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QUADMAP

LIFE+10/ENVIT/407

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QUADMAP PROJECT

Current practices about selection, assessment and management of QUAs (QuietUrban Areas) in EU Countries, though regulated by the END, appear to be extremely fragmented and inhomogeneous. In fact, each country during past years adopted a set of strategies strictly related to their specific contexts.

Proposing a **solution to overcome the lack of harmonized methodologies for QUAs** is the main aim of QUADMAP (QUiet Areas Definition and Management in Action Plans) project.

In addiction to this QUADMAP project wants to define a **set of procedures for definition, selection, and analysis of QUAs**, in terms of both strategic and operative actions.

QUADMAP PROJECT

These procedures:

-are defined basing on the analysis of the State of the Art as well as on results of a stakeholders' questionnaire, submitted in several European countries, about methods used for selecting/analyzing/ managing QUAs;

-are meant to be tested and optimized, according to the results obtained in **pilot areas** in the countries partner of the project (**Italy, Spain, and The Netherlands**).

In general, the proposed methodology is based on four elements:

✓**noise maps**, obtained by applying the methodology defined by the END;

✓**expert analysis**;

✓**questionnaires** submitted to end-users (citizens) about their perception;

✓ **sound measurements** in the selected areas.

QUADMAP PROJECT

The intention of the new methodology is not to provide a strict sequence of operations, but a **logical, effective procedure**, to be implemented also thanks to schematic tools, despite of peculiarities characterizing each Member State.

The methodology is composed of the following phases:

✓candidate QUAs **selection**;

✓candidate QUAs **analysis** by using both quantitative and qualitative approaches;

✓definition of strategic and operative actions devoted to the **management** of QUAs.

Summary

I PART-METHODOLOGY-

➢Proposal for a new definition of QUA

➢QUA data-collection and pre-selection

➢QUA analysis

➢Current work

➢Conclusions

II PART-METHODOLOGY APPLICATION-

➢Application of the methodology to pilot cases in Firenze

PROPOSAL FOR A NEW DEFINITION OF QUA

Considering the **END approach**, *'quiet area in an agglomeration' shall mean an area, delimited by the competent authority, for instance which is not exposed to a value of Lden or of another appropriate noise indicator greater than a certain value set by the Member State, from any noise source'.*

A number of studies about psycho-acoustics have demonstrated that noise influences also our **social sense**, so to re-discover the urban space, with its characteristics of "pleasant place", appears to be particularly appealing.

QUADMAP proposes the following as the **new, general definition of QUA**:
'an urban area whose current or future use and function require a specific acoustic environment, which contributes to the well-being of the population'.

In this way the final objective when providing QUAs is to define areas where people can find some refuge from urban environmental stress factors and where the well-being is improved.
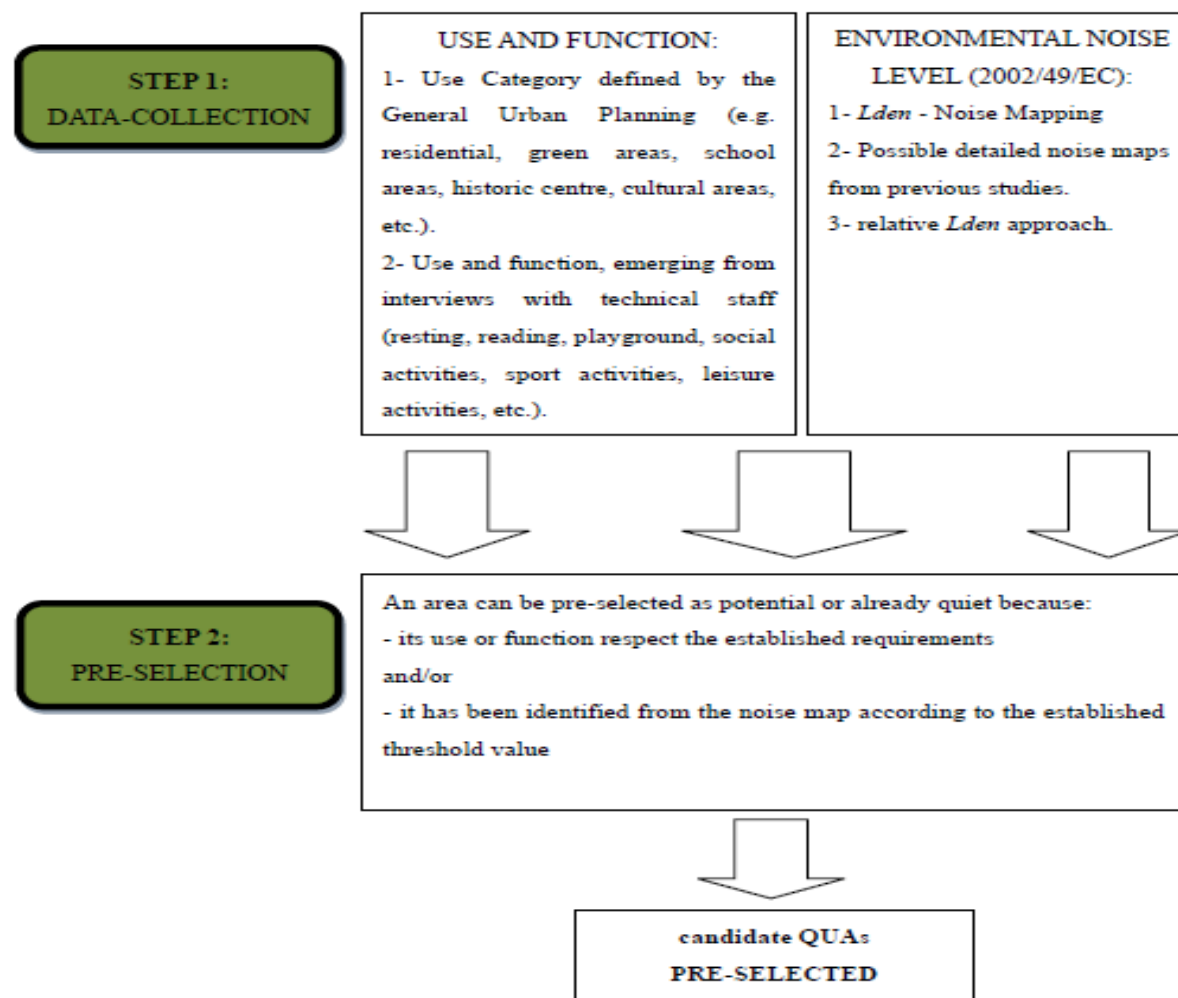
QUA DATA COLLECTION AND PRE-SELECTION

