Soundscape in urban planning and architecture

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Introduction

- Urban soundscape as integral part of a city
  - Identity
  - Quality of life

- Urban sound considered as a resource…
  but what does it mean?
Today (Europe)

Noise action plan

Action 1
Action 2
Action 3
Action 4

Soundscape planning

Picture removed for copyright reasons
Paradigm shift

Urban Soundscape Planning

Urban Sound Planning

Action 1

Action 2

Action 3

Action 4
Soundscape planning

- **Backgrounded**
  - Soundscape does not contribute to experience of the space
  - Avoid attention to sound
  - Unrealistic but very common view

- **Supportive**
  - Supports experience of the space
  - Small contribution to experience
  - Congruency

- **Focused**
  - Soundscape is purpose of being in a place
  - Also consider acoustics of the space

The designer’s vision
- Classes
  - backgrounded
  - supportive
  - focused

The composition
- noise control
- adding sound
- visual setting
Soundscape planning

The designer’s vision

- backgrounded
- supportive
- focused

The composition

- noise control
- adding sound
- visual setting

tranquil soundscape vision

being away

peace

fascination

cohesion
- Attention
- Object formation
- Appraisal
Integrated

- Air quality
- Safety
- Resilience
- Cohesion
Different geographical scale

- The soundscape of ...
Inhabitants are able to identify their neighborhood out of 6 based on 32 sounds.

Sounds were automatically selected based on their frequency of occurrence and their saliency.
Planning, a process

Urban design

- Set objective
- S. o.
- S. o.
- S. o.

Implement or Simulate

I/S I/S I/S

Analyze and Inform A&I A&I A&I

LONG TERM VISION
Classification of Paris soundscapes based on the sounds that are most likely noticed at this location and time

Machine listening

Auditory Features
(16 types)

Input layer (1st)

Middle layer (2nd)

Output layer (3rd)

Sound classification

Dendrogram

Measurement

Distance
Morphology
Morphology

GRAFIC, Paris, France
Morphology

Nieuw Zurenborg, Antwerp, Belgium

- abandoned gasworks site
- elevated railway (goods trains)
- parking lot public bus company
- transformer station
- major road and freeway
- residential area
Topography of buildings has been arranged with park soundscape design in mind.
Land use recovery

Groene Singel, Antwerp, Belgium
- Poor soundscape is main reason for not using the space

Groene Singel, Antwerp, Belgium
Land use recovery

- But also air quality is poor
Land use recovery

- And there is interaction with biological value
Land use recovery

Groene Singel, Antwerp, Belgium

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Land use recovery

- Selection of areas + overall purpose
- Sound design guidelines
- Co-creation
- Create support
- Selecting winning solutions
- Co-creation more detail
- Create support
- Architectural design
- Create support
- ...
Buildings as a tool
Building elements

Soundscape improvement is larger

2 – 3 dBA (LAeq)

3 – 8 dBA (LAeq)
Auralising interventions

Berm near private house along E17

32 ch

2 ch

IL(\phi)
Auralising interventions

Comparing simulated and post-intervention binaural recording, by panel

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<thead>
<tr>
<th></th>
<th>Indicated recording</th>
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Walking along a street

- Building for the common good?

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Table of Facade Sequences: F1 to F5.
Walking along a street

- Building for the common good?

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<td>![Image]</td>
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<td>S4</td>
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Walking routes

Virtual reality evaluation

Bridge giving access to Rivierenhof
Virtual reality evaluation

Bridge giving access to Rivierenhof
Walking routes

Virtual reality evaluation

Bridge giving access to Rivierenhof
Virtual reality evaluation

How would you rate your personal experience while passing this bridge to go from the city center to the park? (very unpleasant - very pleasant)

75 persons
Take home

- Sound as a resource → plan & design
- Staring from a vision
- Knowledge on perception (psycho-acoustics) and appraisal helps implementation
- Integrated, multisensory and multiple concerns
- Available urban elements can be used, yet mainly custom solutions
- Co-design fits very well