PPDAC Worked Example – Noise mapping

This document provides a simplified worked example of the application of the PPDAC methodology discussed in Chapter 3 of "Geospatial Analysis – A comprehensive guide": P: Problem; P: Plan; D: Data; A: Analysis and C: Conclusions

Note: This example is illustrative only and is not based on application of the PPDAC methodology to a specific project that has been implemented. It is intended to provide guidance on how one might approach such a project, for example how one might undertake the preparation of a proposal that seeks to address the task specified. Also, it should be noted that PPDAC is intended to provide a flexible and dynamic methodology, not a rigid set of procedures or forms, and may be applied at several stages and/or levels of a project.

Context of problem: In 1996 the European Commission issued a Green Paper on Future Noise Policy. This Green Paper identified that:

"The data available on noise exposure is generally poor in comparison to that collected to measure other environmental problems and often difficult to compare due to the different measurement and assessment methods. However it has been estimated that around 20 percent of the Union's population or close on 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 "grey areas" where the noise levels are such to cause serious annoyance during the daytime."

This led, in 2002, to a formal Directive from the CEC was issued which required all member states to produce noise maps and impact data for a range of noise sources and to develop measures to alleviate 'noise pollution'. A summary of the Directive is attached as Annex 1. In broad terms the European Noise Directive (END) is designed with the following objectives at its heart:

As part of the effort to tackle noise pollution, the European Union has laid down a common approach to avoiding, preventing or reducing on a prioritised basis the harmful effects of exposure to environmental noise. This approach is based on using common methods to map noise, on providing information to the public and on implementing action plans at local level. This Directive is also to serve as a basis for developing Community measures concerning noise sources.

1 PROBLEM

Produce a series of maps showing the level of noise in major urban areas of England in accordance with CEC Directive 2002/49/EC on Environmental Noise ('END')

The above is the customer core statement of requirement.

At first glance this appears to be a relatively straightforward and well-defined problem. However, it very quickly becomes apparent that the problem is extremely complex and indeed, has required many man years of work involving specialists throughout Europe to reach even a reasonable level of noise mapping in a subset of countries, and even there, only in selected parts of these countries. Fortunately this existing work can be used in order to design and implement the current project.

Much of this groundwork is summarised in the working papers of the CEC IMAGINE project, obtainable from: http://www.imagine-project.org/, notably Work Package 1 (WP1) which deals with Mapping Specifications and GIS. The final report of this component of the programme (135pp – downloadable from the IMAGINE web site) includes a summary checklist (shown below) designed to help define the GIS/Mapping PROBLEM better. Note that this WP focuses on what might be called the 'geometrical' aspects of the noise mapping and modelling problem – WP4-WP7 address areas more related to source noise modelling.

CHECKLIST FOR GENERAL NOISEMAP DESCRIPTION

What is the purpose of the noise map?
- Strategic mapping
- Action planning

What geographic area is covered?
- Main road network
- Main rail network
- Main industries and ports
- Airport
- Agglomeration

What temporal period is used?
- The preceding year
- Other period:……

What indicator is used for noise levels?
- Lday
- Levening
- Lnight
- Lden
- Other noise levels/indicators:…….

Additional information provided by the noise maps?
- Numbers of exposed populations
- Numbers of exposed dwellings
- Numbers of annoyed populations
- Quiet facades
- Insulation of dwellings
- Other information:…….

REFINING THE PROBLEM DEFINITION:
In order to progress with the task, the 'client' would be encouraged to address and prioritise the questions in the checklist, bearing in mind the timescale and budget that is

available (if these have been determined at this point). For example, the client might specify:

- **Purpose** = *Strategic mapping, in the form of 'horizontal' noise maps, to be presented in the form of a series of formats including web-based for public access*
- **Geographic coverage** = *Agglomerations - List of agglomerations to be provided (defined as a large urban area with a population of over 250,000 and a population density of more than 500 persons per square kilometre) – note that this implies inclusion of roads, rail, aircraft, industrial and a range of other noise sources, but not domestic or military-related noise*
- **Temporal period** = *snapshot for 2008*
- **Which indicator is to be used** = *Computed decibel noise levels on an average day, represented by the Lden indicator (the day, evening, night level; Lden is a logarithmic composite of the Lday, Levening, and Lnight levels) – each of these has an agreed technical specification. The END specifies that computations be the average annual noise level at a height of 4metres above ground level*
- **Additional information to be provided** = *none at this stage, but it is expected that additional information will be requested in the future in accordance with the objectives of END*
- **Resolution:** *data resolution (mapped) to be on a grid base overlaid onto agglomeration maps showing key infrastructure at a 10m x 10m grid resolution*

Note that in many instances it will be difficult if not impossible to compute the timescale and budget required without a preliminary study or project. For example, it is quite common for there to be preliminary project involving the preparation of a detailed Requirements Specification (RS) and/or undertaking a smaller-scale or feasibility project, e.g. confined to a single urban area and a single source of noise, with a pre-defined noise propagation model (e.g. a model already in use by a civil engineering consultancy). In the UK this approach was adopted with test modelling be based on London and restricted to road traffic noise - see a description of part of this project, which itself was divided into an initial pilot in one part of London, at

http://www.spatialanalysisonline.com/londonNoisemapping.pdf

and related details and software used at:

http://www.wsanoise.com/

2 PLAN

Although the PLAN phase is next in the sequence, the iterative nature of the PPDAC process emphasises the need to define and then re-visit each component. Thus whilst an outline project plan would be defined at this stage, one would have to consider each of the subsequent stages (DATA, ANALYSIS, CONCLUSIONS) before firming up on the detail of the plan. With projects that are more experimental in nature, drawing up the main elements of the PLAN takes place at this stage. With projects, such as the current one, where pre-existing datasets and analysis tools are expected to be used, the PLAN stage is much more an integrated part of the whole PPDAC exercise.

The output of the PLAN stage is often formulated as a detailed project plan, with allocation of tasks, resources, timescales, analysis of critical path(s) and activities, and estimated costs of data, equipment, software tools, manpower, services etc. Frequently project plans are produced with the aid of formal tools, which may be paper-based or software assisted. In many instances this will involve determining all the major tasks or task blocks that need to be carried out, identifying the interconnections between these building blocks (and their sequencing), and then examining how each task block is broken down into sub-elements. This process then translates into an initial programme of work once estimated timings and resources are included, which can then be modified and fine-tuned as an improved understanding of the project is developed. In some instances this will be part of the Planning process itself, where a formal functional specification and/or pilot project forms part of the overall plan. As with other parts of the PPDAC process, the PLAN stage is not a one-shot static component, but typically includes a process of monitoring and re-evaluation of the plan, such that issues of timeliness, budget, resourcing and quality can be monitored and reported in a well-defined manner.

Our PPDAC PLAN discussion suggests a series of questions that should be considered at this stage:

- the nature of the problem and project — *in this case the task is essentially descriptive, since it involves the creation of a series of strategic maps from a range of data sources and models. However, in the PROBLEM refinement process (above) the client has stated 'not at this stage' in respect of Additional Information. This indicates that the project, if successful, will lead to further work, and by examining the END document it is clear that predictive models (estimation of the impact of noise levels on population) and possibly prescriptive measures (e.g. noise abatement schemes and formal regulations) may follow in the future. This future activity may not impact the current project but should be born in mind during the planning and design process*
- does it require commercial costings and/or cost-benefit analysis? *The answer to this is definitely YES as far as costing is concerned, even if the exercise is essentially 'internal', i.e. carried out within the sponsoring department. How detailed the costings are will vary, depending on the circumstances. It is unlikely that cost-benefit analysis would be required*
- are particular decision-support tools and procedures needed? *NO in this case, but they may be relevant for follow-on projects*
- what level of public involvement and public awareness is involved, if any? *Provision of online access to the maps is required for public access, but no request for interactivity or response has been specified - suggests that client specification may need further refinement/checking*
- what particular operational needs and conditions are associated with the exercise?
- what time is available to conduct the research and are there any critical deadlines? *Must be specified by client - as the snapshot date is 2008 delivery may be expected in 2009 utilising the latest available models and data (this may have specific technical and timing implications - e.g. having to wait for certain datasets for 2008 to be available)*

- what funds and other resources are available? *Must be specified by client, based on preliminary project(s) by contractor*
- is the project considered technically feasible, what assessable risk is there of failure and how is this affected by problem complexity? *The fact that projects of this type, possibly only for single noise sources at a time, have been conducted in the past with success, and that large scale prior research has tackled many of the technical problems in the recent past, indicates that this project is feasible, even though it is clearly challenging. One of the biggest challenges (and hence risk factors) will be to obtain the necessary input data, of a quality and timeliness that meet the client requirements and expectations (see next item)*
- what are the client (commercial, governmental, academic) expectations? *In this instance, apparently very straightforward. However, note that the request includes compliance with a particular EC directive, which itself is linked to Europe-wide projects (notably HARMONOISE) to ensure common models and procedures are applied across the various member states. However, is it a requirement from the client that these specific models must be used for the 2008 snapshot, or would existing national models and/or simplifications of these models be acceptable, at least for the time being. A critical factor in very many projects, especially outside of the purely academic field, is what is called 'expectation management' – that is, ensuring the client knows what they can expect as output and when, and as the project progresses and inevitable problems arise, which might impact their expectations, then the client is advised of such issues and is clear about the implications at the earliest opportunity – in general clients do not appreciate surprises at the last moment in a project, but can often be surprisingly accommodating if they understand issues early enough*
- are there specifications, standards, quality parameters and/or procedures that must be used (for example to comply with national guidelines)? *YES – both UK national and European standards and guidelines exist – for practical reasons it may prove necessary to work with UK guidelines as an interim step, whilst tools to support the full range of European guidelines are developed and datasets become available (e.g. improved 3D GIS data, such as buildings, embankments and walls) to match the model input requirements*
- how does the research relate to other studies on the same or similar problems? *SEE CEC PROJECTS addressing this question and UK projects that pre-date the current exercise (in this instance, the London pilot and full London Noise Map projects)*
- what data components are needed and how will they be obtained (existing sources, collected datasets)? *This issue is covered in the DATA section and highlights the need to start thinking through the DATA issue early in the project design process – because this exercise will almost certainly utilise existing noise mapping software, known to be capable of producing output maps of the required form, the selection of software, which will perform the analysis is a vital question. Thus the process needs to work 'backwards' around the methodology diagram, from the ANALYSIS phase to the DATA phase to the PLAN phase*
- are the data to be studied (units) to be selected from the target population, or will the sample be distinct in some way and applied to the population subsequently (in which case one must consider not just sampling error but so-called study error also)? *In this instance much of the output data is to be generated from models. As such the results are subject to error in both model design and input data measurements – for example, input traffic data may only be available for select cross-cordon sampling points for each agglomeration. Data for other points might be collected as part of the project (but over what period?) and then traffic for other areas estimated from these samples. Clearly for each input data type there are many possible sources and types of error, and the modelling process might accentuate or might smooth such errors. Ideally the output results should be subjected to a degree of independent verification, i.e. based on actual measurements. These can then be compared with the estimated noise levels and with the results of formal validation exercises carried out as part of the design of the modelling procedures (see, for example, the Validation Work Package (WP50) of the CEC Road Traffic Noise Model (RoTraNoMo project).*

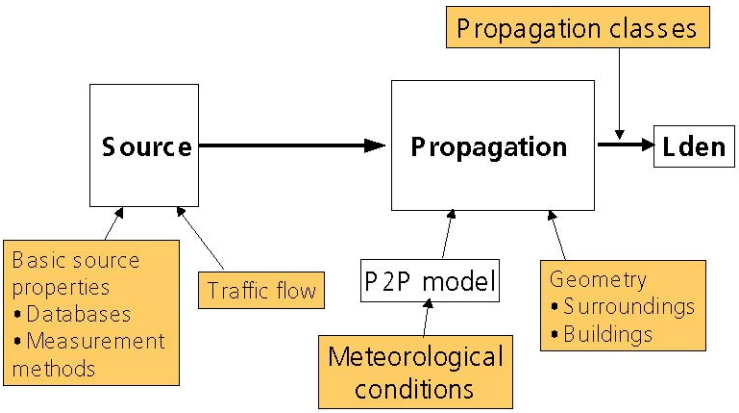
3 DATA

The refined specification above (**PROBLEM** stage) requires mapping based on multiple noise sources across a range of districts, which implies a range of data sources and types. In some instances the data sources will be the result of regular measurements of noise levels, and provided (where available) by the relevant monitoring authorities (e.g. aircraft noise). In other cases, such as road and rail noise, data will be estimated through modelling. In this particular problem, for example, there has been a CEC-wide programme to develop suitable models:

> "The Harmonoise project (Aug 2001-Jan 2005) has produced methods for the prediction of environmental noise levels caused by road and railway traffic. These methods are intended to become the harmonized methods for noise mapping in all EU Member States. The methods are developed to predict the noise levels in terms of Lden and Lnight, which are the harmonized noise indicators according to the Environmental Noise Directive (END) 2002/49/EC."

The engineering models developed by the Harmonoise project would be used as the basis for the current project to both estimate the level of noise generated and to model the propagation of this noise to the areas surrounding the sources (e.g. the spread of noise from major roads, depending upon local terrain, buildings etc). These models provide guidance on their input data requirements, depending on the applications, with noise mapping being the least demanding of the applications for which the models were produced. However, research within the IMAGINE project has shown that simplification of the Harmonoise methods and models may be necessary in order to obtain sufficient coverage within reasonable times and budget. The current study would use the advice provided in the IMAGINE "Guidelines and Good practice" document (the Final Report of the project) in order to produce the maps required within acceptable timescales and budgets.

The diagram below shows the basic building blocks of the Harmonoise and IMAGINE models. Essentially there is a clear separation between the Source modelling (i.e. the source of noise) and Propagation modelling (the way in which the source noise is spread). The former requires data from a range of sources, including some geospatial elements (such as road and rail routes), whilst the latter requires input data which is largely geospatial (terrain, building geometries, land-use etc). Note that our discussion in this subsection (DATA) focuses on the GIS data issues, but there are many other data requirements that would have to be covered in detail as part of the overall project, notably sourcing data relating to noise sources (traffic data for the various modes of transport, and industrial and other point-source noise data for non-transport sources).



The IMAGINE project includes detailed guidance and commentary on the various sources of data required for noise mapping. It identified a significant number of issues to be addressed in obtaining such data, and the current project would utilise the advice provided in the

IMAGINE final report. In particular the report highlights the following table with respect to information input for the modelling process:

General topic	*Specific problem highlighted by this study*
Terrain model	DTM availability, 3D_cartography, isolevel–step, ground point
Ground characteristics	Impedance
Buildings	Type of occupancy (residential, office, school), heights, number of floors, inhabitants, number of apartments per floor, measured absorption coefficients, national absorption coefficients in use
Road and railway infrastructure	Geometry, 3D information, number of lanes/tracks, asphalt type/track type, embankments
Noise protection / reduction devices	Digital indications on obstacles, on paper indications, materials used, height, absorption coefficient
Road traffic	Traffic volumes, speed, vehicle classifications. Variations with day/evening/night, hour/week/seasonal periods.
Railway traffic	Train speed (given by operators or infrastructure owner measured), train type (given by infrastructure owner -observed)
Aircraft traffic	Flight profile, ground track data, general airport data, runway data, air traffic data, aircraft data
Industrial sources	Sound power levels, time of operation for day/evening/night periods, source heights.
Meteorological data	Measured, obtained from other measurement stations, distance from source, distribution over the territory, data type (humidity / temperature / temperature gradient / wind / rain)
Population data	Measured, derived, each apartment / building / area / sub-area

The WP1 document provides a summary checklist for input data, as shown below, and the final report – the current project would undertake a preliminary investigation of the availability and suitability of each data input component. Having completed this preliminary exercise, together with an analysis of the implications of the findings, the project budget and timescales will be reviewed and reported before full-scale data collection and acquisition would proceed.

WP1: CHECKLIST FOR NOISE MAP DATA PROCESSING

Which external datasets are used to build the input model?
For each of the following themes, specify the external data set(s) that have been used to build the input model to the noise calculations.

THEME SET:

- Relief
- Ground Surfaces
- Buildings
- Barriers
- Roads
- Railways
- Industries and ports
- Airports
- Road Traffic
- Rail Traffic
- Aircraft operations
- Population
- Quiet areas
- Other

For each Theme Set area the final report of the IMAGINE project provides a coded commentary, including identifying mandatory and advanced (optional/better) information source. This guidance would be used to direct the data collection component of the project. For example, for the Terrain item, they identify:

Checklist

Specifications	Source/suppliers	Availability	Cost	Benefit
MANDATORY INFORMATION:				
Sparse ground elevation data point	Official cartography / maps / GPS	▲	▲	✸
As ground elevation data are usually known with a reasonable accuracy and require low or no cost, it is generally not a good idea to stop at this level of information, but the possibility of use further, more dense and accurate sources should be investigated instead . Note that cuttings and embankments of road and railways have been treated in infrastructure chapters.				
ADVANCED INFORMATION:				
Digital ground elevation information ☺☺☺	Official cartography / Mapping agency	▲	■	▲
NOTE – Digital data can be provided in various formats; mainly regular or irregular grids or contours lines. The quality indicator is represented by grid spacing or contour level spacing.	Laser scan (LIDAR) cartography	■	✸	▲
	Direct data gathering (GPS or topographic devices)	■	✸	■

It is advisable to describe for each dataset:

- Source, data provider, commercial reference
- Reference to available documentation (meta-information)
- Quality of the data (completeness, correctness, actuality, etc.)
- Structure of the dataset (relevant themes, features and attributes, topological dimension, coordinate dimension)
- Co-ordinate system
- Accuracy and precision
- Other aspects

Which methods are applied for linking external data sets? If applicable, specify how the different external data sets have been combined into a single thematic layer in the noise model.

- None, the dataset contains al the necessary information
- Linking based on dynamic segmentation
- Linking based on a specific unique identifier
- Other method: ……..

Example: “traffic flow assigned to road network using unique identifiers” or “building heights calculated from digital elevation data at centroid of 2-dim footprints”

THEME SET (as above)

What (other) type/methods of processing is used to build the noise model? Please specify type of processing on datasets used for building the input model.

Example: “filtering out only buildings with a height > 4m above ground level” or estimating the number of dwellings per building from total residential floor area”

THEME SET (as above)

Applied defaults on data:

- None
- Own determined defaults
- Defaults according to the Good Practice Guide
- Other: ……..

Please specify defaults which are applied to the data sets; can their expected errors and uncertainties be quantified? Please describe:

Example: “assigning a default surface type to roads when unknown” or “assigning a height to buildings based on the number of storeys” or “assigning a default traffic flow distribution scheme for roads”

THEME SET (as above)

Applied data pre-processing:
Data can be pre-processed to reduce detail of data, reduce datasets and to optimize data for large scale calculations. Applied pre-processing:

- None
- Generalization of geometry
- Simplification of data detail
- Simplification by leaving out datasets

Specify applied pre-processing technique to data set. Can their expected errors and uncertainties be quantified?

The IMAGINE project final report includes recommendations on GIS data and the priorities that should be placed on different types and sources of data. This emphasises the importance of Terrain and Relief data, as summarised in the table below (the recommendations extend to cover ground surfaces, buildings, road infrastructure, rail infrastructure, airports, barriers, industrial infrastructure etc).

<table>
<tr><td>FEATURE / PROPERTY</td><td colspan="3">COMMENTS</td></tr>
<tr><td>Breaking lines</td><td colspan="3" rowspan="2">Top and bottom of embankments, shoulders, verges, transition from road/railway infrastructures to natural terrain, hill tops… are more important than smooth terrain shapes or regular slopes. It the DTM has an accuracy < 1m everywhere, explicit breaking lines are not necessary.</td></tr>
<tr><td>Digital terrain model: height lines, points, interpolated surface, TIN,…</td></tr>
<tr><td rowspan="2">Accuracy requirement</td><td colspan="3">Level of detail</td></tr>
<tr><td>High</td><td>Medium</td><td>Low</td></tr>
<tr><td>Vertical position (in m)</td><td>0.5</td><td>1.0</td><td>2.5</td></tr>
</table>

4 ANALYSIS

To a significant degree the creation of noise maps will utilise specialised noise mapping software, such as CadnaA from DataKustik , IMMI from Woelfel or NoiseMap from W S Atkins, coupled with mainstream GIS software via some form of data exchange mechanism. In the current project selection and/or specification of appropriate software will be of central importance. Most of these packages enable import and export of common GIS data formats, including SHP files. Definition and selection will based on the core requirements (PROBLEM), input data specification (DATA) and output requirements (defined in the problem phase and presented in the CONCLUSIONS phase). However, if a particular modelling package is selected, for convenience, time, cost or other reason, it will have a pre-defined set of expected inputs (data requirements), formats supported, analytical procedures, and output facilities. The degree to which these meet the project requirements must be examined and the need for any development or modification of these procedures must be defined – e.g. by asking 3rd party suppliers to provide quotations for undertaking these tasks on your behalf.

