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NOISE POLLUTION CONTROL, NOISE LIMIT REGISTER

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ABSTRACT
The regulation of noise pollution in Spain is administered by three regional and national authorities: The state, which develops the basic legislation, the autonomous communities, which develop and implement the appropriate laws, and the townships, which regulate noise in their respective areas within the limits established by the legislation governing the sector. This paper explains the operational plan SONICAT, which was developed in Catalonia, which is made up of 946 townships. The objective of this plan is to ensure that within three years all townships of Catalonia have the acoustic zoning of their territory available in computerised form. This plan is promoted by the Department of the Environment of the Government of Catalonia.

1 - INTRODUCTION

Noise is one of the factors which make up the concept of the environment. It is a pollutant which at certain levels affects the health and well-being of the population and therefore has a negative impact on the quality of life.
The population's awareness of this type of pollution is on the increase, which is why it requires more decisive and rigorous action on the part of the government in defence of their health and peace of mind. In this respect, Catalonia has approved by resolution a municipal ordinance regulating noise and vibrations, so that all townships, depending on their responsibilities, have at their disposal a normative text which they can adapt to their needs and peculiarities (ordenança tipus reguladora del soroll i les vibracions, DOGC 2126, 10 November 1995).

2 - ORDINANCE AND NOISE REGISTERS

The noise ordinance prescribes that each township establish the sound quality objectives of its area by setting sound emission values which must not be exceeded.
They are set depending on time of the day and the level of acoustic sensitivity of the area in question. At least three different areas are established:

Zoning	Recommended emission values outdoors L_{Ar}	
	day	night
A. Area of high acoustic sensitivity	60	50
B. Area of moderate acoustic sensitivity	65	50
C. Area of low acoustic sensitivity	70	60

Table 1.

$L_{Ar}=L_{AeqT}+K$, where L_{Ar} = evaluation level, L_{AeqT} = equivalent continuous noise level, K = correction factor according to type of noise.
The objective of this paper is to explain the methodology which is being applied in Catalonia to ensure that within three years all 946 townships which make up the autonomous community of Catalonia will

have carried out acoustic zoning, that is, that they will have established the noise registers of their region, thus facilitating approval of this ordinance.
Accordingly, drawing up the noise register means establishing the acoustic capacity of an area. It constitutes the normative tool to supplement the ordinance by setting a noise level which must not be exceeded.
In this respect, the noise register is a step which goes further than the sonic map since a map is merely an information tool explaining the sound characteristics of an area.
The noise registers are drawn up using the following methodology:

2.1 - Data collection
A standard questionnaire has been designed which, after being filled in by the townships and after a reconnaissance visit to the area has been carried out, will provide the information necessary for understanding the sound characteristics of that township.
The information relating to parameters such as:

- Main traffic routes
- Traffic volume
- Railway lines
- Commercial areas
- Residential areas
- Industrial areas
- Pedestrian paths
- Localised noise sources
- Noise-related complaints
- Areas considered sensitive to noise: hospitals, schools, etc.
- Type of building
- Anything else which might help describe the sound characteristics of a township will be drawn on the map for each township.

2.2 - Interpretation of the data
Based on the information obtained, a proposal for acoustic zoning will be made, assigning to each area the corresponding level of sensitivity to noise. Distinction will be made between industrial areas, dual carriageways, motorways or streets with heavy traffic, quiet residential areas, etc.
The theory of sound propagation, attenuation caused by distance, barriers, etc. will be applied.

2.3 - Measurements of the control noise level
Once the first proposal for the areas of sensitivity has been made, measurements of the control noise level for each type of area will be carried out to ensure the level assignments or to resolve doubtful areas, which will allow the definitions of the different areas of acoustic sensitivities to be completed.
The measurements are short- or long-term to enable the sample to be representative.
The short-term measurements will last for 10 minutes for traffic noise and from 1 to 10 minutes for industrial or machine noise, while the long-term measurements will go on for at least 24 hours.
For each measurement, a monitoring sheet is to be completed, on which the result, the characteristics of the area, the number of vehicles in traffic, other noise sources, etc. are recorded.
The measurement points are identified on the map.

2.4 - Presentation of results
The results are displayed in computerised form. The acoustic zoning data is digitised by means of the software program Miramon over the mapping base to give files in Arc/Info format.
A copy of the register is delivered to each of the townships to enable them to approve it along with the ordinance, regulate the environmental noise pollution of their area and use it as an additional planning tool. After approval, it will be incorporated in the geographic information system of the Department of the Environment, which may be consulted on the Internet.

Catalonia's townships are grouped together in 41 regions. At the present time, work has been completed in 2 regions, is ongoing in 17 regions, and it is estimated that the entire area will be completed within 3 years.

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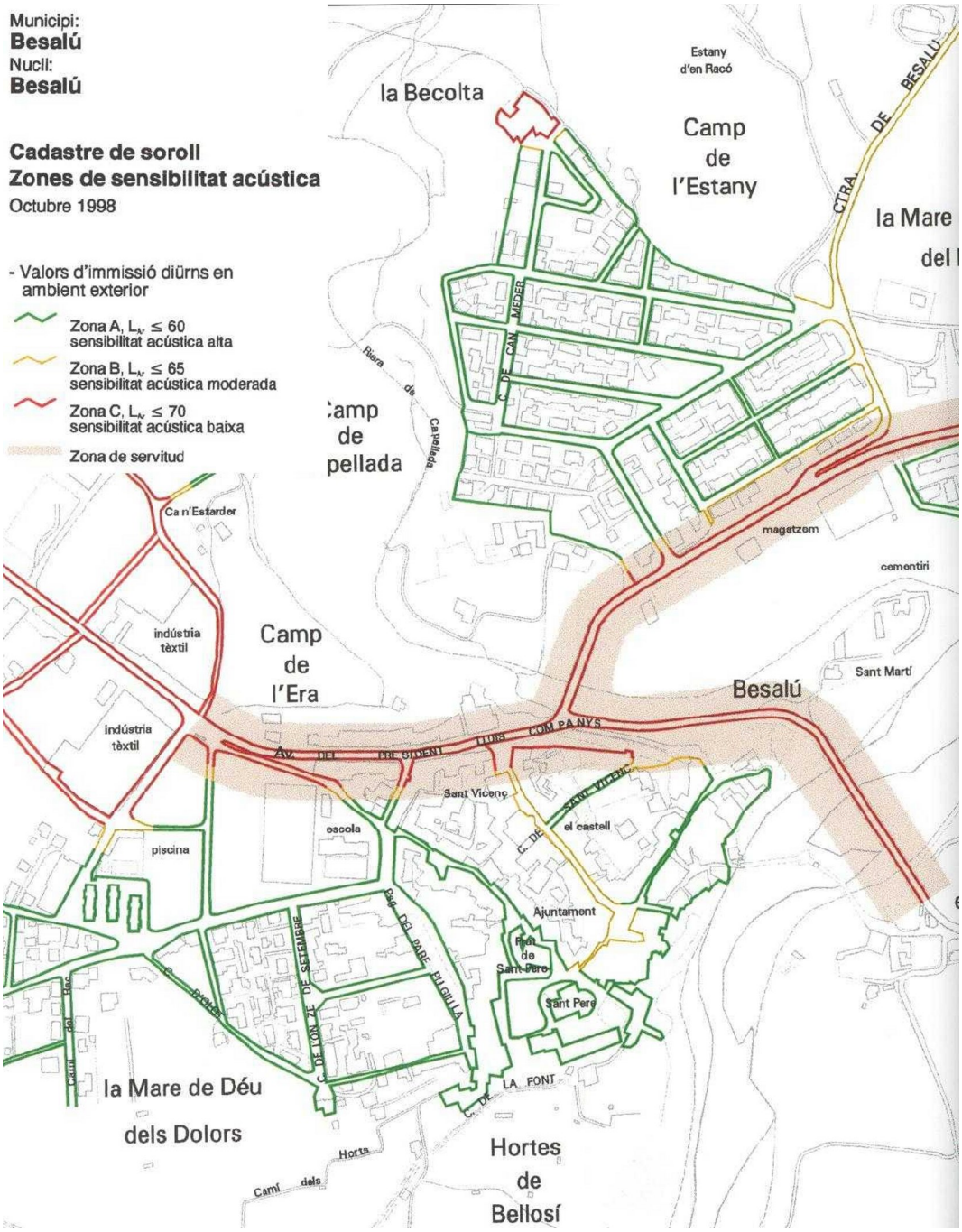

Figure 1: Example of a noise register.