

ACOUSTIC ZONING AND NOISE MAP OF THE TERRITORY OF TARANTO (ITALY)

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ABSTRACT

THE “ACOUSTIC ZONING” AND THE ARRANGEMENT OF A NOISE MAP ARE THE INITIAL STEPS OF THE ACOUSTIC RECLAIM PLANE OF TARANTO’S TERRITORY. COMPARING THE NOISE VALUES THAT HAVE BEEN MEASURED WITH THE VALUES THAT WERE FIXED ON THE ACOUSTIC ZONING, IT IS POSSIBLE TO LOCATE THE AREAS OF CITY TERRITORY WHERE THE RECLAIM WORKS MUST REDUCE THE NOISE WITHIN BOUNDS OF ITALIAN LAW.

LAW REFERENCES

The Italian Main-Law about noise pollution, said “Legge Quadro”, fixes the acts that the City Administrations have to do in the complex of actions that the other Institutional levels must do to respond to the Law purposes about protection of external and inhabited environment.

Whit reference to Municipal Administrations, what is present in the Main-Law was present in another Law (DPCM 1/03/91): this Law:

- Explained what were the maximum limits of exposure to noise;
- Imposed to class acoustically each own territory of Municipal Administrations.

This classification would have to be done on the grounds of the different uses of city territory. So, to Municipal Administrations, the Law gave the power to make use of a new town-planning tool: The Acoustic Zoning. This Zoning, included in an Acoustic Reclaim Plane, would have been the guardianship of public welfare.

For these reasons the Acoustic Zoning has to be co-ordinated with other town-planning tools:

F. ex (1):

Urbanistic general plans

- General town planning scheme
- Building plan

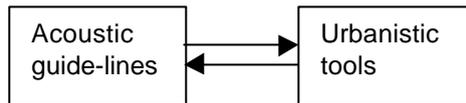
Urbanistic detailed planes

- Lotting plan
- Zone plan
- Production plants plan
- Urban reclaim plan
- Urban traffic plan

Complementary planning tools

- Urban plan of parking
- Sales plan

For a correct procedure of Zoning, we need of these strongly connected elements:



The “Guide-lines”, generally elaborated by Regional Institutions, fix the rules of the Acoustic classification with reference to:

- Fixed sound sources
- Road, railway, air (if exists) traffic
- Settling parameters
- Acoustic parameters

ACOUSTIC ZONING OF CITY TERRITORY

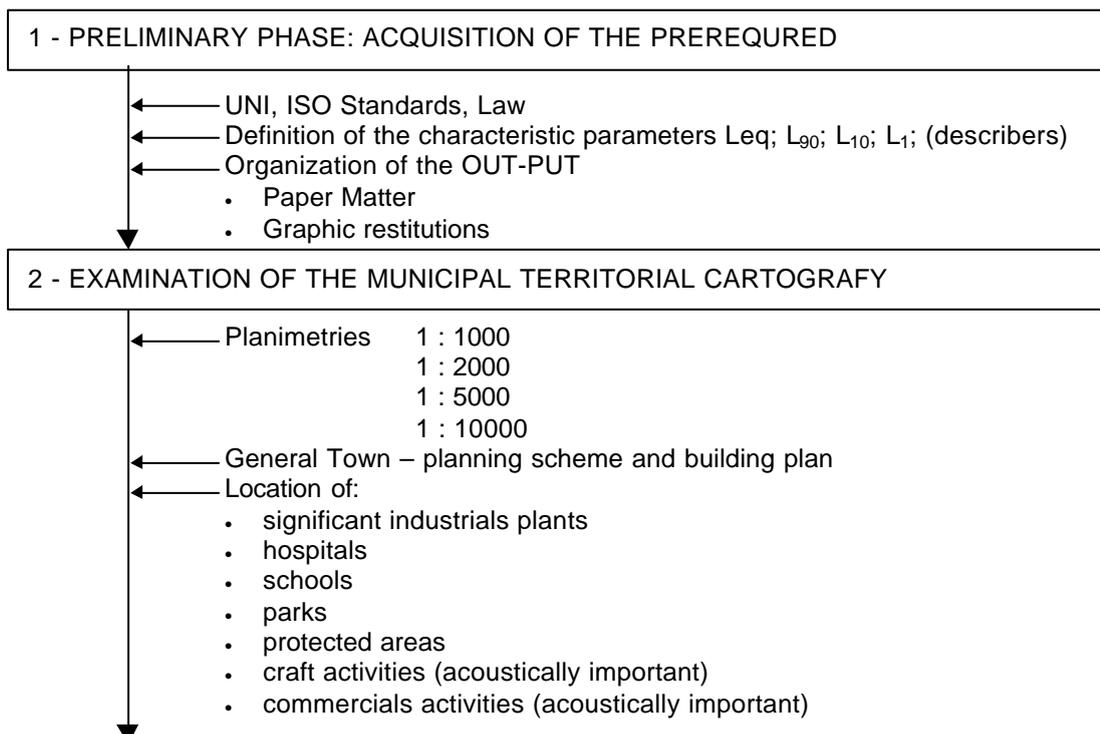
Introduction

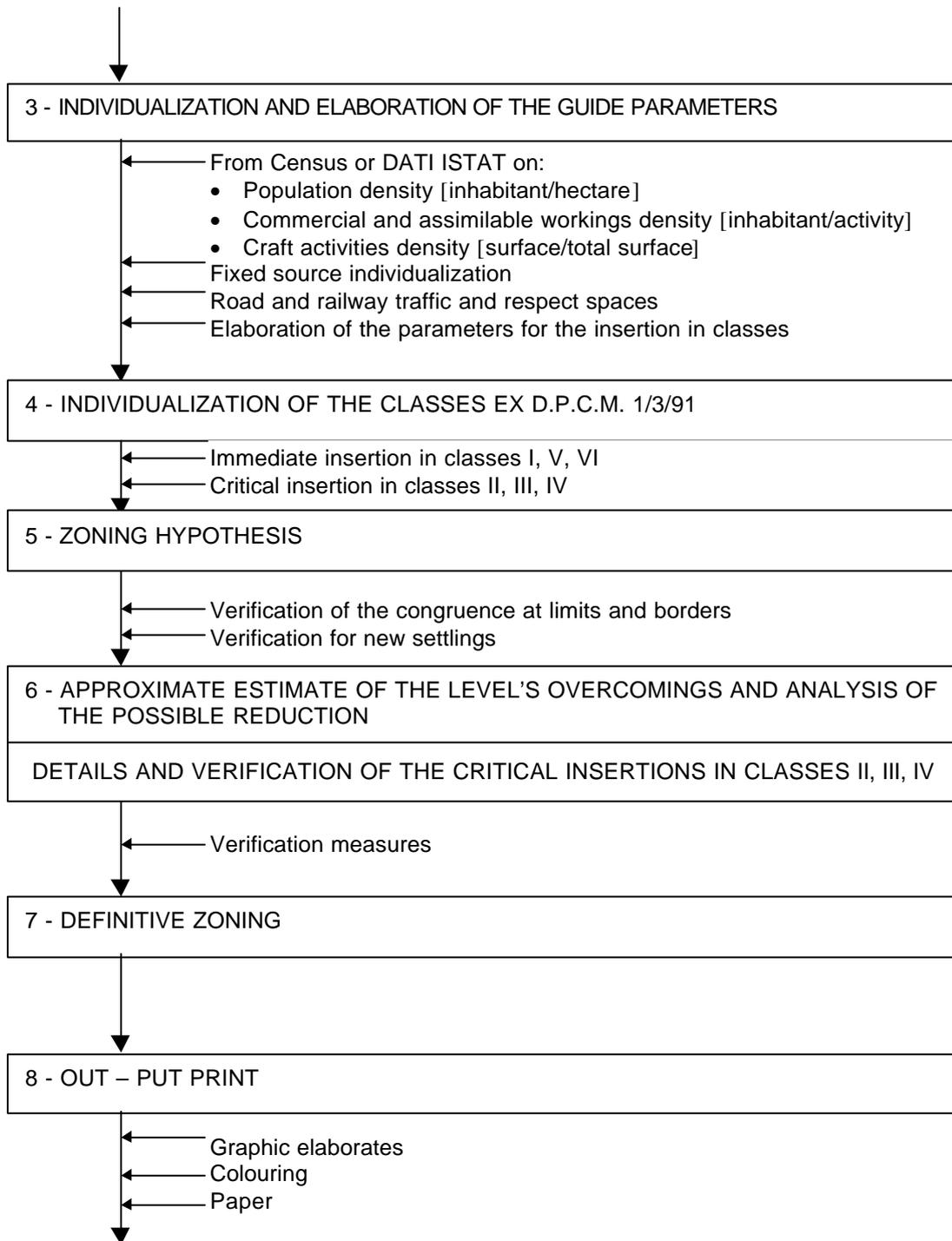
In the arrangement of the Acoustic Zoning, we considered the following problems:

- The Institution “Regione Puglia” has not still issued any “Guide-line” for the Acoustic classification of City territories, not in accordance with the article n. 2 of Italian Law indicated as DPCM 1/03/91.
So, without directing by Regional Institution, to select some general standards to make the Acoustic classification of the city territory, we followed, as much as possible, the instructions that were common for all the already issued “Guide-lines”. The common parts of the “Guide-lines” were obviously adapted to the reality of the Territory of Taranto.
- The same territory of Taranto city is strongly characterized for:
 - Difficult road traffic for the presence of bridges;
 - Big industrial plants;
 - Peripheric distribution of the density of inhabitants,
 - Centralization of services.

Prospect of Zoning

The project of Acoustic Zoning was developed as following:



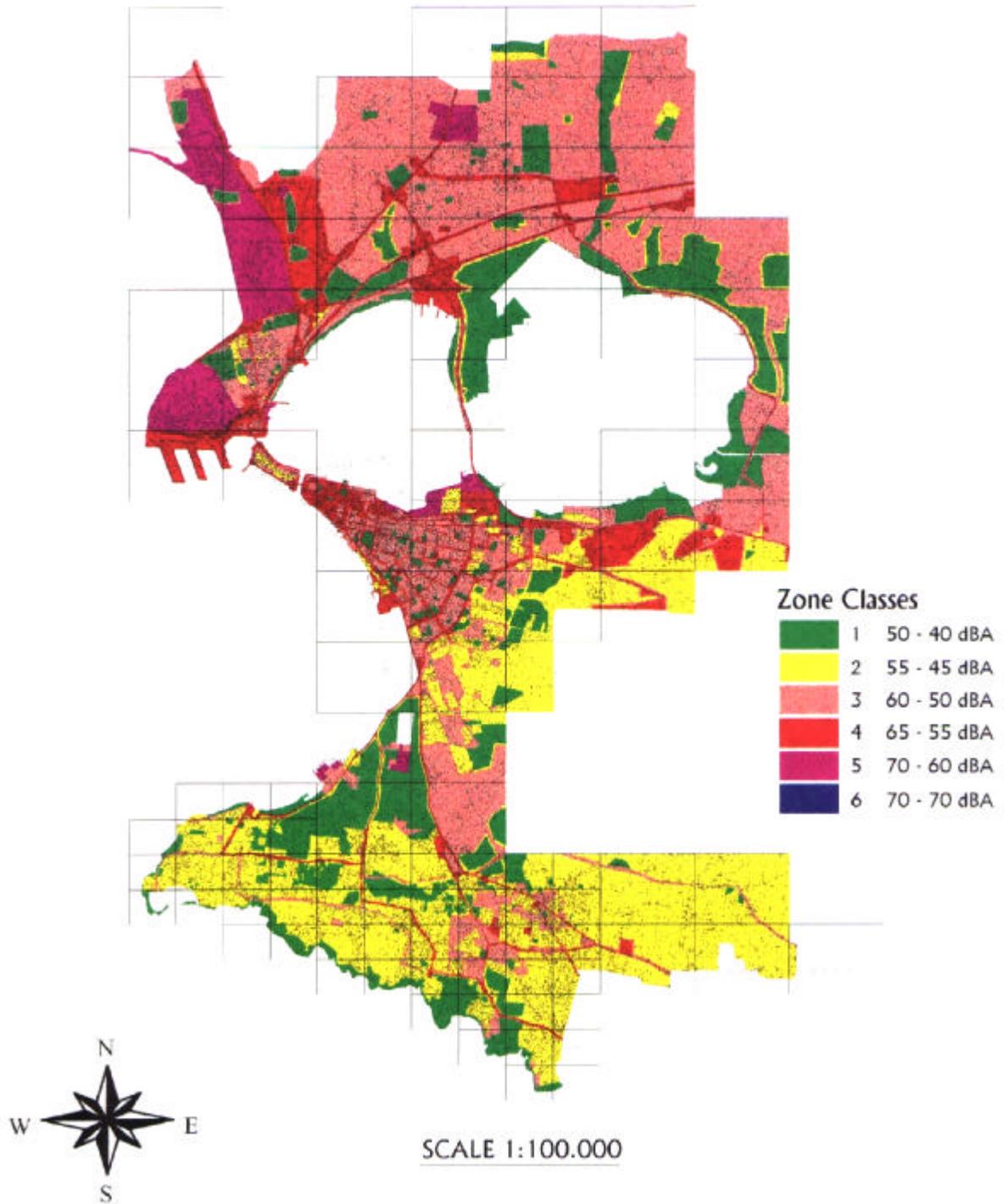


Graphs

In the following recapitulative table, scale 1:100.000, the result of the work made is posted. We can observe, that the total extension of the obtained zones, in comparison with the total extension of the territory, is the next:

CLASS ZONE	I =	17%
CLASS ZONE	II =	31%
CLASS ZONE	III =	34%
CLASS ZONE	IV =	11%
CLASS ZONE	V =	7%
CLASS ZONE	VI =	0%

ACOUSTIC ZONING OF THE TERRITORY OF TARANTO

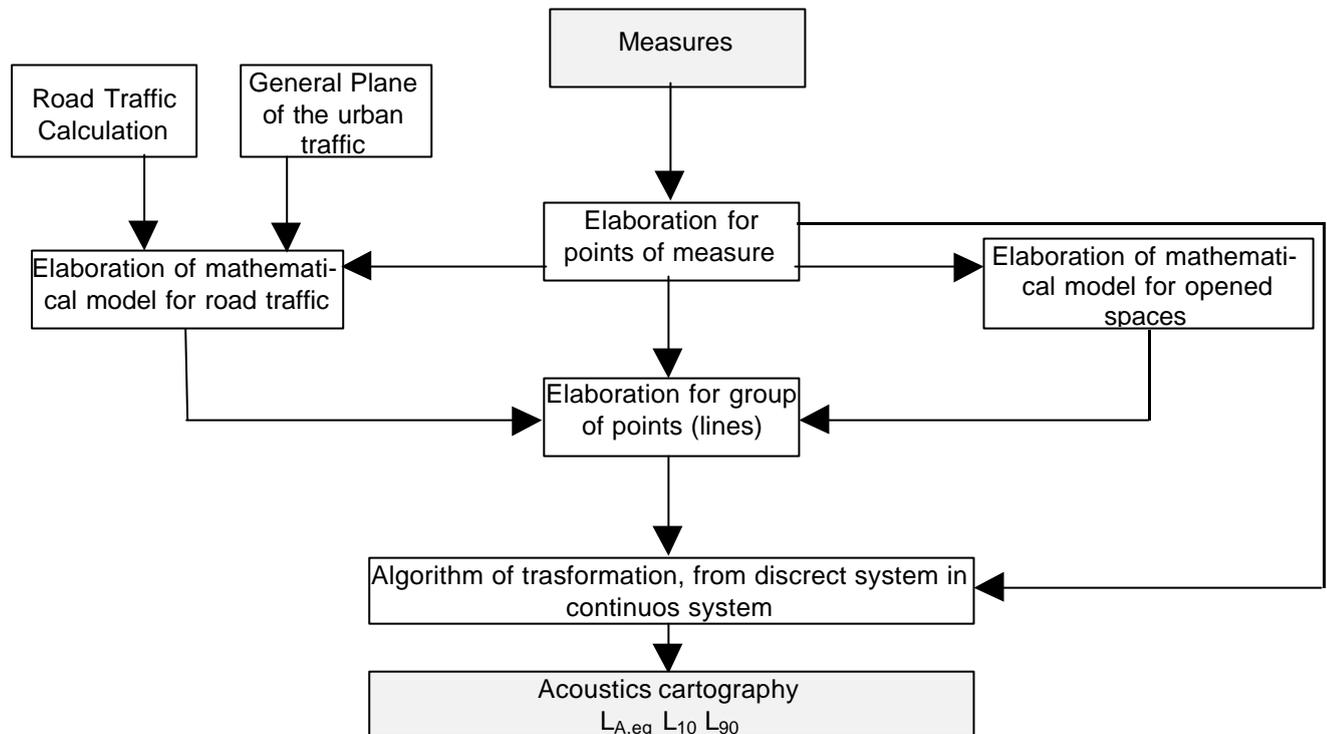


NOISE MAP

In the following, we show the scheme of the correlations between the necessary operations for the realization of the Acoustic Cartography of the Municipal Territory of Taranto.

These items:

- Geographical– topographic description of the areas and/or the places;
 - Indications for the territory utilization;
 - Description of the sources of noise, actual or foreseen, and conditions of functioning;
- are deduced, as much as advisable, from the Acoustic Zoning of the Municipal Territory.



Realization criterions:

With reference to the scheme in blocks already represented, the phases indicated have been developed in according with the following criterions:

Measures:

649 measurements have been executed in different hours of the diurnal period of reference. The temporal arc is included between June and December 1999. For the zone of the Municipal territory, seat of inhabited settlings, more peopled in summer, the measurements have been executed exactly in this season, to get informations in worse conditions from the acoustic point of view. During the temporal interval, the measurements have been executed in conditions more assimilable at the “normality” of the daily life in Municipal territory. So, Sundays and public holidays have been excluded. In these days the road traffic and the presence of the issuing sources, particularly in the summer period, are more intense on some roads, but are much less present in the major part of the territory. The days of Saturday have been besides excluded, because characterized by specific sources, condensed in determinated zones (markets, suburb shops, queues to hypermarkets etc.). In the choice of the “observation times”, inside the diurnal period of reference, as possible, we considered the average habits of life in the territory. So, first afternoon hours have been excluded, because characterized by the scarcity of sources for the shops business hours.

The extension of the measurements to the night period of reference (hours 22,00 ÷ 6,00), has been executed only for some emplacements and for verification. In fact, the D.P.C.M. of November 14th 1997 “Determination of the sonorous sources limit values” indicates in the table C: “absolute limit values” (but in all tables too) a difference of 10 dB(A) between the limit values in the diurnal time of reference and the

limit values in the night time of reference. This diversity of the limits requires that the Territory Acoustic Cartography can be done:

- With series of double measurements for each emplacement, that must be executed separately in diurnal or night times of reference. This would produce a double acoustic cartography, one for the day and one for the night, with uncertainty consequent and difficulty in the individualization of the acoustics crisis areas, in which to execute reclaim interventions;
- Executing series of diurnal and night measurements for each emplacement and elaborating the data, using a describer parameter, for example the equivalent level "day/night" ($L_{A,eq} d/n$), in accordance with the empirical formulas present in technical literature. The "day/night" describer parameter would have then to be confronted with an absolute limit value "day/night", that can be obtained by elaborating the limits of the mentioned table C. But this elaboration is not present in the D.P.C.M. that instead fixes specific absolute values and different in the diurnal and night times of reference.

For these consideration we preferred to carry out the Municipal Territory Acoustic Cartography, only reported to the diurnal describer parameters, to confront with the foreseen absolute limit values of the D.P.C.M. of November 14th 1997 for the diurnal period of reference. This methodology presents the advantage of the Law references certainty and of the individualization of highest values.

In fact, the overcoming of the limit values already in diurnal reference period, requires the necessity of acoustics interventions of reclaim, trough which the relative situation in the night time of reference can certainly improves. This would agree to differ temporarily, previous ulterior night measurements, the necessary interventions of reclaim in the areas of acoustic crisis with reference to the night period.

At last, as expected to the normative in force, the measurements were not executed in rainy days or disturbed by wind, with a speed not higher than 5 m/s. In the instrumental execution we respected law norms and technical standards, with height of the microphones between 1,80 and 4,00 m respect to the ground. The use of the constants F (Fast) and S (Slow) have been selected according to the sources. For the vehicules in movement we used the constant F.

Graphs:

In the following recapitulative table with scale of 1: 100.000, the result of the work made was reported. The confrontation by superimposition with the hypothesis of zoning, supply the first indications on receptors that necessity of acoustics interventions of recovery.

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NOISE MAP OF THE TERRITORY OF TARANTO