In this particular project another set of analysis tasks may be required – the analysis of available datasets (e.g. roadline and embankment data, building profile and height data) in order to provide satisfactory input data for the modelling and mapping software. For example, building height data for each part of each agglomeration is not available as standard in OS sourced mapping, only footprints, so supplementary data sources must be found or conducted (e.g. LIDAR survey data), and then approximate 3D models built of each agglomeration. This alone could be a major exercise, so might be defined as a sub-project with its own PPDAC. The same applies to traffic data – input datasets may be available for a subset of locations (e.g. monitored cordons), times etc., but require extending by some form of modelling to all parts of each agglomeration. It is possible that one or more of the available software packages will incorporate analytical tools to facilitate such estimation, but this would require close examination.

In addition to analyses that may be required for input data requirements, analysis of output data would also be required. For example, whilst the output data may be generated for 10mx10m cells for the area of interest, each layer (by noise source) will have differing quality characteristics. Analysis of each might lead one to determine that a weighted average of noise raster layers may provide a better (more accurate) estimate of total average noise levels, then the default unweighted summation of the individual rasters. And although the output maps in raster format may complete the project deliverable to the customer, it is likely that analysis (and possibly mapping) of uncertainty associated with the maps would be desirable.

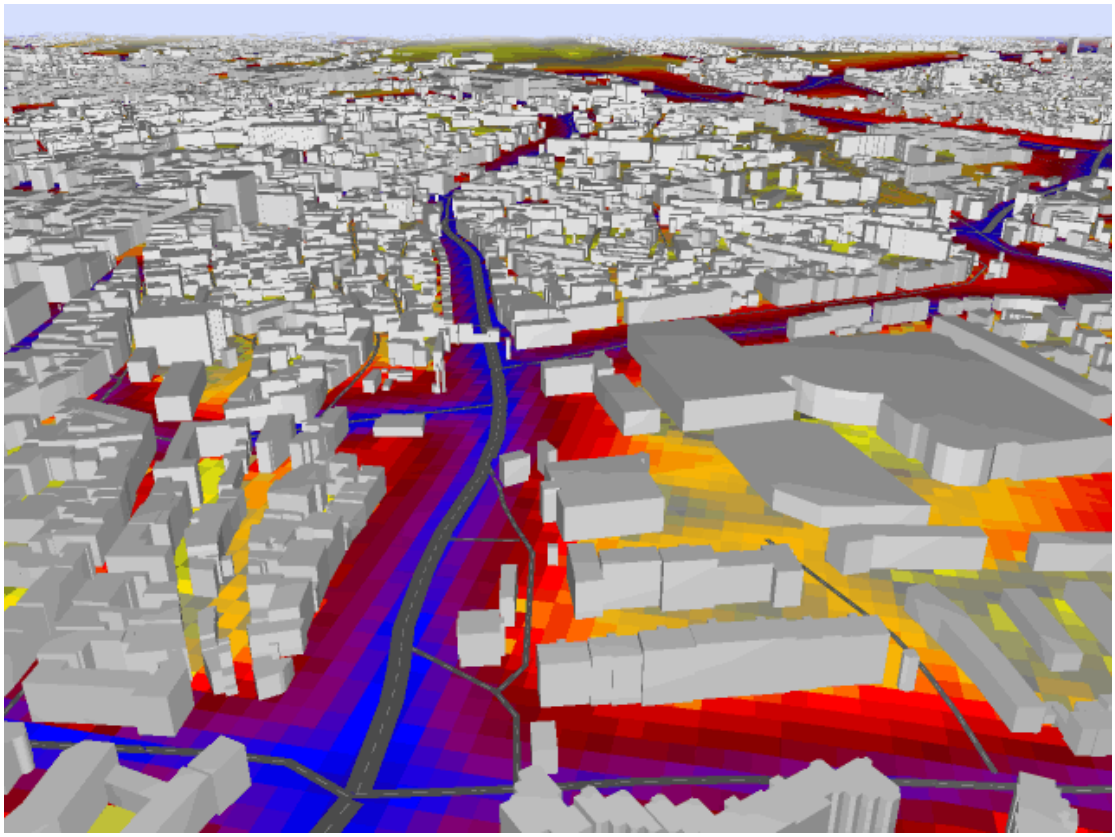
Finally, there is a likelihood that the project will be extended, to comply with other aspects of the END: geographically (providing national coverage); technically (utilising full HARMONOISE models for CEC-wide comparability); in terms of impact (population affected, by degree); and in terms of abatement (design of infrastructure and related projects to reduce noise levels and the impact of noise). Each of the factors may influence decisions regarding the approach taken to meeting the immediate task as defined in the PROBLEM phase.

5 CONCLUSIONS

The results of this project are to be a series of static maps, available via the Internet, showing the (horizontal) noise level in Lden based on multiple sources, as defined in the project definition. The kind of maps produced would be similar to that shown below (produced using the CadnaA software) for Augsburg in Germany. Colours indicate the mapped noise intensity within the City (147sq kms), based on multiple sources. The agglomeration includes some 80,000 buildings and 260,000 people. In addition to the set of maps, data will be provided with each map providing information on the variables covered, the map key and scale, the data resolution, and estimates of the mapped data accuracy.

Static maps of this type are extremely helpful, but provide a very limited picture of the noise levels experienced and are difficult to inspect – for example, one cannot readily click on an area of the map to see how the values apply to a particular city block. As software tools develop increasingly one would expect improved interaction and 3D visualisations to become desirable and then expected. For example, a static 3D visualisation (see below), or a fly-through animated visualisation, may be of much greater use to both the public and to planners. Likewise, data output in the form of GIS-readable raster files and CAD-readable files (e.g. for building facades) may prove essential outputs in future. Such materials may

be included within final presentation of results, and in discussions of how this particular exercise might be extended and lead on to subsequent projects of the kind discussed.



Annex 1: European Commission Directive 2002/49/EC

Assessment and management of environmental noise

As part of the effort to tackle noise pollution, the European Union has laid down a common approach to avoiding, preventing or reducing on a prioritised basis the harmful effects of exposure to environmental noise. This approach is based on using common methods to map noise, on providing information to the public and on implementing action plans at local level. This Directive is also to serve as a basis for developing Community measures concerning noise sources.

ACT

Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise.

SUMMARY

This Directive is aimed at controlling noise perceived by people in built-up areas, in public parks or other quiet areas in an agglomeration, in quiet areas in open country, near schools, hospitals and other noise-sensitive buildings and areas. It does not apply to noise that is caused by the exposed person him or herself, noise from domestic activities, noise created by neighbours, noise at work places or inside means of transport or noise due to military activities in military areas.

Noise indicators and their assessment methods

Lden is an indicator of the overall noise level during the day, evening and night which is used to describe the annoyance caused by exposure to noise. Lnight is an indicator for the sound level during the night used to describe sleep disturbance. The noise indicators Lden and Lnight are used in the making of strategic noise maps.

Other indicators may be used for acoustical planning and noise zoning and in the special cases as listed in Annex I to the Directive.

The values of Lden and Lnight are defined using the assessment methods set out in Annex II to the Directive. Common assessment methods for the determination of Lden and Lnight will be established by the Commission. In the meantime, Member States may use their own methods to determine the common indicators, provided that such methods conform to Annex II.

Dose-effect relations will be introduced in Annex III by future revisions in order to be able to assess the effect of noise on populations.

No later than 18 July 2005, Member States are to communicate information to the Commission on any relevant limit values in force or under preparation, expressed in terms of Lden and Lnight and, where appropriate, Lday and Levening, for road-traffic noise, air-traffic noise, rail-traffic noise and industrial noise.

