelihood of significant effects will generally depend on the estimated emissions, traffic, noise and vibration and degree of visual intrusion and impact on the surrounding ecology.
f) Construction of roads, (unless included in Schedule 1);	The area of the works exceeds 1 hectare	

## 3 Policy Framework

### 3.1 European Policy

In its introduction the European Green Paper published in November 1996 states that, environmental noise, caused by traffic, industrial and recreational activities is one of the main local environmental problems in Europe and the source of an increasing number of complaints from the public. This Green Paper is the first step in the development of such a programme and aims to stimulate public discussion on the future approach to noise policy.

It reviews the overall noise situation in the Community and national action taken to date followed by the outline of a framework for action covering the improvement of information and its comparability and future options for the noise from different sources.

This green paper has been the main driver for ensuing EU policy and for the Environmental Noise Directive.

### 3.2 National Noise Policy in England

#### 3.2.1 Planning and Noise

The main existing policy document for noise from surface transport and other sources is Planning Policy Guidance 24, Planning and Noise, 1994.

The summary of this document states:

Planning Policy Guidance 24 (PPG24) guides local authorities in England on the use of their planning powers to minimise the adverse impact of noise.

It outlines the considerations to be taken into account in determining planning applications both for noise-sensitive developments and for those activities which generate noise. It explains the concept of noise exposure categories for residential development and recommends appropriate levels for exposure to different sources of noise.

It also advises on the use of conditions to minimise the impact of noise. Six annexes contain noise exposure categories for dwellings, explain noise levels, give detailed guidance on the assessment of noise from different sources, gives examples of planning conditions, specify noise limits, and advise on insulation of buildings against external noise.

This guidance introduced the concept of Noise Exposure Categories (NECs), ranging from A-D, to help local planning authorities in their consideration of applications for residential development near transport-related noise sources.

Category A represents the circumstances in which noise is unlikely to be a determining factor, while Category D relates to the situation in which development should normally be refused. Categories B and C deal with situations where noise mitigation measures may make development acceptable.

Annex 1 to the PPG illustrates this approach in more detail and an abstract of the annex is attached to this strategy as Appendix 3. The noise exposure categories (NECs) for road, rail and mixed sources from this document can be seen in that Appendix.

The following paragraph outlines the general principles within PPG 24.

The impact of noise can be a material consideration in the determination of planning applications. The planning system has the task of guiding development to the most appropriate locations. It will be hard to reconcile some land uses, such as housing, hospitals or schools, with other activities which generate high levels of noise, but the planning system should ensure that, wherever practicable, noise-sensitive developments are separated from major sources of noise (such as road, rail and air transport and certain types of industrial development). It is equally important that new development involving noisy activities should, if possible, be sited away from noise-sensitive land uses. Development plans provide the policy framework within which these issues can be weighed but careful assessment of all these factors will also be required when individual applications for development are considered. Where it is not possible to achieve such a separation of land uses, local planning authorities should consider whether it is practicable to control or reduce noise levels, or to mitigate the impact of noise, through the use of conditions or planning obligations.

### 3.2.2 National Noise Strategy

The development of an ambient noise strategy was first proposed within the context of the rural white paper in November 2000. This was followed in 2001 by the publication by Defra of a consultation paper entitled, Towards a National Ambient Noise Strategy.

Bristol City Council, was one of 234 respondents to this consultation paper, and remains supportive of the development of a national strategy for noise from all sources. Defra has given a commitment to developing an overall noise strategy and its website states, %The Government plans to issue a combined National Noise Strategy covering both environmental and neighbourhood noise by the end of 2007.+Obviously this date has already been missed but it is hoped that the consultation draft will be published early in 2008, with the final document following on later.

The National Noise Strategy will, no doubt, take into account the noise mapping and action planning requirements of the END and will have close links with this strategy. No doubt, the National Noise Strategy will take into account the emerging Defra guidance with regard to action planning, mentioned in 2.2.3 above.

It is likely that this strategy will have to be revised to ensure proper integration with the national strategy once published.

### 3.2.3 Regional Planning Policy

In June 2006 the South West Regional Assembly published the Draft Regional Spatial Strategy for the South West, 2006-2026, which incorporates Bristol. That document, states that the greater Bristol area is the largest urban area in the region with a population of 551,000 and is recognised as being the economic hub of the South West.

The spatial strategy acknowledges the need for a strategic approach to development and transport within the region to achieve sustainable growth and meet the economic and environmental needs whilst supporting the demands for additional housing and other infrastructure from an increasing population.

Within the overall document there are sub-regional statements and the West of England Spatial Strategy focuses on Bristol and its neighbouring unitary authorities of Bath and North East Somerset, North Somerset and South Gloucestershire.

The West of England Spatial Strategy is supported by sub-regional policies and SR4 from that document is repeated below.

#### %SR4

Bristol will maintain its role as a Core City and to ensure that it remains the economic hub of the South West, provision will be made for job growth in the Bristol TTWA to accommodate at

least 92,000 jobs over the plan period complemented by provision for an average of about 3,200 dwellings per annum within and adjoining Bristol's urban area over the plan period.

Development at Bristol will focus on the reuse of previously developed land and buildings within the urban area, maximising densities, to provide about 40,000 dwellings complemented by the provision of urban extensions planned and developed as sustainable communities to deliver a high quality of life through high standards of design and green infrastructure, protecting and maintaining environmental assets and landscape setting. Authorities will cooperate in master planning and phasing to accommodate mixed-use development at the following broad locations,:

- South west of Bristol, about 10,500 dwellings (Area of Search A);
- South east of Bristol, about 6,000 dwellings (Area of Search B);
- and North and north east of Bristol, about 8,000 dwellings (Areas of Search C and D).

Investment will be made in key infrastructure to enable the achievement of the development proposed in this Policy+

With regard to the latter 4.2.13 of the spatial strategy states that key infrastructure required will be identified through the Implementation Plan and will include:

- Greater Bristol Bus Network/showcase bus routes along strategic corridors;
- Major Park and Ride improvements;
- Strategic rapid transit network (Hengrove/North Fringe, Ashton Vale/ Emerson's Green, Bath/Cribbs Causeway);
- Improvements to the roads in South Bristol, including the South Bristol Ring Road, improving access to the Airport and facilitating investment for regeneration of south Bristol;
- Selective additional strategic highway capacity to serve business investment and selective additional strategic links to motorways and other trunk route networks, including investigation of a new River Avon crossing and Bristol Parkway link;
- Coastal defences expected to be necessary to enable the economic potential of Avonmouth and Severnside to be realised;
- Improvements to the Greater Bristol Rail Network, such as additional turn-round facilities and platform capacity to allow increases in cross Bristol local services

The spatial strategy recognises that, in the forthcoming years, there will be considerable expansion of housing, other developments and transport links in and around the fringes of Bristol City Council area. In fact a recent review of the spatial strategy recommends that 30,000 new homes will be required within the Bristol City area leading up to 2026.

All future developments will be carefully considered within the context of this surface transport noise strategy to ensure that there is no significant degradation of noise climate as a result of new infrastructure projects; and that new noise-sensitive developments, such as housing, associated schools, etc are not located in areas with an existing unacceptable noise climate, unless adequate mitigation is incorporated to protect them.

The spatial strategy also acknowledges that the urban expansion cannot be accommodated without reduction of Green Belt land on the fringes of the city. These are areas that will possibly be considered in due course as potential quiet areas within the context of the emerging action planning process under the terms of the END. Whilst the Green Belt lies outside Bristol City Council's administrative area it falls within, or adjacent to, parts of our neighbouring authorities in the defined Bristol agglomeration in the Environmental Noise (Identification of Noise Sources) (England) Regulations 2007 (see Figure 1 above).

As stated earlier Bristol will be taking a co-ordinating role for action planning for the agglomeration. It will therefore be appropriate to ensure that, as far as practicably possible, measures are in place as part of this strategy to protect defined quiet areas arising from this strategy and also those within the forthcoming local noise action plan for the purposes of the END.

### **3.2.4 Joint Local Transport Plan**

The four unitary authorities within the West of England, including Bristol, have developed a joint local transport plan (JLTP) to plan and deliver transport improvements in the sub-region.

The shared priorities of the plan are:

- To tackle congestion;
- To improve road safety for all road users;
- To improve air quality;
- To improve accessibility; and,
- To improve the quality of life.

Tackling noise and enhancement of public spaces are two of the shared objectives which contribute to the latter aim of improving the quality of life.

The plan contains a programme of £129.6 million worth of measures for transport improvements within the sub-region, a significant amount of which are aimed at Bristol.

The noise impacts of these improvements will be considered within the context of environmental assessments to ensure that they are introduced in a beneficial way. The synergy between noise and air quality effects of proposals will also be considered to ensure that any benefits for one do not have detrimental effects on the other.

Some aspects of the plan have already been considered and are examined more fully later in this document.

### **3.2.5 Bristol's Planning Policy**

#### **3.2.5.1 The Bristol Local Plan**

The Bristol Local Plan, adopted in 1997, sets the land use and development strategy for the future of the City and forms an important part of the Council's policy framework. The Plan is a statutory document required under the Town and Country Planning Act 1990. It is one of the key policy documents that lead and direct planning and investment in the City and a fundamental means to deliver sustainable development.

The Bristol Local Plan advises prospective developers where they should seek to build new homes, shops and offices, and of important areas of open space and the City's historic environment. When planning applications are submitted, the Plan helps decide whether these applications should be approved.