The variables proposed for the selection of the areas as candidate QUAs are:

➢**Use and Function**, category of land use in the general urban planning (residential, green areas, etc.),or (current) function of the space (social relationship, conversation, resting, etc.);
➢**Noise Levels**, with reference to the definition of a noise limit or threshold according to the END definition of environmental noise *"unwanted or harmful outdoor sound created by human activities, including noise emitted by means of transport, road traffic, rail traffic, air traffic, and from sites of industrial activity such as those defined in Annex I to Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control"* and using the Lden parameter;

In this phase additional, **complementary criteria** (equity distribution, citizens' opinions, public use) can also be considered.
Thanks to the described criteria a pre-selected area can be defined as already **quiet or** only as **potentially quiet**.

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STEP 1:
DATA-COLLECTION

USE AND FUNCTION:
1- Use Category defined by the General Urban Planning (e.g. residential, green areas, school areas, historic centre, cultural areas, etc.).
2- Use and function, emerging from interviews with technical staff (resting, reading, playground, social activities, sport activities, leisure activities, etc.).

ENVIRONMENTAL NOISE LEVEL (2002/49/EC):
1- L_{den} - Noise Mapping
2- Possible detailed noise maps from previous studies.
3- relative L_{den} approach.

STEP 2:
PRE-SELECTION

An area can be pre-selected as potential or already quiet because:
- its use or function respect the established requirements
and/or
- it has been identified from the noise map according to the established threshold value

candidate QUAs
PRE-SELECTED

QUA ANALYSIS 1/2

The analysis phase of the QUA requires two approaches:

-a **preliminary desk study** (and a preliminary "in situ" evaluation, if considered necessary), to be developed by the municipality/agglomeration staff, based on the knowledge of the area or on the analysis of official documents.

subdivision of candidate areas into **HUA** according to:

➢ **Landscape**

➢ **Use**

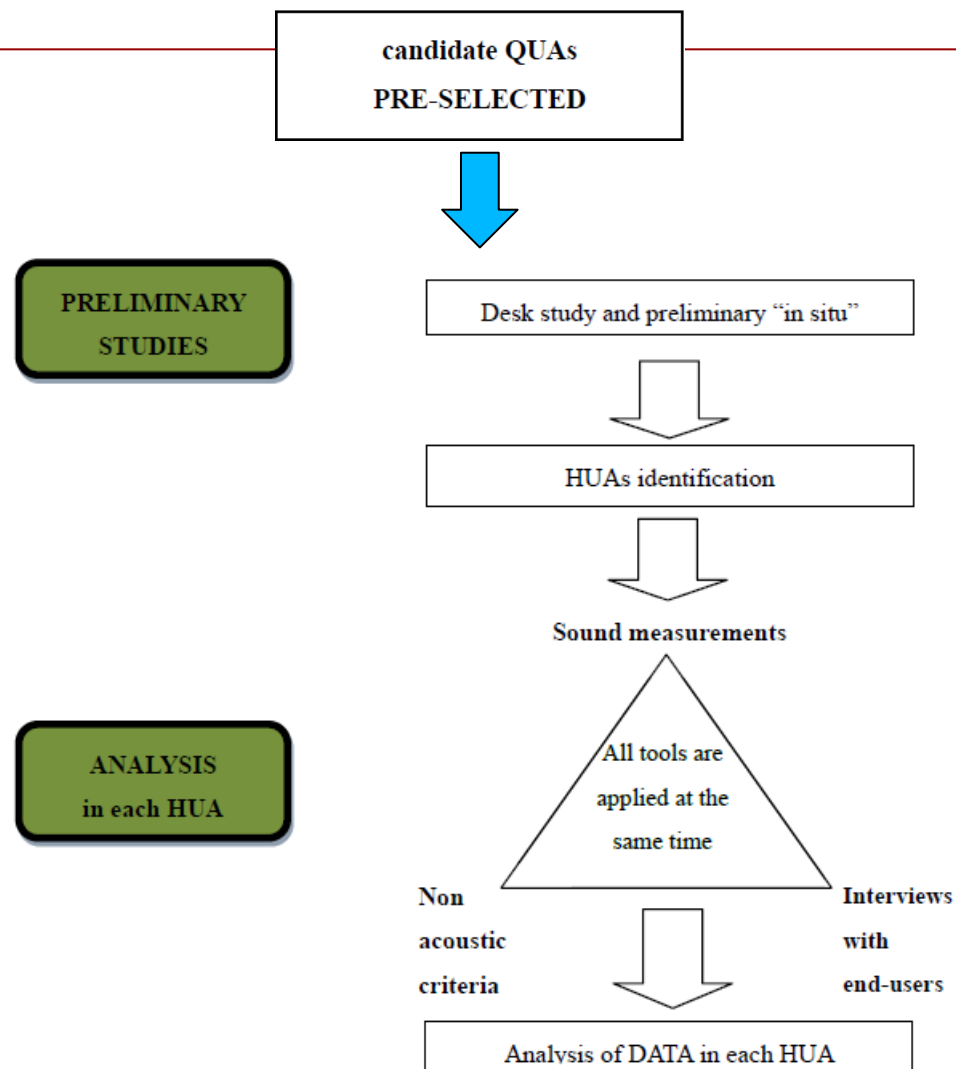➢ **Distance and Presence of sound sources**

QUA ANALYSIS 2/2

- an **"in situ" survey** in each area, to be carried out during the hours citizens are visiting the area.
  It includes:

  ➢ **checking of non acoustic parameters;**

  ➢ **questionnaires to end users;**

  ➢ **sound measurements**.

