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## The soundscapes of Antwerp: a study on the acoustic genius loci

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### Abstract

This research questions the importance of sound in relation to our city experiences. By means of analysing the characteristics of a soundscape in the city of Antwerp this study identifies Antwerp's genius loci. Moreover it is stated that soundscape, cultural heritage and public spaces amplify each other. Design concepts and strategic design methods can adopt soundscape in historical urban spaces in order to increase the quality of life. It is recommended that architects and urban planners interpret the aural score of the built environment in order to compose significant sustainable urban cities.

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### 1. Introduction

The Industrial Revolution of the 19th century dramatically changed the identity of European cities. Effects of progress in technology did not only had an influence on the visual integrity of the city, but also gave birth to new 'soundscapes'. Acoustic characteristics became overwhelmed by sounds of traffic and industry. Often the sounds of the city have become a hectic white noise by which the soul cannot be touched. This mosaic of sounds can be compared with an aural carpet with a pattern that is difficult to decode. Uniformity can lead to an impoverishment or

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fading of characteristic soundscapes of exceptional cultural and historical value. Soundscapes help to improve quality of public spaces and are of key importance to safeguard space's and places' genius loci.

Different acoustic scenes offer value to the level of urban development as well as to architecture. Although sounds offer a continuum in which visual expressions are embedded, we are not always aware of the meaning of hearing and the effect it has on the experience of places. When film soundtrack is remote, the scene loses its spatiality [1]. Indeed similarly each public space has its own acoustic image [2]. A scenographic concept that incorporates contrasts in soundscapes provides the opportunity to develop a more structured mental image of the city.

## **2. Aim: From white noise towards a three dimensional aural experience**

Empirical and qualitative data was gathered in the north-western part of the historic city centre of Antwerp. The aim of this research was threefold. First, the exploration of the visual scape and soundscape was examined. Secondly an investigation of the relationship between the city's soundscape and the site's cultural biography was carried out. Cultural biography is defined as the site that is as an entity and carrier of historical, ecological, economic and social information. As a final goal, aural concepts and a design strategy were created in accordance to the preservation and development of the soundscape of specific areas. Main focus of this research was to by-pass the negative experience of sound and to search for the added value in the experience of cultural heritage. Sound can be considered as valuable and potential resource to create a sustainable environment.

The urban environment is multi-layered, moreover a combination of layers contributes to the complexity and uniqueness of a place. Attention to this stratification will help to analyse and make connections between different layers. This stratification is found at the level of sound as well as at the historical development of the area. Through this stratified approach to sound, it will be possible for designers to decompose the noise into more specific sounds.

## **3. Analysis: A search for a methodology to incorporate sound quality versus visual quality**

A qualitative case study has been conducted to collect data on-site by observations of a multi-disciplinary team. The team (21 people) consisted out of architects, urban planners and art historians. The observation took place on the northern part of the city of Antwerp, adjacent to the river Scheldt. Madge et al. [3] states that qualitative approaches offer interpretations of causal processes that have a wide conceptual relevance. The perception of sound is inherently personal and affected through personal experiences and preferences in the listening situation [4]. Because of the personal perception, a solely acoustic measurement will not give a clear result on the quality of the soundscape.

In the studied area, characterised by a wide range of outstanding architecture, contemporary projects as well as historical heritage, two distinct entities can be perceived. The southern part, which already existed in the 16<sup>th</sup> century, is defined by a fine mesh and dense network of cobbled streets and alleys, with a large variety of built heritage. The other part of the area, located in the North is characterised by open spaces and broad streets. The architectural heritage of this area is strongly related to the harbour and its activities.

To find the characteristics of the soundscape identifying the genius loci of the site, the area was experienced by foot. During this experience, one third of the participants were blindfolded, one third were deaf-made by wearing sound-blocking headphones and the other third had normal vision and hearing abilities (modal). Hereby it was possible to sense the public spaces in different ways, focusing on either the visual or the acoustic or both aspects.

To visualise the qualitative soundscape research, a sonographic map based on a grid of cells has been developed. Each quadrant within the grid was given a rating from 1 to 5 by the respondents and was assessed on visual quality, sound quality and sound intensity. Consequently, these data were translated into a digital spreadsheet (Microsoft Excel, Microsoft, USA) and colours were correlated with the cell value in order to develop a number of readable maps forming the framework for the creation of 3D scapes. In addition, the divergence was calculated, that is the difference in assessment between the modal person and the person with a disability. Finally, by means of cross analysis the visual and sound quality were compared and the average of each quality, a general quality was obtained. Divergence analysis illustrated the contrast between the experience of sound and image. It revealed places where the soundscape needs to be improved to correlate with the visual experience. According to Southworth [5] the degree to which people appreciate a certain sound source depends on information that contains sound and scenery of the surrounding area. A sound that does not fit within a particular context, is experienced as negative and unwanted.

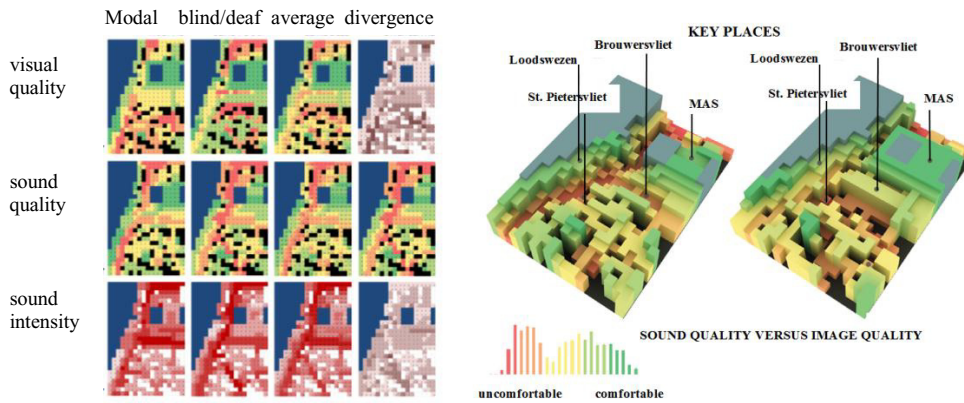


Fig. 1. Mapping of the visual quality, the sound quality and the sound intensity

This way of mapping creates a more visual and direct way of representing the sound quality of urban space. This methodology is highly functional and an appropriate notation system in its ability to record the correlation of visualscape and soundscape. The model tries to fill the gap of acoustic consciousness during the design process and urban planning of public spaces. