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SOUND POLLUTION STUDY IN THE BISTRITA MUNICIPALITY

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***Abstract*:** *This paper presents a study of sound pollution in Bistrița municipality made for the sound map preparation. This paper is the first part in the noise pollution study necessary for the "sound map" and contains the principal steps of the SoundPLAN program .There are a lot of knowledge necessary for a good interpretation and for a good solution for the SoundPLAN program application inside a town. This paper prepares the data on the road in the Bistrița municipality.*

Keywords: *Sound Pollution, Bistrița municipality, Application of SoundPLAN program*

1. INTRODUCTION

The paper proposes a study with a view to drawing up the noise map in the center of an extinct Bistrița city, complying with the provisions European Directive 2002/49 EC transposed by HG 321/2005. The noise took into account is the one due to road traffic and the input data on the basis of which it is performed map are measurements of noise from the strictest studied, as well as data about the traffic auto in the area [1].

For the purpose of drawing up map of the noise is used SoundPLAN software package, which consists of a coordinated package of Sound PLAN-Manager. Each program in the menu solves a specific task, and must not be had the entire program when we solve a specific task. The SoundPLAN MANAGER modules are: Library; Geo-Database; Calculation; Result Tables, Spreadsheet; Expert Industry; Wall Design; Graphics.

SoundPlan program properties are [2]:

•Comply with point by point European Directive 2002/49 EC;

•Allows to import maps from Bitmap format, autocad * .DXF, Arcview * .shp, etc.

•To allow the importation of data relating to traffic by road, rail (MS Excel, or GIS);

•Allows to perform 3D model of relief and buildings, calculation of relief 3D;

•Calculations on more than one million points of grid;

•Enables the calculation of the sound level on building facades;

•It is the database built-in.

2. SoundPLAN SETTINGS

In the initial settings, we've selected standards for the calculation of the parameters of the noise which will apply to the project. These standards involve use of certain procedures for modeling entities significant, calculation formula, the process of calculation, and implementing procedures. In the case of the project application, the selection has been:

In case of paper is sated our use of the standard French NMPB Routes 96 (Guid du BRUIT) in the case of road traffic noise - standard required by the Directive 2002/49 EC.

For each project, is generated a folder. Thus, all the data relating to a project are stored together. This procedure facilitates efficient management of the project by the entire team.

In our case we have created the folder "Bistrița".

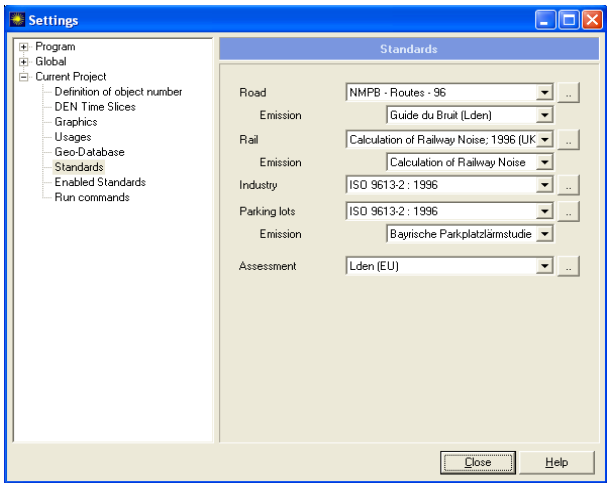

Fig. 1. Setting standards in Sound PLAN

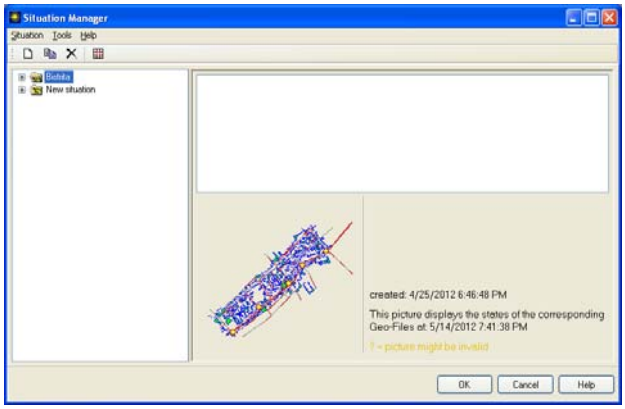

Fig. 2. Define of Bistrița project

For the creation model simulated acoustic are required:

•Modeling geographical level curves;

•Modeling noise sources - roads in our case;

•Modeling buildings, parks (obstacles);

•Positioning points of reception;

•Calculation of levels of noise at the point of reception.

Under the project has been shaped in the center denotes a city Bistrița. Does not have access to a map in electronic format, acoustic design elements have been introduced in the program manual. As a background guide to entering the data have been used 2 sections of a map to scale of roads and buildings in Bistrița in .bmp "map2web" of the firm Schubert & Franzke.

In the menu Geo-Database we have built a topologic model required acoustic modeling, consisting of the following layers of information:

1. Level curves (using information Google Maps); 2. Street; 3. Street Name; 4. Buildings;

5. Parks; 6. Measuring point measuring.

Enter the level curve for the calculation model digital relief ("Digital Ground Model") is made by placing first in the shares of the landscape, in order that the objects subsequently introduced may not be to zero, but above the altitude field.

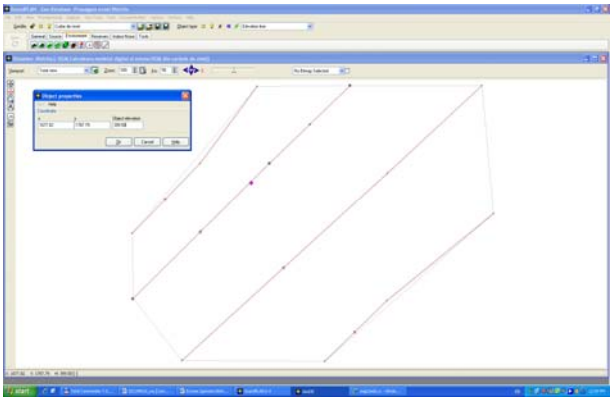

Fig. 3. Level curves

In the event noise emitted by road traffic streets (roads) are linear sources of noise. The SoundPLAN “street” is defined as an object, having a generic name and is divided into several sections. Object of type "Alignment Street" means the instrument for shaping road in SoundPLAN is defined as linear source of noise pollution. The alignment of road is defined by co-ordinates X,Y, elevation object and elevation field. Elevation of road is set after elevation land use (DGM). In "street" editing "points" along route. Subject "street" edited can be selected, deselected, copied, inserted new points, edited properties. Acoustic emissions road (in dB) for the period of day, evening, night (in accordance with EU) can be set directly or calculated according to the data available.

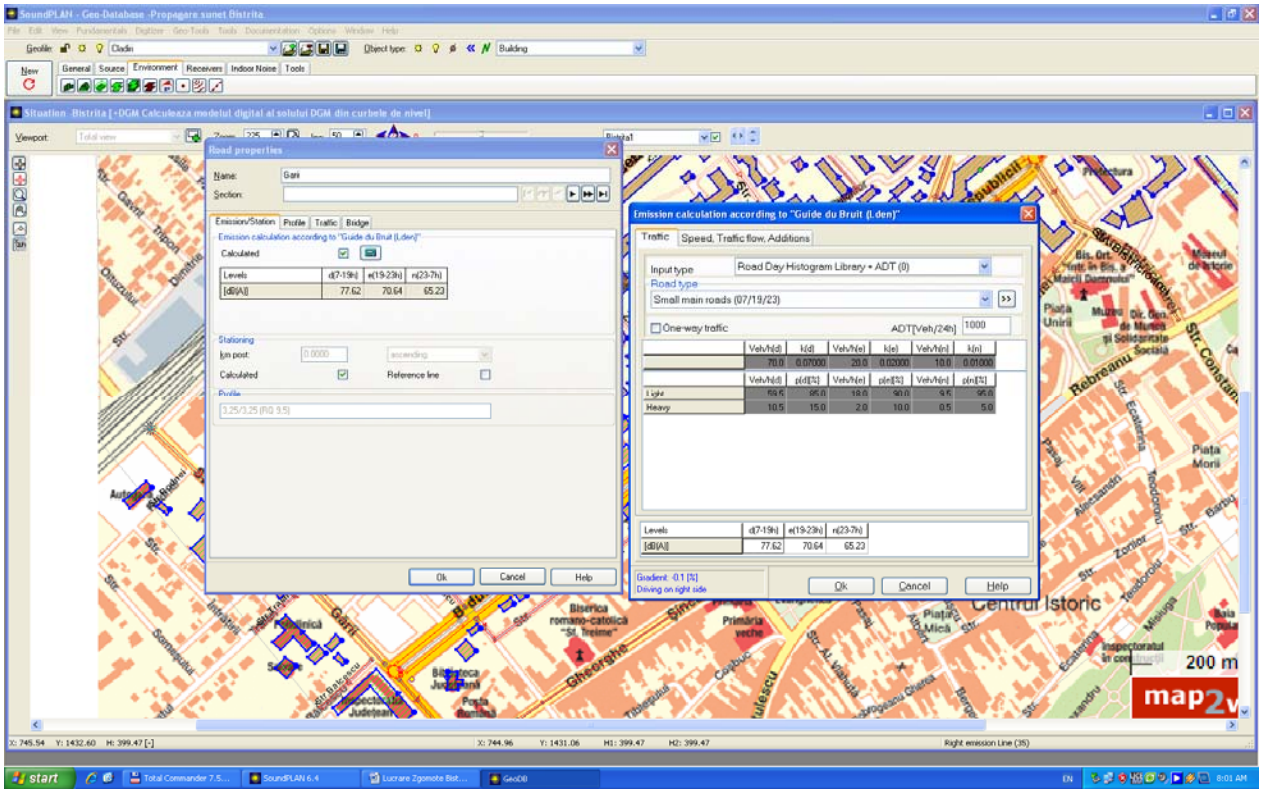

Fig. 4. Create object of type "streets": Street Railway Station

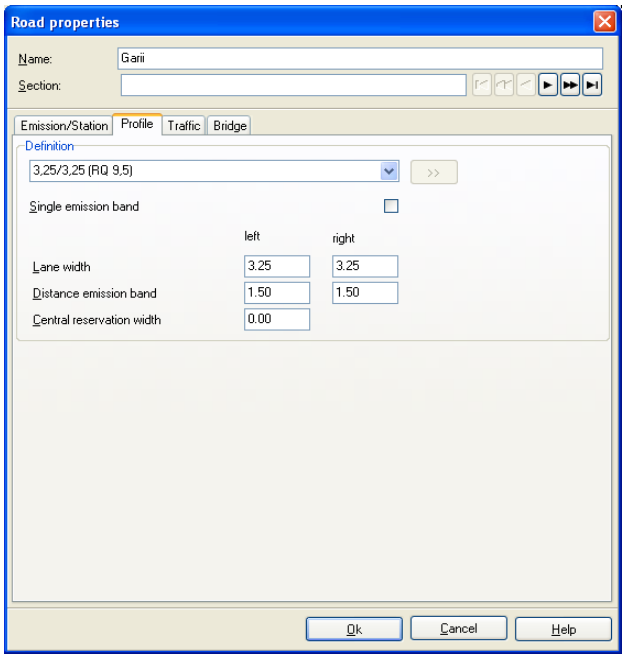

Fig. 5. Profile object "street":
Street Station 2 strips of 3.25m

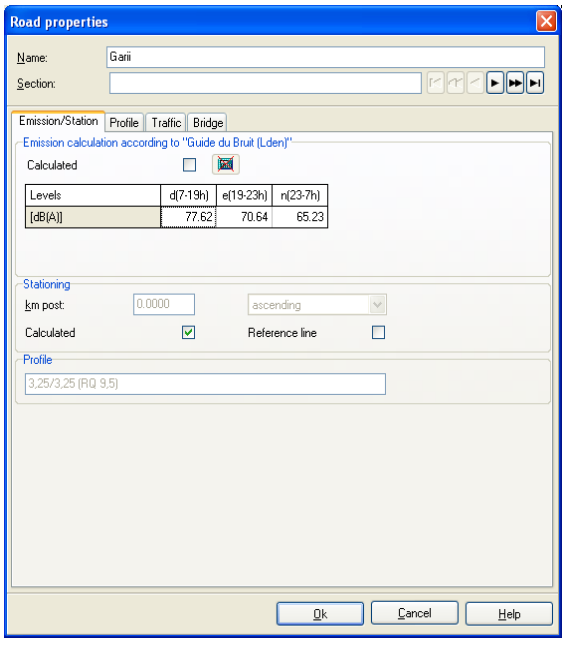

Fig. 6. Direct setting of acoustic emissions "street "

Acoustic emissions road (in dB) for the period of day, evening, night (in accordance with EU) can be set directly or calculated according to the data available.

If we don't have the values specified for emissions path, they may be deducted from

If we don't have the values specified for emissions path, they may be deducted from features of traffic, number lanes, gearbox, type asphalt etc using libraries available from the program SoundPLAN.

Many of the emission calculations traffic in SoundPLAN same menus of inputs with

emblazoned on the basis of the standard used. Main Parameters for input to define traffic emissions in SoundPLAN are:

•The time periods DEN: Shall be defined for the day, evening, night (7-19); 19-23; 23-7). Together they do 24 Hours;

•Directions traffic: Uni-directional sense, both directions (traffic volume divided symmetrically in both directions);

•Slope of road (in %), calculated from the co-ordinates road and displayed;

•Driving on right/left;

•ADT (Average Day Traffic) [vehicles/day] or average volume traffic/hour, for periods DEN, total or separately on vehicle types (light or heavy);

•k: Factor to calculate the volume of traffic clockwise for a period of time ink * ADT ADT=vehicles/hour for each of intervals DEN;

•p[%]: The percentage of the selected type of vehicle over the total volume of traffic on the time period.

3. METHODS OF SOUND EMISSION CALCULATION

Methods of calculation of sound emission are five categories and are illustrated in figures below.

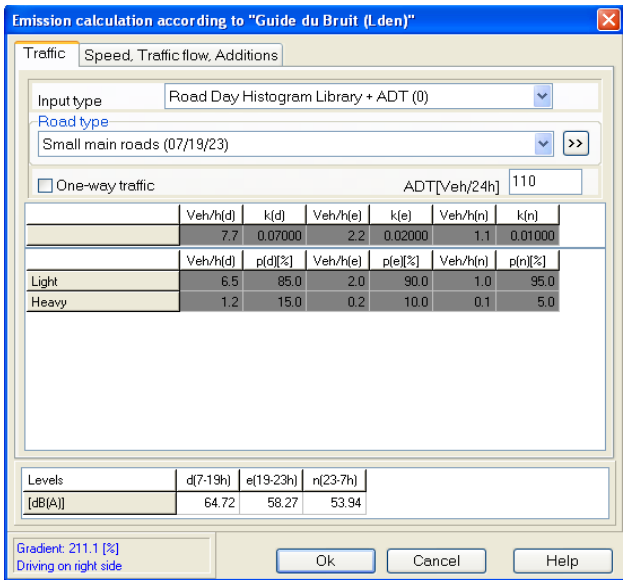

Fig. 7. Method (0) - calculation of acoustic emissions "street "

In this case (0) the input data are given by the settings of the traffic data:

-Volume total average traffic/day (ADT) (input type);

- the type of road (road type).

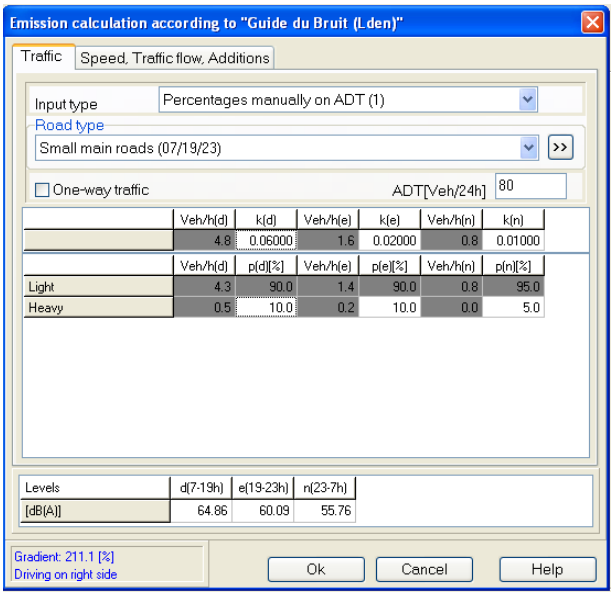

Fig. 8. Method (1) - calculation of acoustic emissions "street "

In this case (1) the input data are given by the settings of the traffic data:

-Traffic one way/2 senses; -Volume total average traffic/hour (ADT) (input type); -k for each of intervals DEN k(d), k(s), k(n);

-Percentage heavy vehicles for each of intervals DEN;

- the type of road (road type).

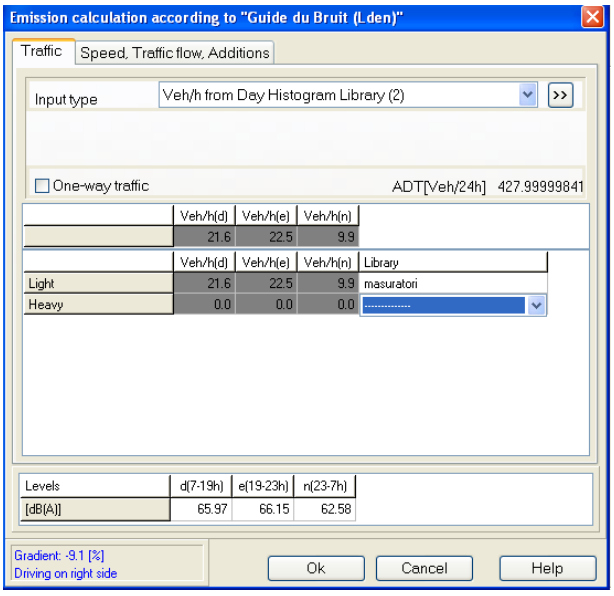

Fig. 9. Method (2) - calculation of acoustic emissions "street "

Method (2) is used for intermittent sources, such as parking in industrial areas.

To define the operating hours in the following ways:

-Minutes/hour;

-Seconds/hour;

-units/hour;

-%;

-dB.

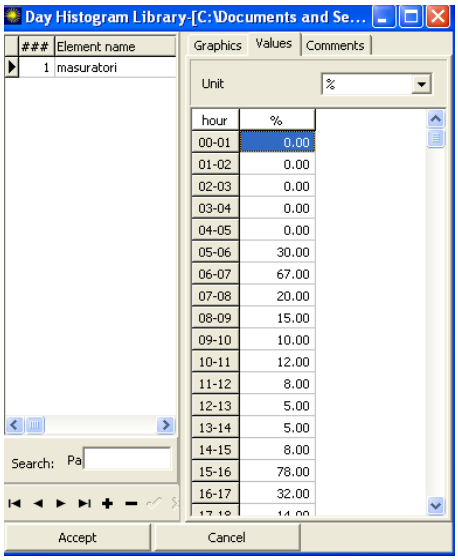

Fig. 10. Defining percentage for parkings

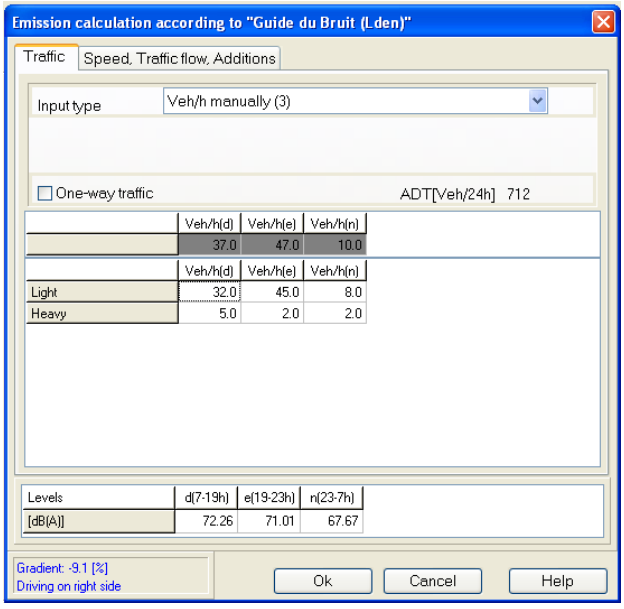

Fig. 11. Method (3) - calculation of acoustic emissions "street "

Method (3) shall consist of the manual definition:

-Autovehicles/hour;

-On day/evening/night;

- Vehicles light/heavy.

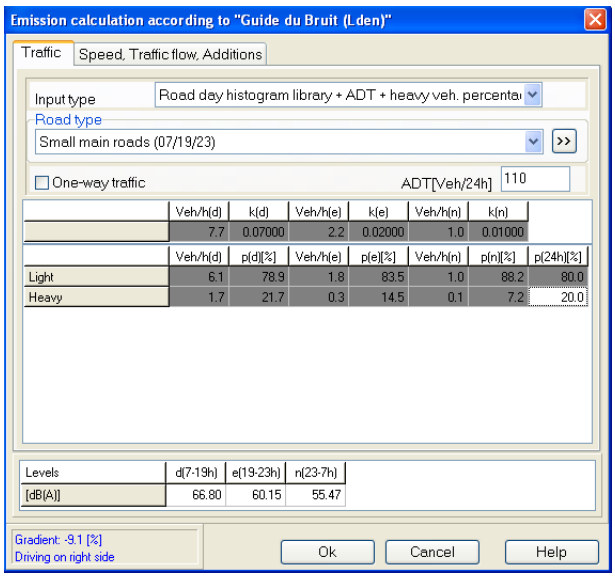

Fig. 12. Method (4) calculation acoustic emissions "street"- menu road Library day histograms +ADT + %heavy vehicles/ 24h (4)

It selects the type of road, which can be carried out manually by ADT (traffic environment daily) and the percentage of heavy backed up/ 24hours, and other items are automatically through SoundPLAN program. Concrete state of Bistrita city is presented in figure below.

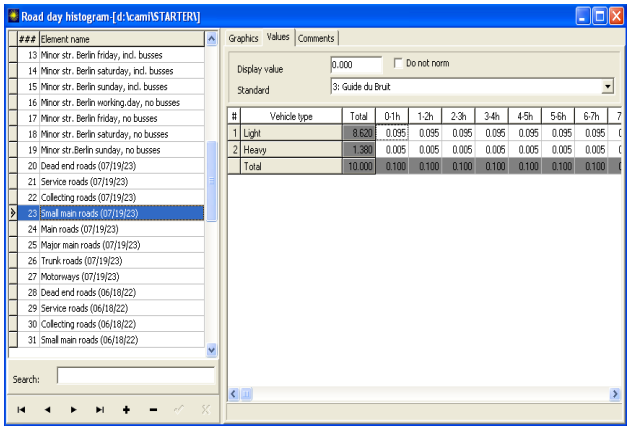

Fig. 13. The histogram for " major road small "

Bar Graphs can be used are compatible with the type of road will be assessed, taken from libraries or defined. Settings in the menu "Speed, traffic flow, Additions" are made in the same way as in Method (0).

4. BUILDINGS

The building is used for modeling of effects of reflection and shielding (absorption) of physical objects such as buildings.

If a building is fairly close to a source or a receiver, and the reflection is possible, need calculated reflections. Reflections are defined as values of surfaces or coefficients of reflection.

For deployment buildings have used the button of the "environment" named "building".

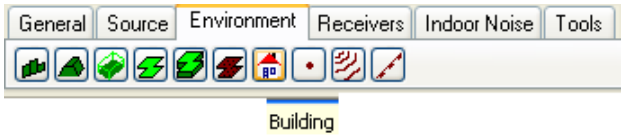

Fig. 14. Button for deployment object type " building "

For 3D modeling of buildings has used the number of buildings stages noted (B, A^N) and the signal of land (DGM).

Each building may be provided a number of people as an owner and the number of inhabitants/ building.

Number of inhabitants is required to both indicate that persons affected by noise, and for the construction of strategic maps for noise and action plans in accordance with the requirements of the Directives of the European ambient noise there is.

5. CONCLUSIONS

The noise in the environment has become in the last few years a worldwide problem. It is estimated that over 250 million Europeans living or carries out its activities in areas in which the noise in the environment is an unacceptable level. Whether we are talking about the noise generated by traffic auto, airports, the yards in design or industrial sites, place an accent and more on reducing or blocking these sources of noise pollution.

Reduction of the sound pollution in urban agglomeration is the main direction of evolution of research in the field of the environment and ambient in this direction is recorded the present work with application in the municipality Bistrita.

It contains the preparing steps for the “noise map” in the Bistrița municipality.

6. BIBLIOGRAPHY

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[2] *** http://on line progrsm of applications SoundPLAN

STUDIUL POLUĂRII SONORE ÎN MUNICIPIUL BISTRIȚA

Rezumat : Lucrarea prezintă un studiu al poluării sonore în municipiul Bistrița în vederea realizării “hărții de zgomot”. Lucrarea de față constituie prima parte, partea pregătitoare în realizarea “hărții de zgomot” și conține principalii pași necesarii pentru aplicarea pachetului de programe Sound PLAN. Sunt necesare cunoștințe adaptate utilizării programului de mare complexitate, cu care se pot realiza hărțile de zgomot în aglomerările urbane.

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