  These ones, in their turn, are useful in the subsequent phase of QUA management.

candidate QUAs
PRE-SELECTED

PRELIMINARY STUDIES

Desk study and preliminary "in situ"

HUAs identification

Sound measurements

All tools are applied at the same time

Non acoustic criteria

Interviews with end-users

ANALYSIS in each HUA

Analysis of DATA in each HUA

CURRENT WORK

Principals aims of the current work are to **test the usability of operative tools in pilot areas** and to **define the best acoustic and non-acoustic parameters** to analyze the QUA. For the last aim UNIFI is setting up instruments, building and testing software in order to gather information from collected data:

✓long term measurements ⟶ test procedures useful for peaks identification and indexes testing, looking for correlations with results from questionnaires in general;

✓short measurements ⟶ evaluate noise parameters (LAeq) and compare them with correspondent questionnaires;

✓wave recordings ⟶ evaluate psychoacoustic parameters (loudness, sharpness, …) and compare them with correspondent questionnaires;

✓questionnaires ⟶ understand a possible utility (not linked to any kind of measure) to gain information for future interventions.

CONCLUSIONS

The proposed methodology is being tested in a set of pilot cases in Italy, Spain, and in The Netherlands. Each Country focuses on specific typologies of potential QUAs (school courtyards, squares, peri-urban areas, green paths) in order to understand the **applicability of the general proposed methodology to the different situations**, but also **to be able of calibrating the common method according to the specific needs**.
In the following section preliminary aspects emerging from data collection phase in the city of Firenze will be presented and discussed.

APPLICATION OF THE METHODOLOGY TO SIX PILOT CASES IN FIRENZE

Considerations about:

QUESTIONNAIRES

RESULTS DERIVING FROM DATA ANALYSIS

All the pilot areas in the city of Firenze are school gardens, mainly affected by traffic noise.

The analysis phase of the QUAs for the delimitation of HUAs required a two-steps approach: a preliminary desk-study and an "in situ" survey comprising questionnaires and noise/sound measurements in each area.

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Proposed methodology has been punctually applyed to the 6 areas:

First step: subdivision of candidate areas into HUA has been carried out according to three items:

➡ Landscape

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Delimitation of HUAs in Firenze pilot cases: nursery (04,05,06) primary (01,03) secondary (02) schools

01 DE FILIPPO = 2 HUAs

02 P.UCCELLO = 2 HUAs

03 MANZONI = 2 HUAs

04 DIONISI = 1 HUAs

05 VAMBA = 2 HUAs

06 PIO FEDI = 1 HUAs

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Second step: HUAs "In situ" surveys:

Wave recordings

The WAVE file recording has the aim to collect acoustic information about the actual sounds during the time of in situ analysis strictly linked to the end-users perception.

The minimal requirements :
-**at least one recording position or a "sound walk" carried out into each HUA;**
-**the recording measurements** carried out in a time span **when the HUA is typically used,** in parallel to both the long term measurement and the end-users interviews;
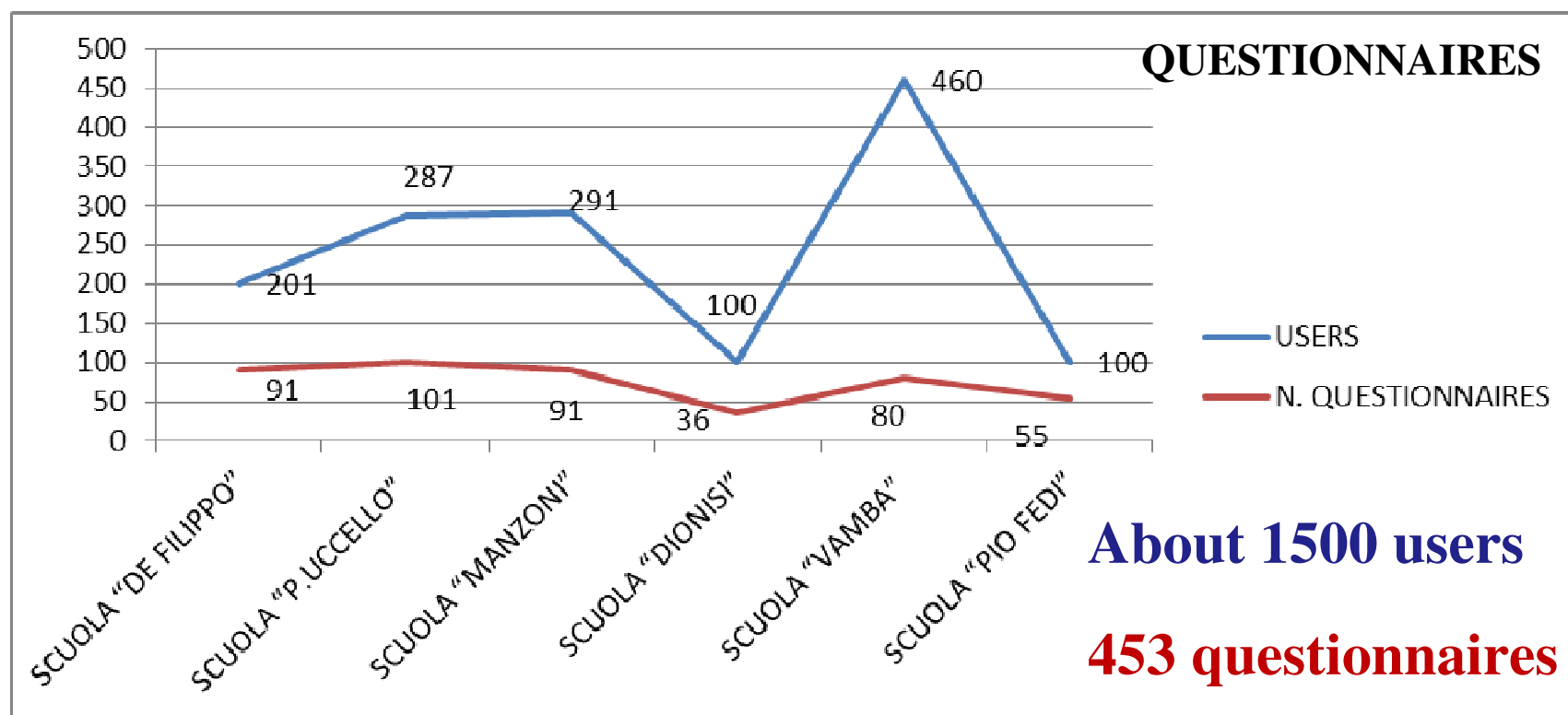-**a WAVE file** (44.1 kHz sample rate) recorded.

The recording positions close to the interview location, but far enough (at least 3 m distance) not to be corrupted by the on-going interview.

Based on the results of analysis carried out in the pilot cases, the adequate parameters and indexes have been chosen.

CONSIDERATION AND RESULTS

About the application of this methodology to Firenze pilot cases

About 1500 users

453 questionnaires

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Is not possible to use the same questionnaire for all the sample

1. If children are part of the sample, it is necessary to simplify questions, because they have difficulties to understand the meaning of some questions, expecially when they were asked to describe their perception

	E.1 I perceive as an IMPORTANT element in a quiet area ...						E.2 Referring to this area, I perceive each of the following items as pleasant				
	Perception						(Un) pleasant				
Air quality	1	2	3	4	5		1	2	3	4	5
Safety	1	2	3	4	5		1	2	3	4	5
Well-maintenance	1	2	3	4	5		1	2	3	4	5
Services and equipment (benches, playing areas..)	1	2	3	4	5		1	2	3	4	5
Accessibility	1	2	3	4	5		1	2	3	4	5
Acoustic environment	1	2	3	4	5		1	2	3	4	5
Natural elements (green areas, water, birds..)	1	2	3	4	5		1	2	3	4	5
Climate (humidity, brightness, wind)	1	2	3	4	5		1	2	3	4	5
Visual aspects	1	2	3	4	5		1	2	3	4	5
Smells	1	2	3	4	5		1	2	3	4	5

1st importance of listed environmental quality items in a quiet area
2nd intensity of importance of general categories with the 1-5 scale.
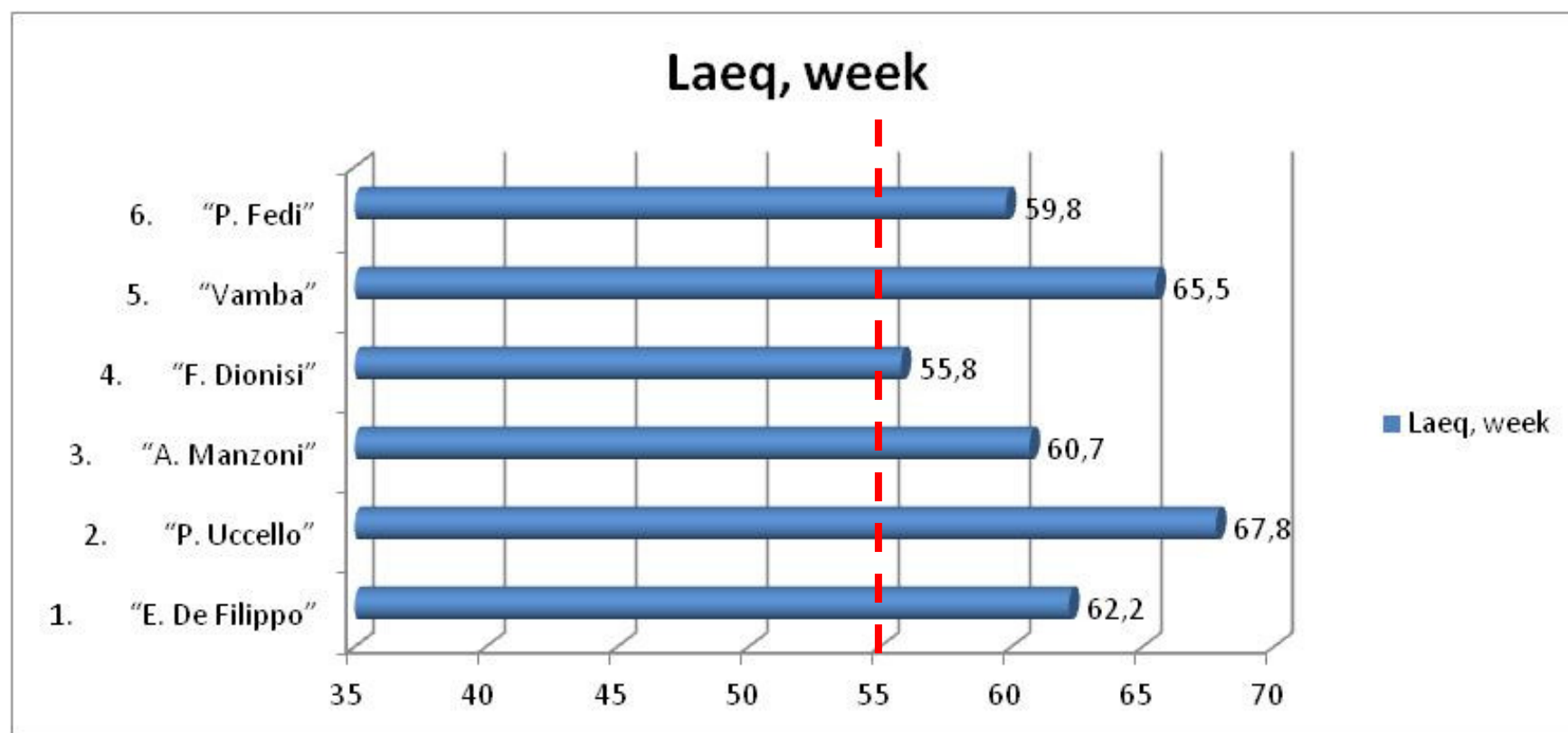*3rd pleasantness or unpleasantness of the mentioned items, with the 1-5 scale*

Is not possible to use the same questionnaire for all typologies of area

2. some questions are useless if the survey is referred to only one typology of area (as our case -> school courtyards): this is the case of the set of questions on "PLACE USE" -> same answer -> risk of inattention
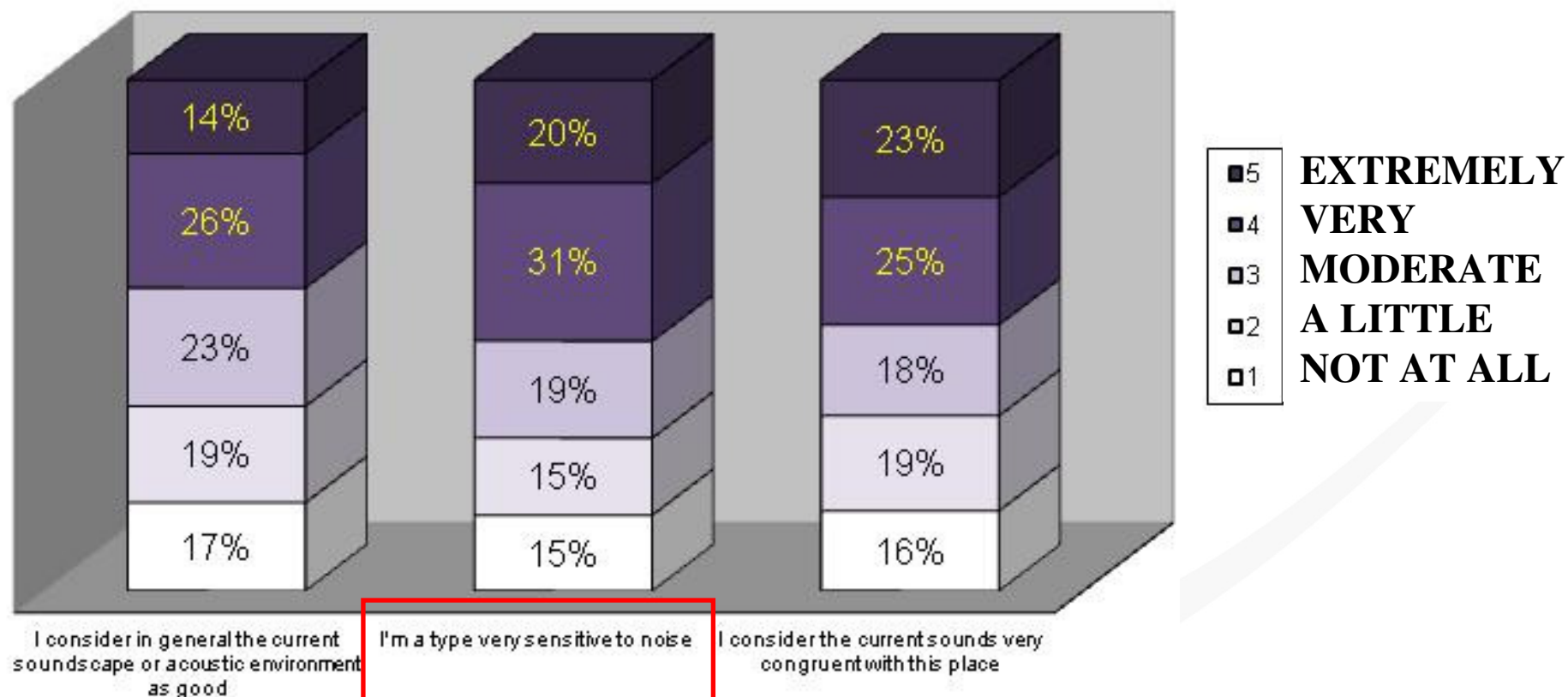
U.1. What is the reason for you being here today?
U.2. How often do you visit this venue?
U.3. During what day do you visit this area <u>mostly</u>?
U.4. At what time of the day do you visit this area <u>mostly</u>?
U.5. During what period of the year do you visit this area mostly ?
 U.6. How long do you mostly stay in this area?
U.7. How do you reach this area?
U.8. This place is close to your…
U.9. How far is the distance between your <U8 answer>. and this area?
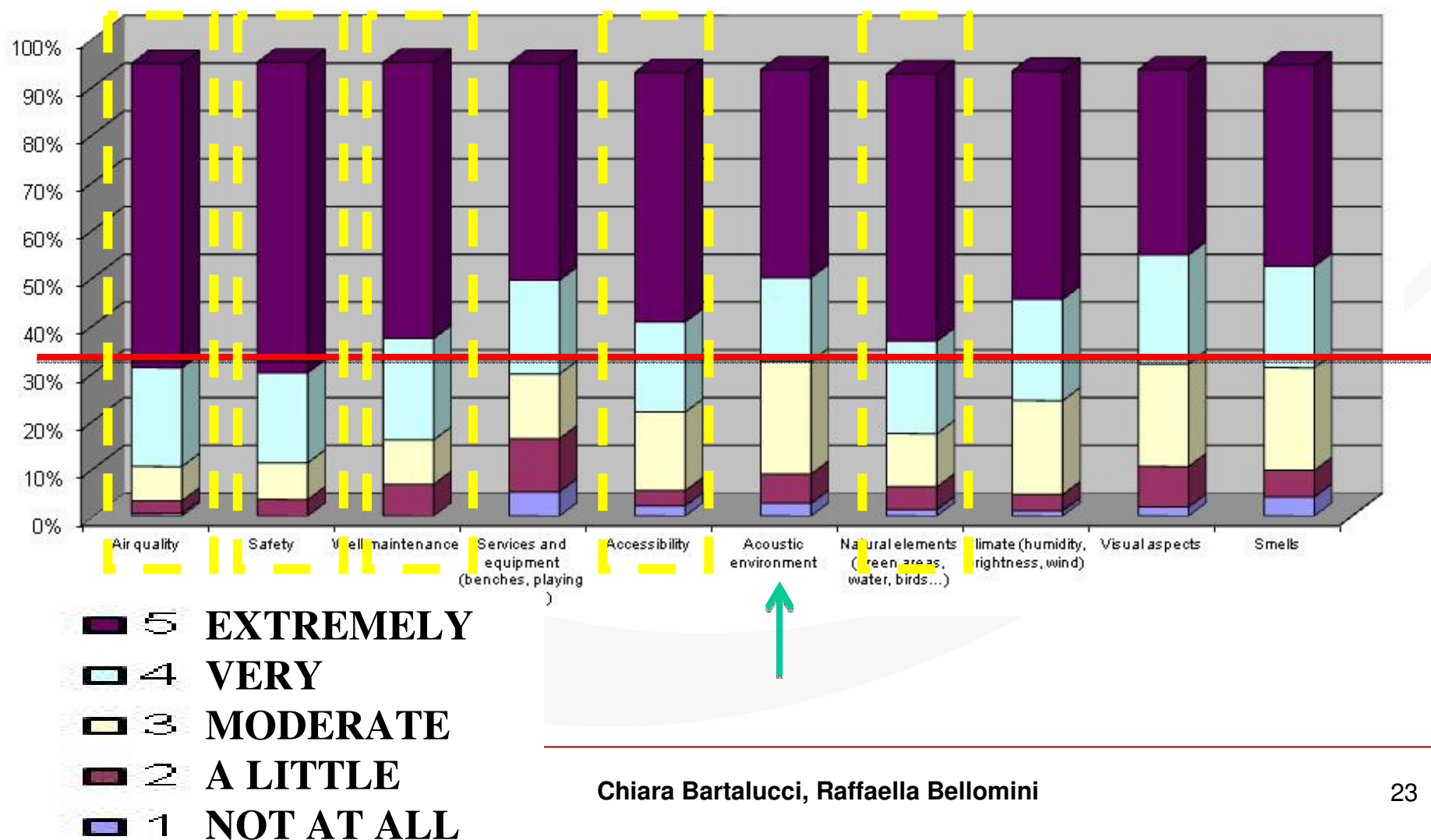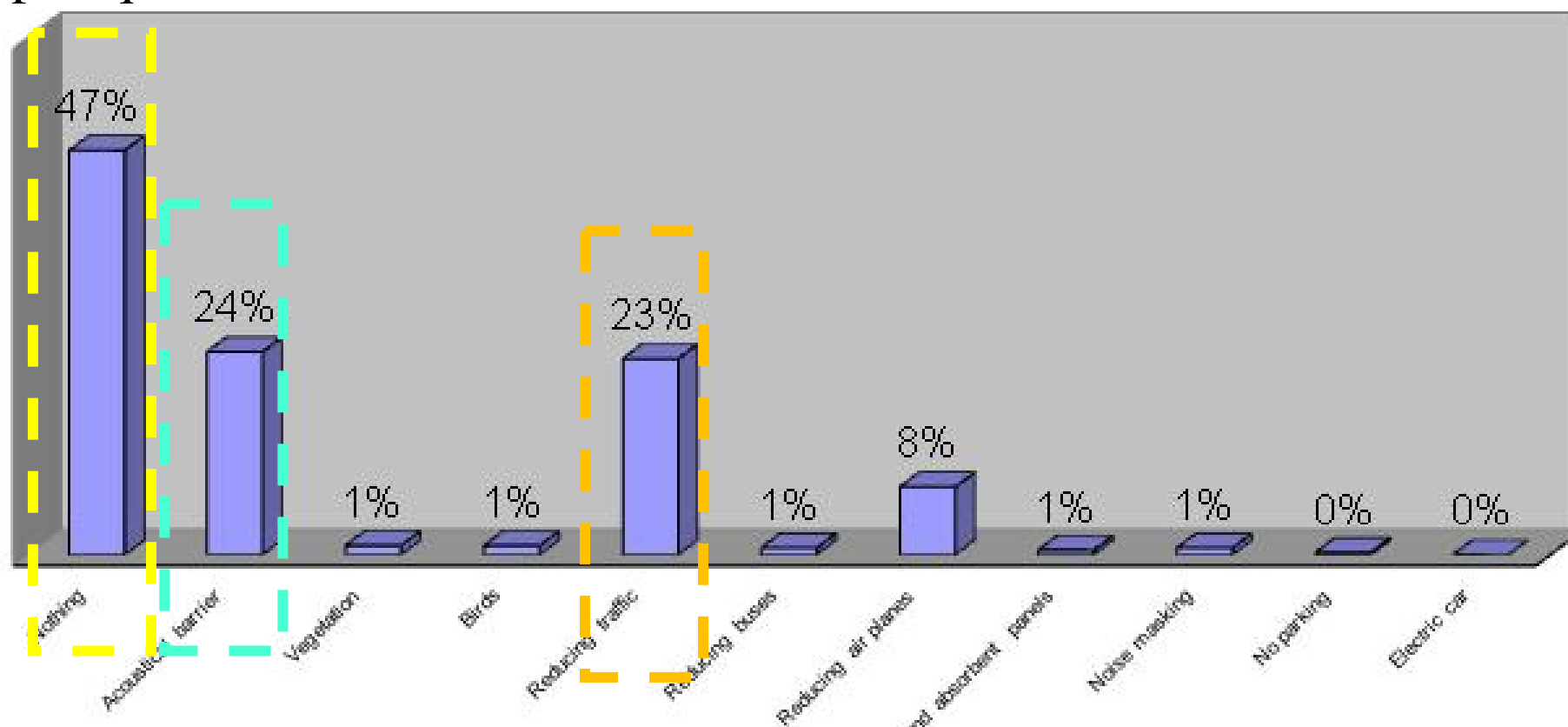U10. What is the <u>main</u> reason for you visiting this area?

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REGARDING DATA ANALYSIS….

LONG TERM MEASUREMENTS - Lday

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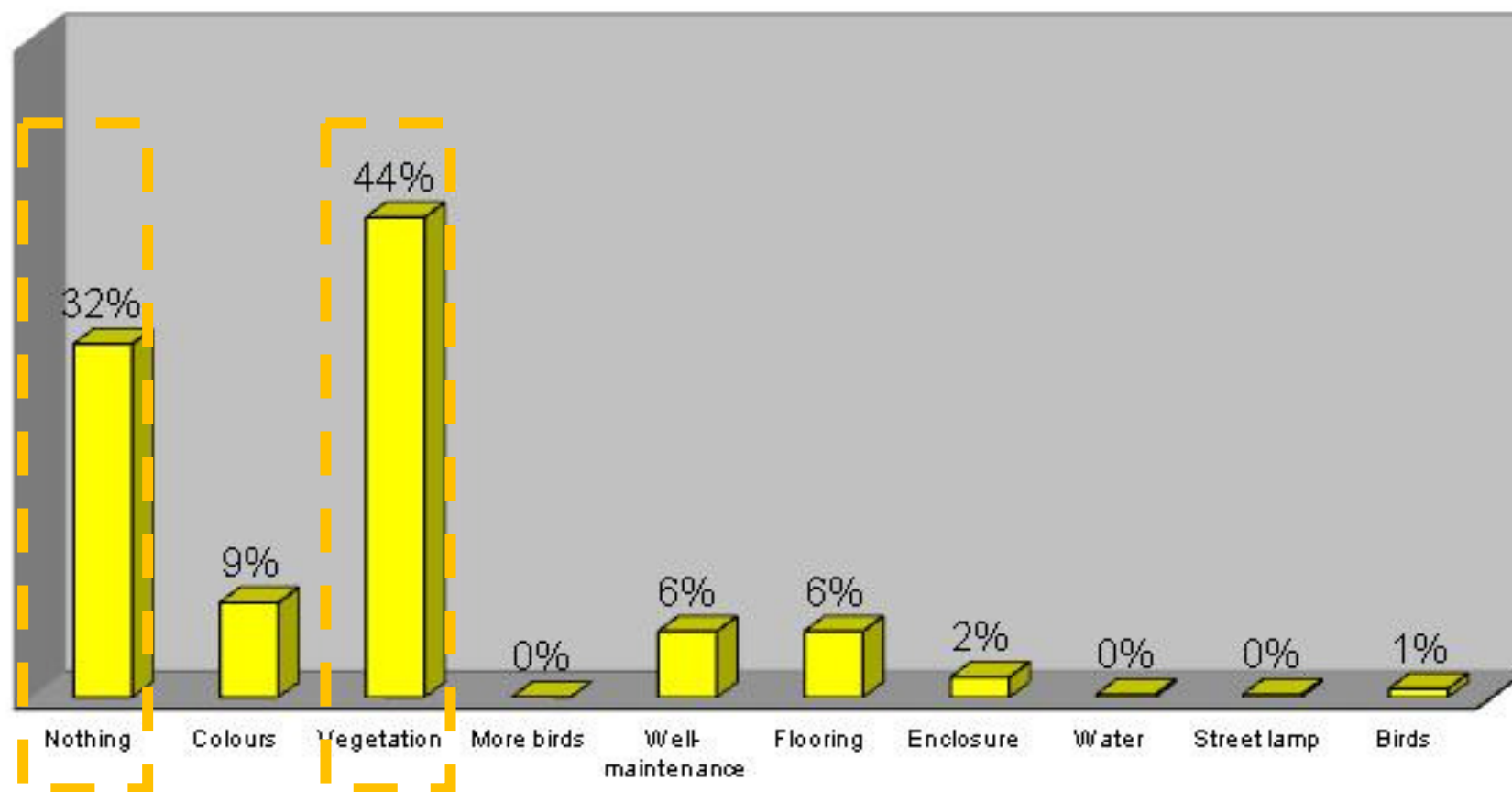
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I perceive as an IMPORTANT element in a quiet area…

5 EXTREMELY

4 VERY

3 MODERATE

2 A LITTLE

1 NOT AT ALL

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# What should be done in order to improve the acoustic environment or soundscape, from the acoustical perspective? – open question

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# What should be done in order to improve this area (visually)? – open question

What should be done in order to improve this area (equipment)? – open question
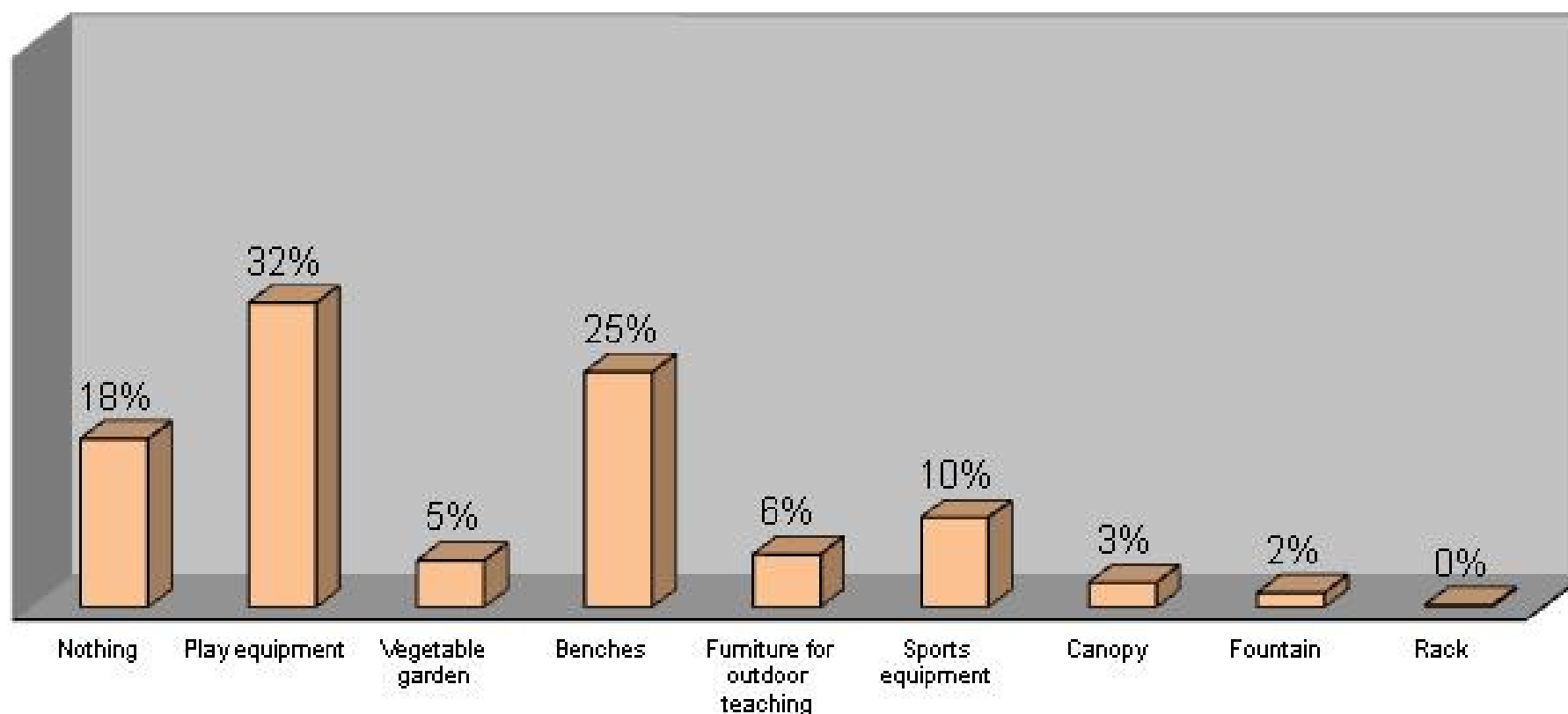
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SCHOOL	Noise reduction interventions for the garden (noise barriers, road sign)	Noise reduction interventions for the building (windows, baffles, sound absorbent panels)	Other interventions (trees, games, services and equipment)
Primary School "E. De Filippo"	€ 50.000,00	-	€ 7.347,60
Secondary School "P. Uccello"	€ 141.640,00	-	€ 6.000,00
Secondary School "A. Manzoni"	€ 125.000,00	-	€ 6.991,40
Nursery School "F. Dionisi"	€ 84.832,90	-	-
Nursery School "Montessori/Vamba"	€ 129.392,00	-	€ 10.858,00
Nursery School "P. Fedi"	€ 428,00	€ 27.175,84	-
TOTAL COSTS (VAT INCLUDED)	**€ 642.864,41**	**€ 32.882,77**	**€ 37.748,37**
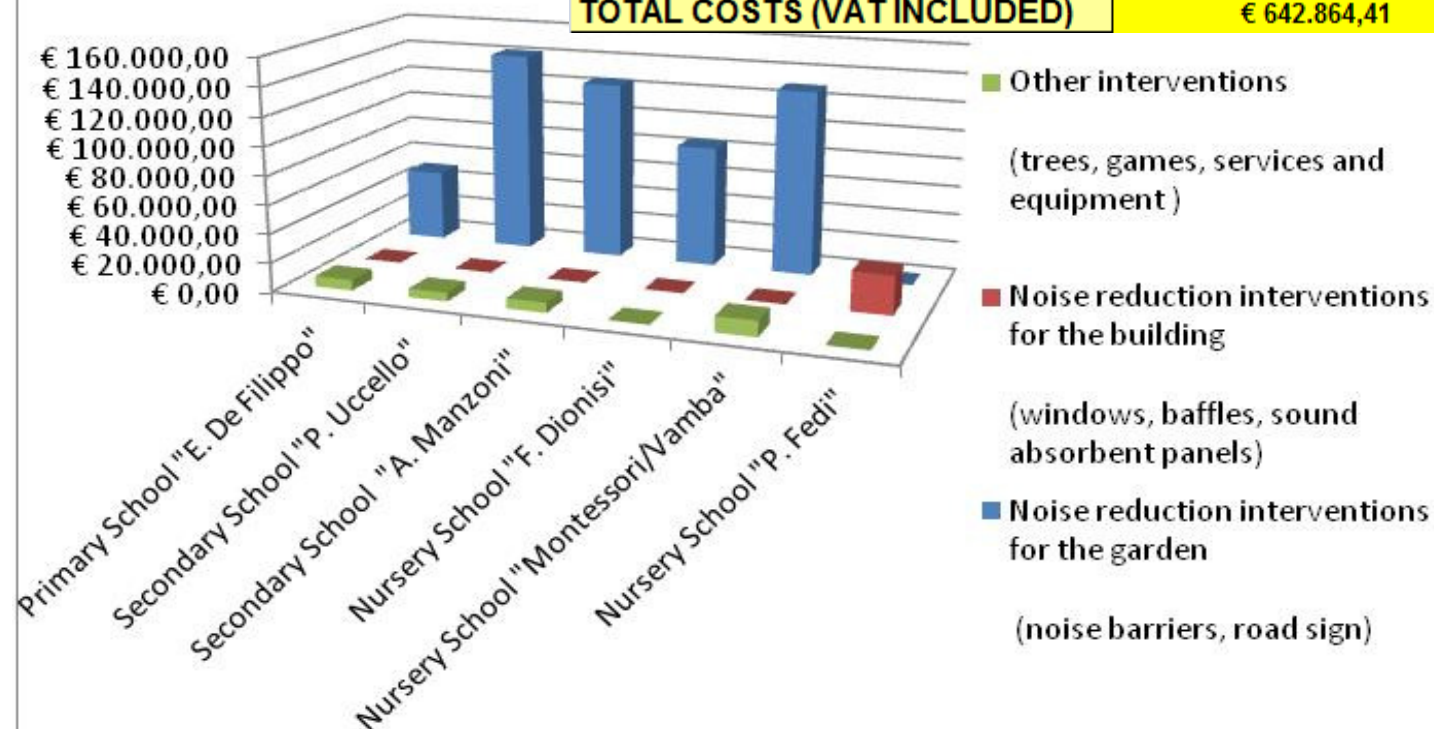
Designing phase has been carried out considering specific indications of end users.

Intervention realization is planned in first monts of 2014.

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Thanks for your attention

LIFE+10/ENVIT/407

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http://project.quadmap.eu/it/

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