Strategic noise mapping

A strategic noise map enables a global assessment to be made of noise exposure in an area due to different noise sources and overall predictions to be made for such an area. The

strategic noise maps must satisfy the minimum requirements laid down in Annex IV to the Directive.

No later than 18 July 2005, Member States are to make available to the public information concerning the competent authorities and bodies responsible for making and, where relevant, approving strategic noise maps.

No later than 30 June 2005, and thereafter every five years, Member States must inform the Commission of the major roads which have more than six million vehicle passages a year, railways which have more than 60 000 train passages per year, major airports and the agglomerations with more than 250 000 inhabitants within their territories. By 30 June 2007 at the latest, strategic noise maps showing the situation during the preceding year in the vicinity of the infrastructures and in the agglomerations referred to must have been made and, where relevant, approved.

No later than 31 December 2008, Member States are to inform the Commission of all the agglomerations with more than 100 000 inhabitants and of all the major roads and major railways within their territories. By 30 June 2012 at the latest, and thereafter every five years, strategic noise maps showing the situation during the preceding year must be made and, where relevant, approved for those agglomerations, roads and railways.

Noise maps must be reviewed, and revised if necessary, every five years.

Action plans

Action plans are aimed at managing noise issues and effects, including noise reduction if necessary. They must meet the minimum requirements set out in Annex V to the Directive.

The measures within the plans are at the discretion of the competent authorities, but should address priorities which may be identified by the exceeding of any relevant limit value or by other criteria chosen by the Member States and apply in particular to the most important areas as established by strategic mapping.

No later than 18 July 2005, Member States are to make available to the public information concerning the authorities and bodies responsible for drawing up and, where relevant, approving the action plans.

No later than 18 July 2008, action plans must be drawn up for major roads which have more than six million vehicle passages a year, railways which have more than 60 000 train passages per year, major airports and agglomerations with more than 250 000 inhabitants. No later than 18 July 2013, action plans must be drawn up for all major agglomerations, major airports, major roads and major railways.

The action plans are to be reviewed when a major development occurs affecting the existing noise situation, and at least every five years.

Information for the citizen

Member States are to ensure that a public consultation is organised and the results thereof are taken into account before the action plans are approved.

Member States are to ensure that the strategic noise maps and the action plans are made available and disseminated to the public in conformity with Annexes IV and V to Directive 2002/49/EC and in accordance with the Directive on the freedom of access to information on the environment .

Reports concerning the Directive

On 10 March 2004, the Commission forwarded a report to the European Parliament and the Council on existing Community measures relating to sources of environmental noise (see "Related Acts" below).

Member States are to collect the noise maps and action plans. They are to forward to the Commission the information contained in the noise maps and a summary of the action plans. Every five years, the Commission is to publish a summary report on the data contained in the noise maps and action plans. The first report will be submitted by 18 July 2009.

No later than 18 July 2009, the Commission is to submit to the European Parliament and the Council a report on the application of this Directive. The report will assess the need for further Community actions on environmental noise and, if appropriate, propose implementing strategies. It is to include in particular a review of the acoustic environment quality in the Community. The report is to be reviewed every five years.

REFERENCES

Act	Entry into force	Deadline for transposition in the Member States	Official Journal
Directive 2002/49/EC [adoption: codecision COD/2000/0194]	18.07.2002	18.07.2002	Official Journal L 189 of 18.07.2002

RELATED ACTS

Report from the Commission to the European Parliament and the Council of 10 March 2004 concerning existing Community measures relating to sources of environmental noise, pursuant to article 10(1) of Directive 2002/49/EC relating to the assessment and management of environmental noise [COM(2004) 160 - Not published in the Official Journal].
This report reviews the existing Community legislation on environmental noise, which includes provisions on the harmonisation of noise assessment and management, on environmental impact assessment, market access requirements for certain vehicles and equipment (tyres, outdoor equipment and tractors, recreational craft), railway interoperability specifications and rules on operating restrictions at airports. The report also notes that research and development constitute an essential building block in the development of Community measures relating to noise (the "CALM" thematic network and the projects funded under the Fifth and Sixth Framework Programmes of Research).

Commission Recommendation of 6 August 2003 concerning the guidelines on the interim computation methods for industrial noise, aircraft noise, road traffic noise and railway noise, and related emission data [Official Journal L 212 of 22 August 2003].

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