The Local Plan recognises the adverse affects noise can have and in its paragraph 2.4.10 states, %Noise can be a major nuisance in urban areas. Excessive levels of noise can cause stress and other related problems affecting peoplesqhealth. Noise can also adversely affect wildlife. The main causes of noise pollution in Bristol are road traffic, industrial development and social and domestic sources. Also offices and other types of development can cause noise and disturbance problems indirectly, for example through the generation of traffic. Certain types of development are particularly sensitive to noise, for example, housing, schools and hospitals. The background levels of noise in residential areas are often very low. The introduction of noisy activities into such areas can therefore be particularly disruptive.

The City Council will pay particular attention to any likely increase in ambient noise levels when determining planning applications.

In paragraph 2.4.11 it also emphasises the relevance of PPG 24 Planning and Noise to how the planning system can be used to reduce the impact of noise on people. The guidance outlines two main approaches.

Its main policy for noise control is:-

ME4

(I) Development which has an unacceptable impact on the environmental amenity or wildlife of the surrounding area by reason of noise will not be permitted.

(II) In determining planning applications in areas of existing noise such as roads, aerodromes, railway lines, industrial/commercial developments and sporting, recreational and leisure facilities, account will be taken of the provision of adequate sound insulation measures.

Implementation: The city council through the process of development control will seek to ensure the incorporation of one or more measures as appropriate to reduce the impact of noise, either in the initial design of a development proposal or by the use of planning conditions and planning obligations. When determining planning applications close liaison will be sought with the Directorate of Health and Environmental Services. Where appropriate the city council may impose conditions specifying acceptable noise limits.

Since the Local Plan was adopted the appropriate departments of the City Council have undergone some considerable reorganisation with the noise control function in the Pollution Control Team being undertaken from within the Neighbourhood and Housing Services Department.

However it is an important part of this strategy that the City Council continues to meet the aims of the Local Plan. This will be achieved by maintaining and improving liaison between the relevant sections of the Planning Transport and Sustainable Development Department and the Neighbourhood and Housing Services Department.

### **3.2.5.2 Local Development Framework for Bristol**

The Bristol Local Plan is being replaced by radical changes to the planning system. The Local Development Framework (LDF) will eventually replace the Local Plan which remains in force until the LDF comes into effect.

A Local Development Framework must include a Core Strategy, Site-Specific Allocations of land, a Proposals Map and may also contain additional optional development documents such as Area Action Plans. These are classed as Development Plan Documents (DPDs) and outline the key development goals of the Local Development Framework.

DPDs are subject to rigorous procedures of community involvement, consultation and independent examination. Once adopted, development control decisions must be made in accordance with the DPDs unless material considerations indicate otherwise. DPDs are also subject to a Sustainability Appraisal to ensure economic, environmental and social effects of the plan are in line with sustainable development targets.

It is clear that this noise strategy must integrate with the Core Strategy within Bristol's LDF. A key element will be that the Council's Pollution Control Team liaise with its Strategic and Citywide Policy colleagues and others to achieve this and thus ensure that noise issues are adequately addressed within the context of the forthcoming LDF. This must also encompass the aims of action planning for the purposes of the END.

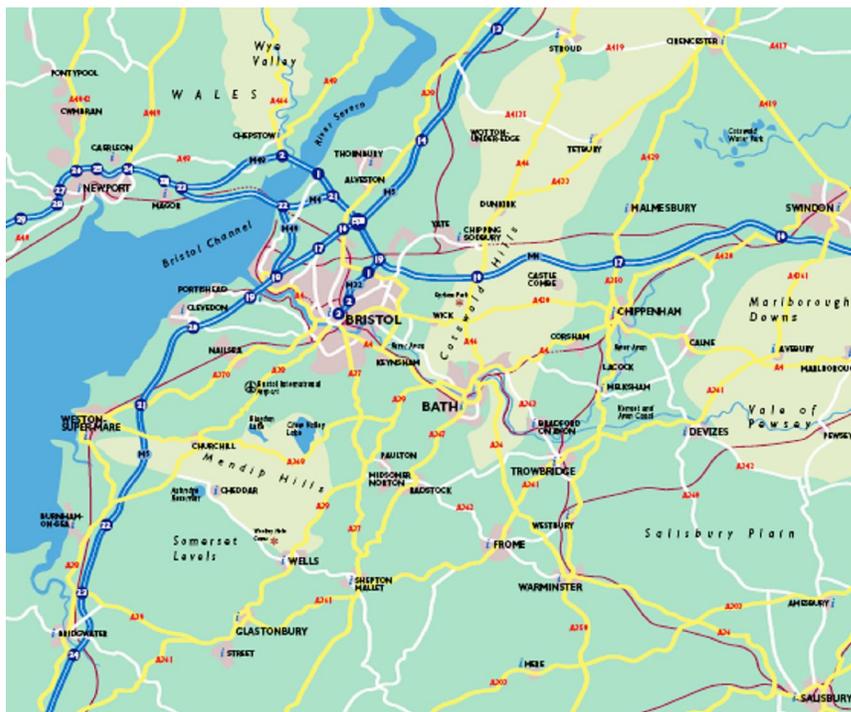
### 3.2.5.3 Major Planning Applications

Bristol City Council Development Control Service has worked closely with Business West and a number of developers, property agents, planning consultants and multi-disciplinary consultancies, to further improve the Development Control Service by jointly developing a clear Protocol for working together to effectively process major planning applications.

The Planning Protocol is available on the City Council's website at: [http://www.bristol.gov.uk/ccm/cms-service/stream/asset/?asset\\_id=20010005](http://www.bristol.gov.uk/ccm/cms-service/stream/asset/?asset_id=20010005) sets out the arrangements for liaison between the City Council and the applicant with regard to major applications, both at the pre-application stage and once the application has been validated.

The Council's Pollution Control Team is committed to playing its part to ensure compliance with this protocol where noise is a material consideration. This is likely to be the situation in most, if not all, major planning applications. The Pollution Control Team will contribute to the Development Teams considering the proposals with major applications.

**Figure 2 Location of Bristol**



## 4 Description of Bristol

Bristol is an urban unitary authority situated on the tidal reaches of the River Avon between south Gloucestershire and north Somerset in the West of England. The north-west part of its district lies on the Severn estuary.

Bristol has a history stretching back for over 1000 years and its development as a city reflects its importance as a regional capital, a thriving international port and a centre for commerce and industry. It is the ninth largest city in England and Wales, and the largest non-metropolitan authority.

Bristol City Council district covers an area of 109.6 square kilometres (42.3 square miles). The population of Bristol is currently around 398,300 (2005 mid-year estimate) and has an average population density of 3621 persons per kilometre.

The city also contains 1205 kilometres of road, including 14 kilometres of motorway. There are also 55.3 kilometres of railway within the city.

Figure 2 above shows the location of the city with regard to the surrounding area, together with motorways (blue), other main roads (yellow and white) and railways (red).

## 5 The role of noise mapping in this strategy

### 5.1 Strategic noise mapping

Through participation in the Silence project Bristol City Council has developed its own capability and expertise to carry out noise mapping.

The Environmental Quality Team of Bristol City Council undertook the work to develop the first noise maps of Bristol during 2006 and 2007. The noise mapping was done using CADNA-A software from Datakustik. The noise mapping algorithms used were the UK methods - Calculation of Road Traffic Noise (CRTN) (HMSO, 1988) for road noise and Calculation of Railway Noise (CRN) (HMSO 1995) for railways. The noise maps have been produced in accordance with the requirements of the Environmental Noise Directive and the Environmental Noise (England) Regulations (2006). Guidance from the Working Group - Assessment of Exposure to Noise (WG-AEN, 2006) was used where relevant in developing the noise maps.

Further information on the noise mapping work done in Bristol is available from Bristol City Council's web site. <http://www.bristol.gov.uk/noisemap>.

These maps are strategic maps where noise levels at a receptor height of 4 metres above ground level are calculated on a 10 metre grid spacing. These levels are then shown on the map in terms of coloured noise contours. These noise levels are annual average noise levels calculated in terms of  $L_{den}$ ,  $L_{night}$ , for average weather conditions. The actual noise levels experienced at a particular location will show significant variation over time due, for example, to changes in traffic flows throughout the day, different wind directions, and other weather conditions. For this reason the maps are not intended to be use as a guide to the noise level that might be experienced, at any one time, outside a particular property.

Figure 3 below shows an example of such a strategic noise map and is a combined road and rail noise map in terms of  $L_{den}$  for Bristol.

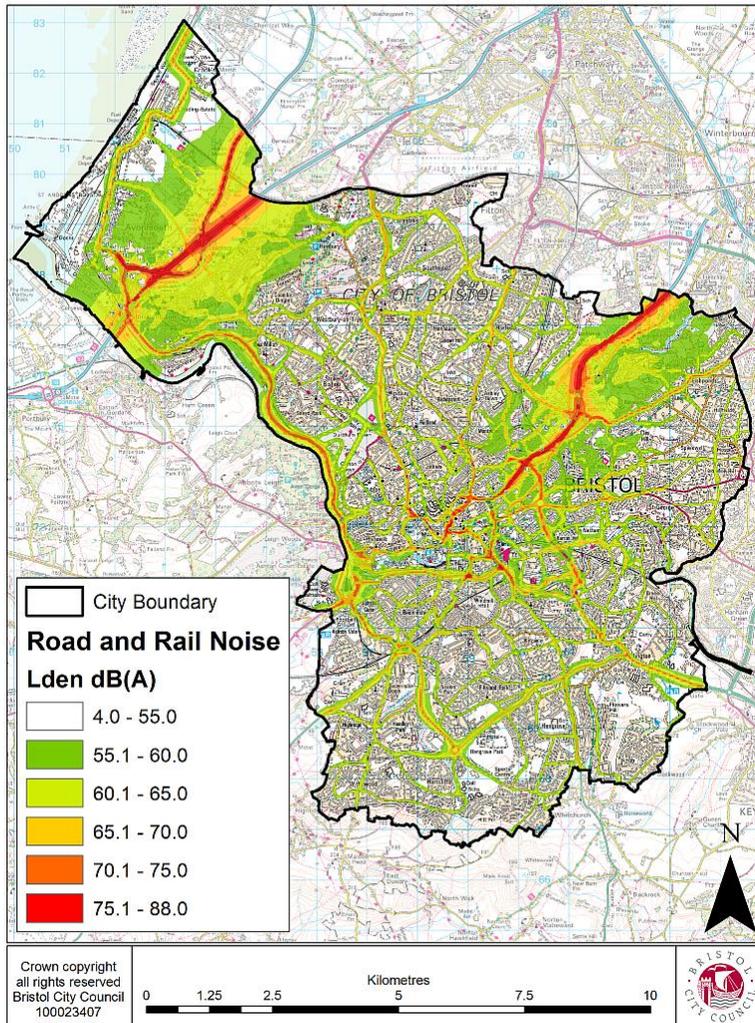
### 5.2 Benefits of noise mapping

The benefits of noise mapping, many of which are inter-related, can be considered to include:

- Identification/quantification scale of noise problems
  - In terms of noise levels - The contours/ grid points indicate the long-term average noise levels in the noise parameter for particular localities,.
  - In terms of the numbers of people exposed to the varying levels - Using a geographical information system (GIS), the populations within particular noise contours, in any specific area of interest can be identified.
- Identification of quiet areas - The maps can be used to help determine quiet areas within the city, which are not subject to intrusive levels of noise from transportation noise sources. This is explored later in this document.

Figure 3  $L_{den}$  Combined road and rail noise

### Road and Rail Noise Map: Bristol 2005



- Provide information
  - For decision makers - This is one of the requirements of the END where the noise mapping data must be supplied by the UK government to the European Commission. At a more local level noise mapping can aid city councillors and officers to make land-use planning decisions.
  - As an indicator of the quality of life - Bristol City Council produces extensive data, at city-wide and Council ward level, on the quality of life. (See Quality of Life in Bristol 2006 at: <http://www.bristol.gov.uk/cdm/content/Council-Democracy/Statistics-Census-Information/draft-indicators-of-the-quality-of-life-report-2006.en>. Figure 4 below shows a ward by ward perception of road traffic noise from Bristol's Quality of Life survey.
  - Using a GIS, areas of wards within each contour band from the noise map can be calculated. Similarly using the GIS, the percentage of each ward population that lies within each noise contour can be determined. This information can

then be compared on a ward-by-ward basis as an indicator of the quality of the noise climate for each ward, and hence contribute to the understanding of the quality of life.

**Figure 4 Perception of road traffic noise from Bristol's Quality of Life survey**

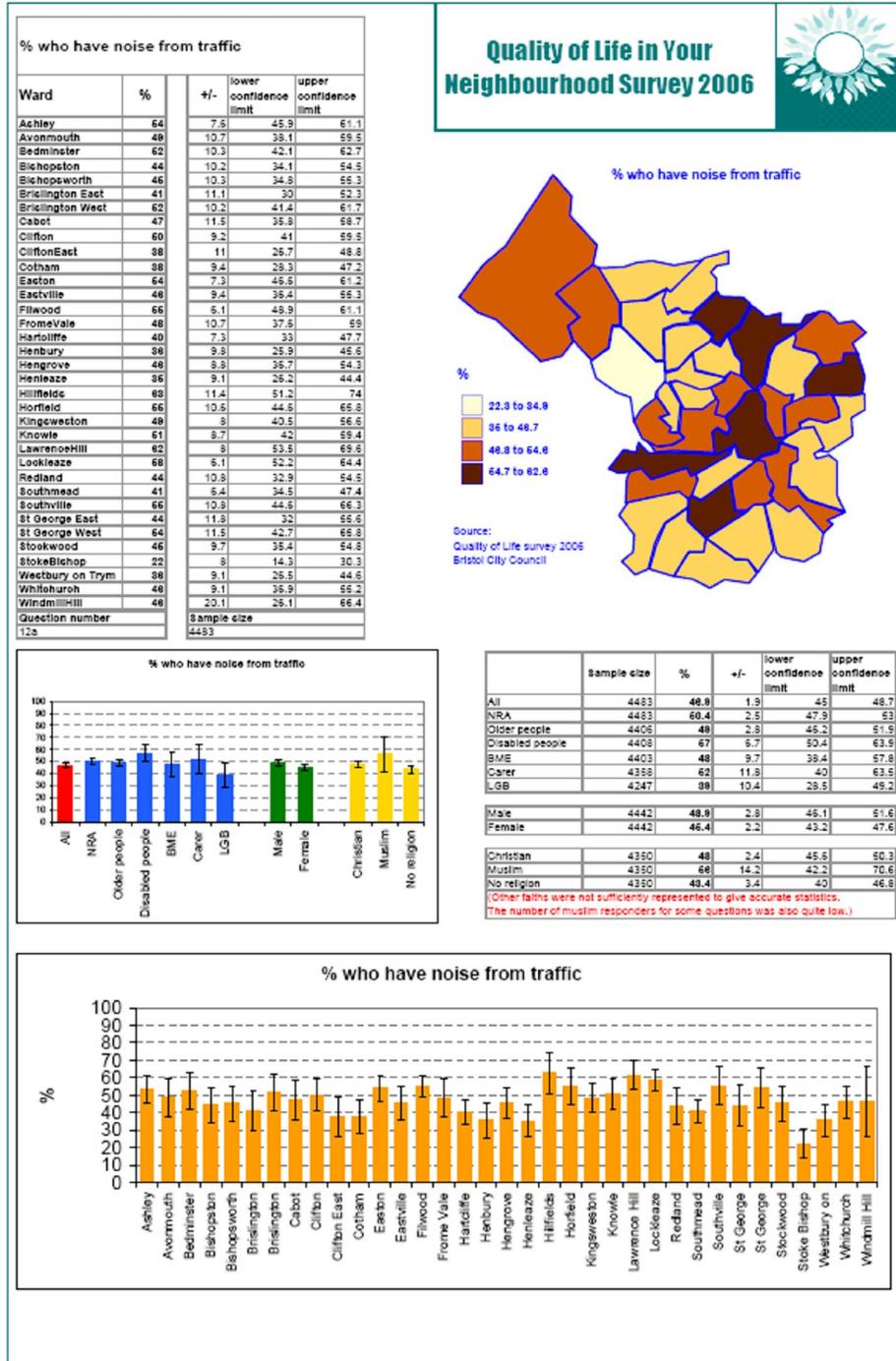
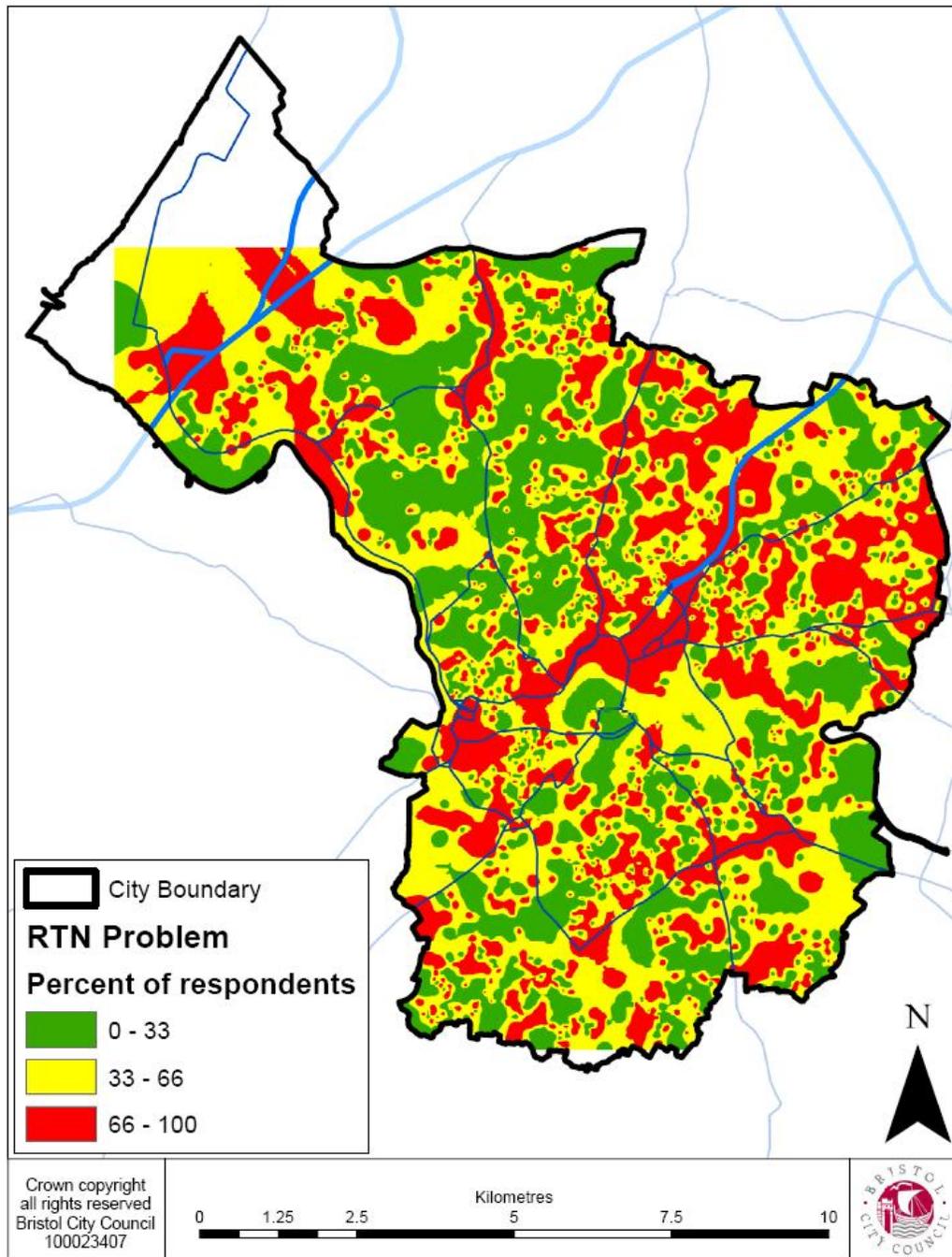


Figure 5 Respondents to the Quality of Life Survey 2006 reporting traffic noise as a problem



## 5.2 Benefits of noise mapping (contd)

- Help set targets for noise reduction - By quantifying the scale of existing noise problems from, for example, road traffic, the maps can then be used to evaluate the impacts on the noise climate of different noise control and/or traffic reduction options and thus provide realistic targets for noise reduction.

- Be a planning tool
  - Strategic level - The noise map can be used to determine which areas are suitable, or not suitable, for specific types of development. The information can be incorporated into planning constraints maps within the context of the Local Plan and LDF.
  - Major scheme assessment - The noise maps can be used to consider the impacts of major schemes with noise difference maps showing the pre- and post-development noise climate.
  - Local assessment - The impacts of a local scheme can be assessed. The relevant part of the city-wide 3-D model and its attribute data can be extracted. The input data for the locality can then be refined, by adjustment to include the likely change arising from the development. The grid spacing and the number of reflections taken into account can be increased for the noise calculation model to improve accuracy. For a larger scale model this would not be possible due to the amount of computing time necessary for a complex model. The noise calculation programme can then be re-run for the small locality to take into account the new scheme; again with difference maps showing the pre- and post-development noise climate.
- Development of PPG 24 Noise Exposure Category maps - Models can be run to categorise Bristol into NECs for transportation noise sources for the purposes of assisting the assessment of different locations for their suitability for new residential or other noise sensitive development.
- Help develop action plans through scenario testing - A number of different scenarios can be tested in the model, and resultant changes in noise levels can be assessed. The noise mapping software can again also be used to calculate the differences for before and after situations, both in terms of noise level and numbers of persons exposed, to highlight the most beneficial scheme. This is looked at more fully in chapter ??
- Monitor effectiveness of action plans and planning controls . By comparison of the noise climate before, and after, the implementation of measures within noise action plans and major development schemes.
- Monitor environmental noise trends . By quantifying the noise climate at different points in time the noise maps can monitor the changes in noise exposure over the intervening time period.

The above benefits of noise mapping have been developed from discussions with John Hinton, Birmingham City Council and Chair of WG-AEN.

Bristol's noise mapping capability will form the central plank for this strategy by assessing the impacts of noise from road and rail transport on the noise climate within the city. It will also provide the ability to test different noise reduction scenarios to gauge the relative noise benefits of each.

Chapter 2.2.2 advises that Defra has produced a noise map for the Bristol agglomeration which is due to be published shortly. Bristol City Council's maps are however specifically and only for the area within its administrative boundary.

For the purposes of testing scenarios and possible noise reduction initiatives and for the uses highlighted above, within Bristol, the maps and their contributory data produced by the City Council will be used.

Within the context of local noise action planning for the Bristol agglomeration, it is anticipated that the maps, which have been produced for Defra to meet END requirements, will be made available to the City Council together with appropriate input data.

### 5.3 Synergy between noise mapping and air quality modelling

There are considerable similarities between the techniques used for modelling air quality and those for noise mapping, with similar input data into geographical models. The City Council is required to undertake air quality modelling and declare air quality management areas where there are regular exceedances of limits of certain pollutants. The latter usually arise from transport sources, especially road vehicles. Further information about air quality and AQMAs in Bristol can be found at: <http://www.bristol.gov.uk/ccm/navigation/environment-and-planning/pollution/pollution-control--air-quality/>.

In Bristol noise mapping and air quality modelling has been undertaken within the Council's Environment and Sustainability Team. This facilitates consideration of the synergies between air quality modelling and noise mapping. Following on from its Silence work the Environment and Sustainability Team has already undertaken a study exploring the noise and air quality emissions impacts of changing speed limits on the M32. This study is available at: <http://www.bristol.gov.uk/ccm/content/Environment-Planning/Pollution/m32-noise-and-air-quality-report-whole-document.en>.

A key reason for understanding the synergies between air quality modelling and noise mapping is to ensure that air quality management measures and noise action planning measures are mutually beneficial and thus sustainable, and that measures for the one purpose do not have negative impacts for the other.

### 5.4 Validation of the noise maps

Where practicable the relative accuracy of the noise maps will be validated by undertaking long-term noise monitoring at specific locations throughout the city. Monitoring locations will be carefully selected to give a representative sample of typical areas within the city, for example, a residential area near a motorway, residential area near a main road (non-motorway), suburban area, quiet location.

Monitoring will also be undertaken as a means of validating benefits arising from implementation of suitable developments incorporating noise mitigation. This will apply to whether the development or scheme is achieved through the planning route or by way of any action planning to meet END requirements for the Bristol agglomeration.

To assist this process and to support its greater understanding of the noise mapping and action planning processes Defra is providing Bristol City Council with three long-term noise monitoring kits. The City Council will collaborate in a joint project with Birmingham City Council, which is also being provided with additional noise monitoring equipment. Bristol intends to locate the noise monitoring at appropriate existing air quality monitoring sites, to make use of the existing power, communications and associated infrastructure at the sites.

Bristol and Birmingham Councils will provide the data, and an associated joint report on the outcomes of this project to Defra.

It is anticipated that this project will commence in April 2008.

The long-term noise monitoring equipment will also be used, where appropriate, to assess the effectiveness of any noise action planning and noise benefits or impacts of any major development proposals.

## 6 Highway Maintenance within Bristol

As stated previously, Bristol City Council, as highway authority for its area, has responsibility for maintaining, at the public expense, 1191 kilometres of roads within the city.

The budget available for this work is limited and the City Council, in its use of public money, is required to use its resources in the most prudent and economical way possible. Subsequently, highways asset managers have to take into account a range of factors including: cost, durability, locality, speed limit on the road, time available for the re-surfacing task, extent of disruption to traffic flows, etc. when making decisions about which particular type of resurfacing material to use.

Low noise road surfaces are most beneficial where traffic speeds are higher, and at 50 miles per hour (80 km/h) or above. Most of the urban roads within Bristol do not fit into this category being subject to a 30 mph (56 km/h) speed limit. Noise emissions from the type of surface may not be the most important consideration, when selecting a specific resurfacing material, especially as the whole life costs of low noise surfaces are significantly higher than traditional resurfacing materials.

## 7 Identification of Quiet Areas

One of the important aspects of the action planning requirements for agglomerations within the END, and thus the resultant regulations in England, is that the plans must aim to protect quiet areas against an increase in noise.

In order to develop appropriate criteria for the identification of quiet areas and subsequent guidance for this process Defra commissioned TRL to carry out a review of existing knowledge and to develop suitable methodologies. This research is reported in the Defra document, *Research into quiet areas . Recommendations for identification* (<http://www.defra.gov.uk/environment/noise/research/pdf/quiet-areas.pdf>).

With regard to quiet areas in agglomerations the documents states, "Research into defining, identifying and appreciating the benefits of preserving quiet or relatively

Quiet Areas in urban conurbations cuts across many different fields including health, physical and psycho-acoustics, environmental psychology. An important aspect of the research carried out into Quiet Areas has been to establish the positive effect natural sounds have on health and well-being.

### 7.1 Current research

Research carried out in Sweden (Berglund et al., 2004) has examined how adverse health effects of noise are related to individual exposure and perceived soundscapes in residential areas with and without access to Quiet Areas. Their results show that access to a quiet façade of a dwelling reduces annoyance to noise by 10-20%, depending on the sound level from road traffic at the most exposed side. Results suggest (Nilsson and Berglund, 2006) that a good urban outdoor soundscape should:

- (a) be dominated by positive sounds from nature, and
- (b) have an overall equivalent sound level below 50 dB(A) during the daytime.

Research carried out in Norway has examined the relationship between localised areas of noise and quiet within a neighbourhood on residential noise annoyance in Oslo (Klaeboe, 2005). Results indicate that noisy neighbourhoods have the potential to increase residential noise annoyance primarily for apartments exposed to low residential noise levels whereas quiet neighbourhood areas have the potential to reduce residential noise annoyance the most at intermediate and high residential noise levels.

In the Netherlands, reviews of current research has concluded that the percentage of time during which a disturbance is present (or the length of time during which a level of quiet is regarded as acceptable) is generally more important than the actual noise level (van den Berg and van den Berg, 2006). Alongside these acoustic criteria additional criteria about the sounds heard which convey positive or negative feelings, with regard to appropriateness for a given context, are also important.

Research carried out in Italy to identify indicators to describe perceived soundscapes is following a similar approach to that found in the Netherlands in that it is related to temporal variations in noise although the method is more complex (Licitra and Memoli, 2006).

Research in the UK into Quiet Areas has primarily been carried out to assist in the implementation of END (Symonds Group Ltd, 2003).

## 7.2 Quiet Areas in Bristol

For the purposes of this strategy the short-term procedure recommended within the Defra document will be followed.

This recommends that for Quiet Areas in agglomerations, e.g. public and open spaces, at least part of the candidate area must fall within the noise band  $< 55 \text{ dB } L_{\text{day}}$ , (as determined from the first round of noise mapping) and the candidate area must be at least 9 hectares.

The specifications for the filter definitions and the candidate list of Quiet Areas will be reviewed and, where necessary, revised by the City Council before the list is finalised.

The following filter specifications which may require revising include:

**Noise Level filter:** The specification of a  $55 \text{ dB } L_{\text{day}}$  limit is seen as an appropriate compromise, based on the mapping requirements of the END and definitions for Quiet Areas used elsewhere in Europe;

**Minimum Area filter:** The specification of a minimum area of 9 hectares is based upon consideration of both the minimum area that should lie within the defined noise limit to warrant preservation (50%) and the minimum area required to achieve  $55 \text{ dB } L_{\text{day}}$ , based on the presence of at least one major road at the boundary. However some important amenity spaces, particularly in the city centre, for example Queen Square, are smaller than 9 hectares, and whilst relatively close to main roads may not necessarily have one on their boundary. It will therefore be appropriate to adopt a reduced area as a filter in appropriate circumstances.

**Minimum Area of Quiet filter:** The specification that a minimum area of 4.5 hectares must fall within the noise band  $< 55 \text{ dB } L_{\text{day}}$  is to allow areas significantly larger than 9 hectares to qualify as candidate Quiet Areas when less than 50% of the area falls within the specified noise band.

These criteria will be applied to Bristol's combined  $L_{\text{day}}$  noise map to identify suitable candidate areas. An appropriate Council working group will be set-up to identify and agree quiet areas and will comprise relevant officers from the Council's Culture and Leisure Services, Neighbourhood and Housing Services, and Planning Transport and Sustainable Development departments. Quiet areas determined through this process will then be formally ratified with a view to inclusion in constraints maps for the city in the context of the existing Local Plan and emerging LDF.

This procedure will also be followed for the identification of quiet areas within the coordinating action planning role that Bristol will be undertaking on Defra's behalf for the Bristol agglomeration resulting in similar ratification by Bristol's neighbouring unitary authorities, for the areas within their boundaries. Particular consideration will need to be given to those quiet areas which cross the boundaries of adjoining authorities. The

specifications for the filter definitions and the candidate list of Quiet Areas will be reviewed and, where necessary, revised by the co-ordinating partnership prior to finalisation of the list.

## **8 Road and rail noise impacts**

### **8.1 Tackling road and rail noise impacts through Development Control**

#### **8.1.1 Planning – general considerations**

As stated in Chapter 2.2.4 of this document noise is a material consideration for planning.

The City Council will expect that any proposal which has potential noise implications will be accompanied by a suitable assessment which thoroughly considers and addresses all noise impacts. This will apply whether the proposal involves new noise-sensitive uses in a location with existing transport noise sources, new transportation noise sources in a location with existing noise-sensitive uses, or a larger development involving all these considerations.

Any noise assessment must be undertaken by a suitable qualified and competent noise consultant, and address all likely circumstances that will arise when the development is complete.

The Planning Protocol for major applications defines the way that the City Council will work with developers and their agents to ensure all issues, including noise, are properly addressed within the application process.

In addition from 6 April 2008 in line with the new mandatory planning Standard Application Form and to ensure validation of their application there will be a requirement for all applicants to submit information conforming to the national mandatory list, published by the Government, and to the local list adopted by the City Council. Details of the national mandatory validation requirements will be available, from 6 April 2008, on the UK Government's Department for Communities and Local Government website see: <http://www.communities.gov.uk/planningandbuilding/planning/> and for the City Council's local list see: <http://www.bristol.gov.uk/ccm/navigation/environment-and-planning/planning/>.

#### **8.1.2 New housing or other noise sensitive developments**

The City Council will ensure, through proper consultation between the Development Control sections (PTSD) and colleagues within the Pollution Control Team (N&HS) involving the developer or agent as necessary, that any proposal involving new housing or other noise sensitive development, near transportation noise sources, incorporates appropriate noise mitigation where necessary.

This will be achieved either by ensuring that before it receives planning consent the development proposal incorporates the necessary mitigation measures, or that conditions are attached to the planning consent to effectively control noise. These conditions must be discharged prior to commencement of the use for which planning permission was granted.

Factors that will be taken into account, either individually or in combination, for noise mitigation include the following:

- Location of the site in relation to the noise sources;
- The position of houses, or noise sensitive buildings on the site;
- The orientation of houses, or noise sensitive buildings on the site;

- The layout of the site to maximise the opportunity for less noise sensitive buildings, or less noise sensitive facades, to shield other parts of the site, including recreational areas, from noise;
- Topography of the site and the opportunity to use the natural landscape to protect buildings, and recreational areas from noise sources;
- The use of noise barriers;
- Sound insulation for houses, and other noise sensitive uses.

In certain circumstances where a satisfactory noise climate cannot be achieved it may be appropriate for the Pollution Control Team to recommend that planning permission be refused.

In making their decisions officers from the Pollution Control Team will follow the guidance contained within PPG 24 Planning and Noise, or its subsequent revision, PPS 24 (when published). Where appropriate officers should have regard to other relevant documents, for example, British Standard BS 8233:1999 Sound Insulation and noise reduction for buildings . Code of practice. Ideally, the aim will be to achieve a good internal noise standard in living rooms and bedrooms as defined in that Standard and shown in the table below.

**Table 2 Good internal noise standard – BS 8233:1999 Sound insulation and noise reduction for buildings – Code of Practice**

Room	Internal Noise Level
Living room	LAeq,16h - 30 dB(A)
Bedroom	LAeq,8h - 30 dB(A)

In certain circumstances, for larger scale developments near transportation noise sources, it may be appropriate for developers or their agents to produce a localised noise map which categorises the area for residential purposes in terms of the Noise Exposure Categories under PPG 24. An aim of this strategy will be to ensure that, in due course, developers and their consultants submit these maps to the City Council as an integral element of the application validation process. These noise maps will aid the assessment of the suitability of the proposal, and the mapping techniques can also be used to test appropriate noise reduction measures, and thus, ensure that adequate noise mitigation is incorporated into the proposal.

### **8.1.3 New road development or alterations to roads**

#### **8.1.3.1 Development control considerations**

The City Council will require that any new highway development, or significant alteration of existing highways incorporate a suitable noise assessment to fully consider and address all impacts that the proposal will have on the noise climate of the surrounding areas.

This assessment will rely on a robust transport study of projected traffic flows not only looking at the situation soon after completion but, dependent on the extent and nature of the highway development, looking at projected flows, potentially up to 20 years into the future.

For major road schemes this process should follow existing Transport Analysis Guidance which has been produced by the Department for Transport and is available at: <http://www.webtag.org.uk/index.htm>; and in particular the noise element which is available at:

[http://www.webtag.org.uk/webdocuments/3\\_Expert/3\\_Environment\\_Objective/3.3.2.htm](http://www.webtag.org.uk/webdocuments/3_Expert/3_Environment_Objective/3.3.2.htm) and its associated worksheet at [http://www.webtag.org.uk/webdocuments/3\\_Expert/3\\_Environment\\_Objective/3.3.2-worksheet01.doc](http://www.webtag.org.uk/webdocuments/3_Expert/3_Environment_Objective/3.3.2-worksheet01.doc).

Noise mapping may be used to assist this assessment process, and the City Council will work with developers to facilitate this.

Where the assessment identifies that there is an impact on the noise climate appropriate mitigation measures will need to be included within the scheme.

Such measures could include:

- Position and route of the new road;
- Landscaping and use of the existing natural landscape to assist in shielding noise sensitive locations from noise;
- Use of barriers;
- Use of low-noise road surfaces;
- Sound insulation schemes in addition to any under Noise Insulation Regulations 1975 (see below).

The design of the roads should follow advice and guidance within the Design Manual for Roads and Bridges (DMRB) (<http://www.standardsforhighways.co.uk/home/index.htm>).

However, the existing noise assessment advice within the DMRB is currently being revised. The Highways Agency has stated that this revision will incorporate guidance to ensure outputs are compatible with the above TAG Unit. It is anticipated that this revision will be completed in 2008.

#### **8.1.3.2 Sound insulation schemes**

As stated in 2.2.5.1 earlier under the Noise Insulation Regulations 1975, subject to the qualifying conditions summarised in that paragraph, a sound insulation scheme may apply for dwellings affected by resultant traffic noise from a new road development, or alteration of an existing road. This scheme will be administered by Bristol City Council as highway authority for its area. Noise mapping techniques will be used to consider eligibility of dwellings for sound insulation under the scheme.

#### **8.1.4 New rail development, or alteration of existing railways**

##### **8.1.4.1 Development Control considerations**

In a similar way to highway developments the City Council will expect that any new railway, light-rail or tramway scheme, or significant alteration of existing railways incorporate a suitable noise assessment to fully consider and address all impacts that the proposal will have on the noise climate of the surrounding areas.

Major rail schemes will follow existing Transport Analysis Guidance produced by the Department for Transport and available at: <http://www.webtag.org.uk/index.htm>; and in particular the noise element of the guidance which is available from the same website at: [http://www.webtag.org.uk/webdocuments/3\\_Expert/3\\_Environment\\_Objective/3.3.2.htm](http://www.webtag.org.uk/webdocuments/3_Expert/3_Environment_Objective/3.3.2.htm), and its associated worksheet at: [http://www.webtag.org.uk/webdocuments/3\\_Expert/3\\_Environment\\_Objective/3.3.2-worksheet01.doc](http://www.webtag.org.uk/webdocuments/3_Expert/3_Environment_Objective/3.3.2-worksheet01.doc).

Noise mitigation measures that may be appropriate can include:

- Position and route of the new railway;
- Landscaping and use of the existing natural landscape to assist in shielding noise sensitive locations from noise;
- Use of barriers;
- Curves of sufficient radius to prevent flange-squeal from all rolling stock.

In addition it will also be necessary to consider the location of rail signals as the regular stopping of trains in noise-sensitive locations with associated braking noise, particularly for older freight rolling stock, followed by engine and exhaust noise when the train moves off, can give rise to considerable annoyance and, where this occurs at night, sleep disturbance.

#### **8.1.4.2 Sound insulation schemes**

As stated in 2.2.5.2 above under the Noise Insulation (Railways and Other Guided Transport Systems) Regulations 1996 an authority responsible for constructing a new railway, tramway or other guided transport system, or for adding to an existing system, has a duty to provide insulation for dwellings and other buildings used for residential purposes, or to pay grant for insulation for buildings within 300 metres. Noise levels are calculated, or measured, in accordance with guidance contained within Calculation of Railway Noise (as amended), 1995, HMSO.

Whilst it may not necessarily be the authority responsible for constructing these schemes the City Council will work closely with agencies and its partners as appropriate and use noise mapping techniques to assess eligibility for these schemes.

#### **8.1.5 Section 106, Town and Country Planning Act 1990**

In addition to conditions attached to planning consents, Section 106 agreements may be used to secure measures to mitigate noise impacts of developments.

These could take the form of financial contributions from developers to enable the Council to provide measures, or direct measures provided by the developers, themselves. It should be noted that Section 106 Agreements can only be used to secure noise impact measures if the proposed development would be unacceptable without the measures being in place.

In a recent example, the City Council has used a Section 106 agreement to require a developer to construct an acoustic fence if a new road scheme, which is sited adjacent to the development, is implemented.

### **8.2 Localised rail noise issues**

From time to time, generally arising from the receipt of complaints, the City Council may become aware of localised operational rail noise issues. These could include locomotives idling in noise sensitive locations, flange-squeal, brake squeal, noisy freight units at night, rail-head corrugations resulting in increased noise, etc.

In these instances the City Council will liaise with Network Rail and the appropriate rail operators to ensure appropriate noise mitigation measures are undertaken.

### **8.3 Joint Local Transport Plan Proposals**

Much of the ambient noise within Bristol is determined by road traffic flows. Reducing traffic flows and through a range of measures including the improvement of the bus network and routes, expanded Park & Ride services, rail service improvements, promotion of public transport, car-sharing, cycling walking, etc tackling congestion is one of the four objectives of the JLTP.

Examining the noise benefits of transport initiatives within the JLTP, and other forthcoming schemes will be an essential part of this strategy.

A project has already been undertaken, using noise mapping techniques, to assess projected traffic flow changes arising from the Greater Bristol Bus Network (GBBN) successful bid

within the JLTP. This also forms one of the City Council's deliverables for the Silence Project (see Modelling Noise Impacts of Traffic Management Measures in Bristol, Bristol City Council, 2008, SILENCE Deliverable H.D2. WP H1 Methods for Noise Control by Traffic Management).

One of the scenarios examined within this report is the GBBN scheme which involves a 50mph inbound limit from the J2 off-slip, becoming 40mph at J3 off-slip. At this point an off-side bus lane commences and runs to Houlton Street and the new Cabot Circus gyratory. Outbound, a 40mph limit is proposed from J3 off-slip, becoming 60mph at J2 on-slip. No bus priority measure is proposed outbound.

The M32 GBBN scenario was modelled using these parameters within the noise mapping software. Speeds on the Junction 1 to Junction 2 section were assumed to be the national motorway limit of 70mph. Figure 6 overleaf shows the noise map of the M32 urban section with projected traffic flows with the GBBN proposals.

Figure 7 below shows the noise benefit difference between 2005 situation and GBBN proposal noise levels ( $L_{den}$ ). It can be seen that it indicates an improvement in the noise climate of up to around 2 dB(A).

Early discussions have already taken place with the Highways Agency, InterRoute (the Highways Agency's network management contractors for the South-West) and Bristol's and the West of England Partnership's transport planners with a view to maximising the noise benefit from the implementation of this scheme.

Bristol will continue to develop its noise mapping techniques and expertise in order to assess forthcoming transportation proposals and influence adoption of noise beneficial schemes.

As part of this strategy officers from the Pollution Control and Environment and Sustainability Teams will meet regularly with transport planning colleagues from the City Council and the West of England Partnership to co-ordinate development of appropriate schemes for the city.

## **9 Action Planning in Bristol under the Environmental Noise (England) Regulations 2006**

### **9.1 Action Planning under the Environmental Noise (England) Regulations 2006**

Chapter 2.2.1 advised that the majority of Bristol City Council's area lies within the Bristol agglomeration identified for the purposes of the above regulations and the END. It also comprises a little over 67% of the agglomerations area - See Figure 1 on page 6 of this document.

Action planning for the agglomeration will therefore make a significant contribution to the aims of this strategy.

Defra is the competent authority for action planning for agglomerations in England. However, Bristol, in recognition of its noise mapping expertise, has been asked by Defra to coordinate the process on its behalf for the four unitary authorities that comprise the agglomeration. Defra has advised that there will be funds available to resource this work being undertaken on their behalf.

At the time of writing this strategy the arrangements for this first round action planning process are just being initialised.

Figure 6 Noise map M32 urban section GBBN proposals

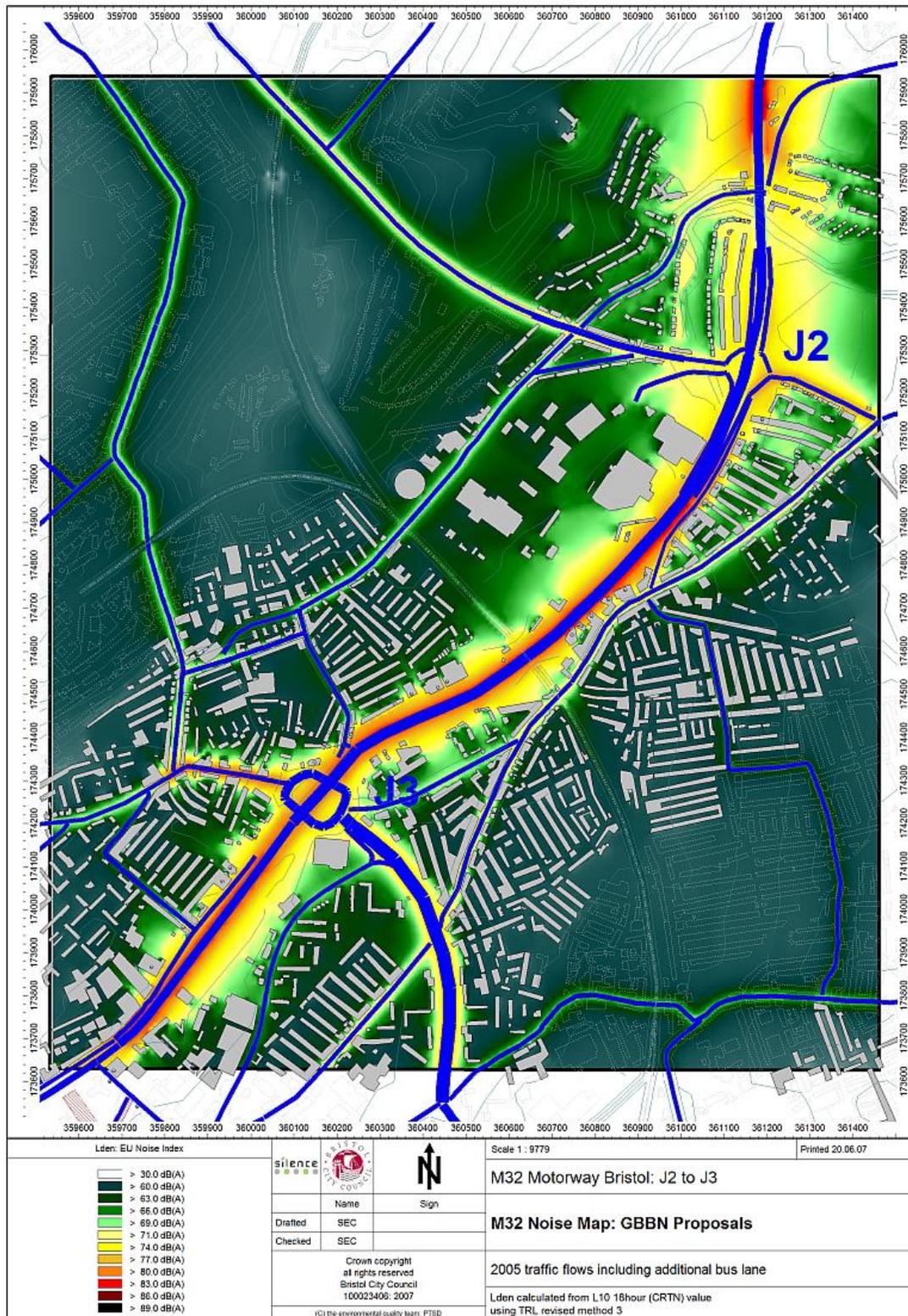
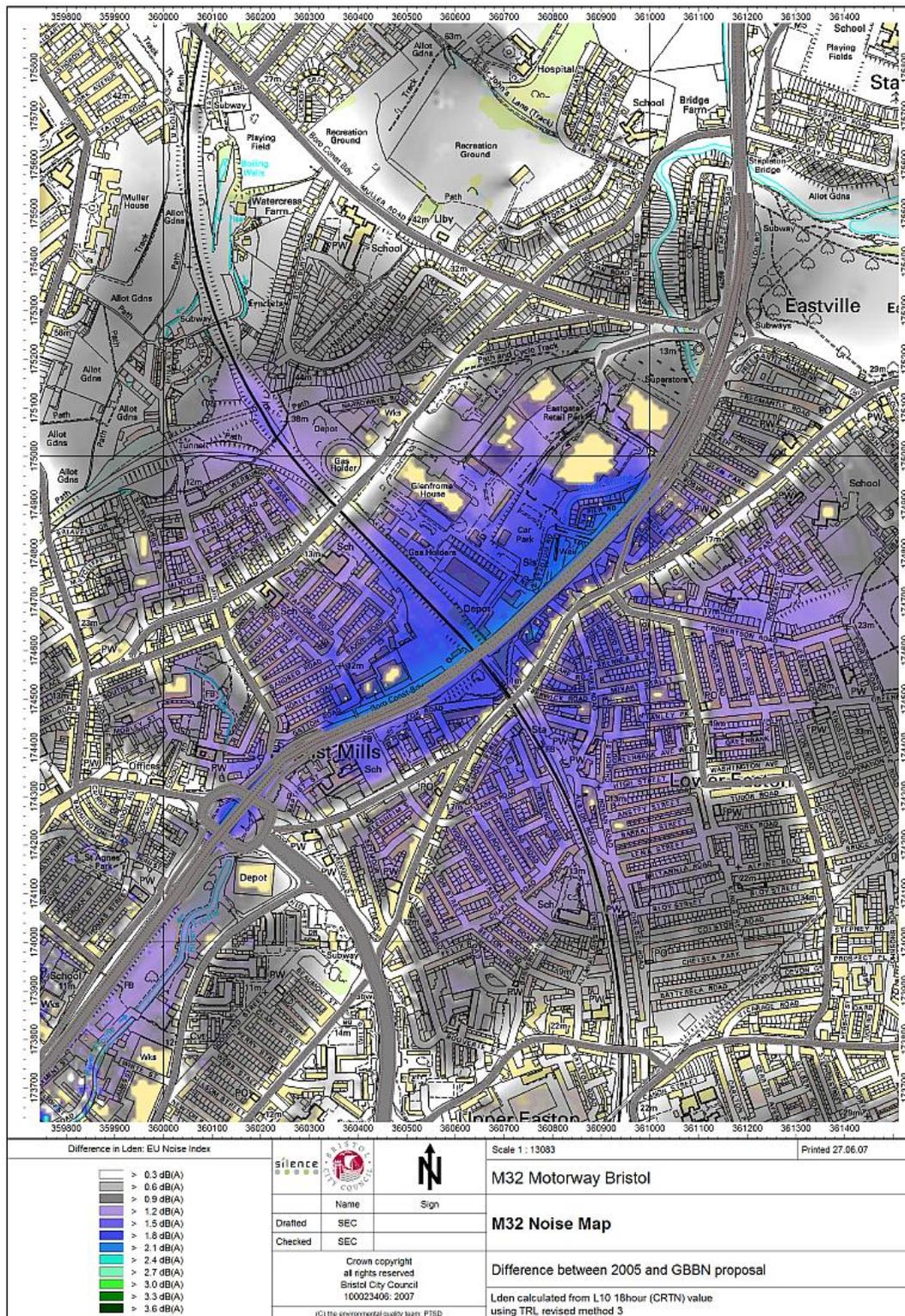


Figure 7 Difference between 2005 situation and GBBN proposal noise levels (Lden)



In order to progress this project it is the intention to set up a project group, coordinated by staff from Bristol, under the auspices of the West of England Partnership (WEP), comprising appropriate noise experts, modelling experts, transportation and spatial planners from the unitary authorities, together with representatives from the Highways Agency and Network Rail. Other participants in this project group, the West of England Noise Action Group (WENAG), will also be needed from time to time to assist with the preparation of documents, presentations, web-based information, consultation, and education.

The project will be overseen by Defra, and, in order to share experiences and knowledge, will involve the exchange of information with representatives from other areas of England undertaking this work in a similar way, notably London, West Midlands, and West Yorkshire.

It is generally understood that, under the present circumstances, central government will not be providing additional finances to fund any actions identified by the action plans. Any appropriate actions therefore will need to be resourced and built into projects through existing funding routes, for example, transportation projects identified within the Joint Local Transport Plan such as work being undertaken to implement the Greater Bristol Bus Network. See the previous chapter (Chapter 8.3) for an example of this.

As stated earlier in this document, the City Council has produced noise maps for its area only, and Defra, through its consultants, have produced noise maps for the Bristol agglomeration. It is understood that Defra's consultant used the same noise modelling software that the City Council use.

In order to undertake this action planning project it is essential that the WENAG have access to the agglomeration noise maps, together with the topographical, building and all other attribute data that have contributed to the noise map. This will allow the group on behalf of the West of England Partnership, to undertake proper mapping assessment of any potential noise reduction schemes for the agglomeration identified within the action plan.

One priority for the development of the action plan would be to ensure that the WENAG obtain use of the Defra noise maps for the Bristol agglomeration and all their input data.

## 9.2 Action planning in practice

As stated earlier in Chapters 2.2.3 and 9.1 above Defra will be publishing guidance on action planning for noise sources, including road and rail noise. Bristol will follow this guidance both in consideration of its own area but also within the context of collaborative work for the Bristol agglomeration.

This guidance will give advice on the information and considerations which the WENAG will follow when developing action plans for the various noise sources including those from surface transport. At the time of writing this guidance has not yet been published, even in draft form, but it is anticipated that action plans will assist the identification of noise management areas, and prioritise these for action. The action planning process will have six key phases:

### (i) Identification of noise management areas

This will be based on a number of factors including:

- Areas of higher noise exposure identified from the noise maps;
- Numbers of persons exposed;
- Population density;
- Duration of exposure;
- Sensitivity to the particular noise sources;

- Local circumstances and priorities;
- Reported perception of noise problems

The guidance document may specify levels to assist the prioritisation of the management areas and Bristol will take the prescribed levels into account.

**(ii) Further investigation and analysis**

This may involve validation of noise exposure by measurement, and application of local knowledge to assist further analysis of the input data into the noise maps to ensure that they fully and accurately reflect the existing circumstances.

**(iii) Evaluation of national and local policies and plans**

To take into account plans and programmes contained within the Regional Spatial Strategy, Joint Local transport Plan, Local Plan (and forthcoming Local Development Framework) and Air Quality Management Areas, together with local knowledge of any development proposals for the area that are already in hand, or that are at the pre-planning stage and likely to come on-stream in the immediate future.

**(iv) An evaluation of possible mitigation measures**

Examination of the various options to manage noise, including the assessment of the benefit that would be achieved from any option, and the costs of its implementation. Any potential impact of the option on other environmental factors such as air quality would also be examined.

**(v) Consultation**

The guidance will also set out a framework for consultation with stakeholders that the WENAG will follow to ensure appropriate public participation and ownership of the action plan.

**(vi) Review**

The local noise action plans will be reviewed and revised where necessary every five years after approval and when a major development affects the existing noise situation.

In drawing up plans for action for the Bristol City Council area and for the wider Bristol agglomeration area regard will be given to the outcomes of the SILENCE project and the resultant wide-ranging documents in particular, Integrated Framework for Urban Action Plans, Deliverable No. I.D10 under work Package I.3 Design of Urban Action Plans (various authors). This document gives a comprehensive overview of the action planning process and provides advice for options to mitigate for noise.

The project outcomes and other SILENCE information are accessible at: <http://www.silence-ip.org/site/index.php?id=32>.

## 10 Abbreviations

dB(A)	A-weighted decibel
CRN	Calculation of Railway Noise, UK methodology for railway noise
CRTN	Calculation of Road Traffic Noise, UK methodology for road traffic noise
DCLG	Department for Communities and Local Government, UK government
Defra	Department for Environment, Food and Rural Affairs, UK government
DPD	Development Plan Documents . supporting documentation for the Local Development Framework
DRBM	Design of Roads and Bridges Manual
EC	European Commission
EIA	Environmental impact assessment
END	Environmental Noise Directive (Directive 2002/49/EC relating to the assessment and management of environmental noise)
EU	European Union
GBBN	Greater Bristol Bus Network
GIS	Geographical information system - which can be described as the software tools, their hardware platform and the people that use them to aid the mapping, and spatial analysis, of data and information
HMSO	Her Majesty's Stationery Office . publisher of UK legislation and other documents
JLTP	Joint Local Transport Plan
LDF	Local Development Framework
PPG	Planning Policy Guidance, for example, PPG 24 Planning and Noise
TAG	Transport Analysis Guidance . from the UK's Department for Transport
TRL	Transport Research Laboratory
WEP	West of England Partnership . a collaborative organisation of the four unitary authorities of Bath and North East Somerset, Bristol, North Somerset and South Gloucestershire
WENAG	West of England Noise Action Group - the noise action planning collaborative group acting on behalf of Defra for the Bristol agglomeration under the auspices of the West of England Partnership.

WG-AEN

Working Group . Assessment of Exposure to Noise, a working group of the European Commission

## 11 Glossary of Terms

$L_{A10,18h}$	The arithmetic mean noise level in dB(A) exceeded for 10% of each hour over the period 06:00 . 24:00 hours.
$L_{Aeq,16h}$	The equivalent continuous sound level in dB(A) that, over the period 07:00 . 23:00 hours, contains the same sound energy as the actual fluctuating sound that occurred in that period.
$L_{Aeq,18h}$	The equivalent continuous sound level in dB(A) that over the period 06:00 . 24:00 hours, contains the same sound energy as the actual fluctuating sound that occurred in that period.
$L_{Aeq,6h}$	The equivalent continuous sound level in dB(A) that over the period 24:00. 06:00 hours, contains the same sound energy as the actual fluctuating sound that occurred in that period.
$L_{den}$	The day-evening-night level in decibels as defined in Annex 1 of the Environmental Noise Directive, and which is transposed into UK regulations, where the day is the 12 hours time period between 07.00 and 19.00, the evening is the four hour period between 19.00 and 23.00; and the night is the eight hour period between 23.00 and 07.00.

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## Appendix 1 Summary of the Environmental Noise Directive

The directive from the European Parliament and Council on assessment and management of environmental noise was adopted in June 2002. As part of their implementation of the directive, the individual Member States, including the UK, have to draw up strategic noise maps and action plans aimed at preventing and reducing environmental noise. This is noise from road traffic, railways, aircraft, and industrial areas.

The directive contains four key elements:

- The harmonisation of noise indicators and assessment methods for environmental noise.
- The collection of information about noise exposure in the form of noise maps.
- The preparation of action plans.
- Informing and consulting residents.

The aim of the directive is to define a common European approach intended to avoid, prevent, or reduce, on a prioritised basis, the harmful effects, including annoyance, due to exposure to environmental noise. Only large cities, major roads, major railways, and major airports are covered by the directive.

In the first phase, by June 2007, noise maps have to be drawn up for urban areas with over 250,000 inhabitants, all major roads carrying more than 6 million vehicles a year, major railways with over 60,000 rail passengers a year, and finally, the major airports. This is followed by the preparation of action plans for these noise sources by July 2008.

In the second phase, between 2012-13 and then on a 5-year cycle, urban areas with over 100,000 inhabitants, all major roads carrying more than 3 million vehicles, and railways with over 30,000 rail passengers a year and major airports will be subject to the noise-mapping and action planning process.

## Appendix 2 ANNEX V, Environmental Noise Directive

### MINIMUM REQUIREMENTS FOR ACTION PLANS

referred to in Article 8

1. An Action Plan must at least include the following elements.
  - a description of the agglomeration, the major roads, the major railways or major airports and other noise sources taken into account.
  - the authority responsible.
  - the legal context.
  - any limit values in place in accordance with Article 5.
  - a summary of the results of the noise mapping.
  - an evaluation of the estimated number of people exposed to noise, identification of problems and situations that need to be improved.
  - a record of the public consultations organised in accordance with Article 8(7).
  - any noise-reduction measures already in force and any projects in preparation.
  - actions which the competent authorities intend to take in the next five years, including any measures to preserve quiet areas.
  - long-term strategy.
  - financial information (if available): budgets, cost-effectiveness assessment, cost-benefit assessment.
  - provisions envisaged for evaluating the implementation and the results of the Action Plan.
  
2. The actions which the competent authorities intend to take in the fields within their competence may for example include the following.
  - traffic planning,
  - land-use planning,
  - technical measures at noise sources,
  - selection of quieter sources,
  - reduction of sound transmission,
  - regulatory or economic measures or incentives.
  
3. Each Action Plan should contain estimates in terms of the reduction of the number of people affected (annoyed, sleep disturbed, or other).
  
4. The Commission may develop guidelines providing further guidance on the Action Plans in accordance with Article 13(2).

(L 189/23EN Official Journal of the European Communities 18.7.2002)

## Appendix 3 Planning Policy Guidance 24 - Planning and Noise - Annex 1

### Noise Exposure Categories For Dwellings

1. When assessing a proposal for residential development near a source of noise, local planning authorities should determine into which of the four noise exposure categories (NECs) the proposed site falls, taking account of both day and night-time noise levels. Local planning authorities should then have regard to the advice in the appropriate NEC, as below:

NEC	
A	Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as a desirable level.
B	Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise.
C	Planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.
D	Planning permission should normally be refused

2. A recommended range of noise levels is given below for each of the NECs for dwellings exposed to noise from road, rail, air, and "mixed sources". Annex 2 provides a detailed explanation of how the boundaries of each of the NECs have been derived. Paragraph 9 of the main text explains that in some cases local planning authorities may be able to justify a range of NECs of up to 3 dB(A) above or below those recommended.

3. The NEC noise levels should not be used for assessing the impact of industrial noise on proposed residential development because the nature of this type of noise, and local circumstances, may necessitate individual assessment and because there is insufficient information on people's response to industrial noise to allow detailed guidance to be given. However, at a mixed noise site where industrial noise is present but not dominant, its contribution should be included in the noise level used to establish the appropriate NEC.

4. The NEC procedure is only applicable where consideration is being given to introducing residential development into an area with an existing noise source, rather than the reverse situation where new noise sources are to be introduced into an existing residential area. This is because the planning system can be used to impose conditions to protect incoming residential development from an existing noise source but, in general, developers are under no statutory obligation to offer noise protection measures to existing dwellings which will be affected by a proposed new noise source. Moreover, there would be no obligation on individuals with an interest in each dwelling affected to take up such an offer, and therefore no guarantee that all necessary noise protection measures would be put in place.

5. Thus, where new industrial or commercial development is proposed near a residential area the effect of the new noise source on the surrounding area will have to be assessed in accordance with existing procedures. In many cases where a new source of noise is to be introduced by a project that requires environmental assessment (EA) (see paragraph 22), the effect of noise will be considered in this context; but it must be accepted that in these circumstances the options to control noise are likely to be more limited than where residential development is proposed in an area with an existing noise source. It must also be borne in mind that when dealing with new roads and aerodromes, schemes may exist to provide insulation in specified circumstances.

Noise Levels <sup>0</sup> Corresponding To The Noise Exposure				
Categories For New Dwellings L <sub>Aeq,T</sub> dB				
Noise Exposure Category				
Noise Source	A	B	C	D
Road traffic				
07.00 - 23.00	<55	55 - 63	63 - 72	>72
23.00 - 07.00 <sup>1</sup>	<45	45 - 57	57 - 66	>66
Rail traffic				
07.00 - 23.00	<55	55 - 66	66 - 74	>74
23.00 - 07.00 <sup>1</sup>	<45	45 - 59	59 - 66	>66
Air traffic <sup>2</sup>				
07.00 - 23.00	<57	57 - 66	66 - 72	>72
23.00 - 07.00 <sup>1</sup>	<48	48 - 57	57 - 66	>66
Mixed sources <sup>3</sup>				
07.00 - 23.00	<55	55 - 63	63 - 72	>72
23.00 - 07.00 <sup>1</sup>	<45	45 - 57	57 - 66	>66

#### Notes

- <sup>0</sup> Noise levels: the noise level(s) (L<sub>Aeq,T</sub>) used when deciding the NEC of a site should be representative of typical conditions.
- <sup>1</sup> Night-time noise levels (23.00 - 07.00): sites where individual noise events regularly exceed dB L<sub>Amax</sub> (S time weighting) several times in any hour should be treated as being in NEC C, regardless of the L<sub>Aeq,8h</sub> (except where the L<sub>Aeq,8h</sub> already puts the site in NEC D).
- <sup>2</sup> Aircraft noise: daytime values accord with the contour values adopted by the Department for Transport which relate to levels measured 1.2m above open ground. For the same amount of noise energy, contour values can be up to 2 dB(A) higher than those of other sources because of ground reflection effects.
- <sup>3</sup> Mixed sources: this refers to any combination of road, rail, air and industrial noise sources. The "mixed source" values are based on the lowest numerical values of the single source limits in the table. The "mixed source" NECs should only be used where no individual noise source is dominant.

To check if any individual noise source is dominant (for the purposes of this assessment) the noise level from the individual sources should be determined and the combined by decibel addition (remembering first to subtract 2 dB (A) from any aircraft noise contour values). If the level of any one source then lies within 2 dB(A) of the calculated combined value, that source should be taken as the dominant one and the site assessed against the appropriate NEC for that source, rather than using the "mixed source" NECs. If the dominant source is industrial noise see paragraph 19 of Annex 3. If the contribution of the individual noise sources to the overall noise level cannot be determined by measurement and/or calculation, then the overall measured level should be used and the site assessed against the NECs for "mixed sources".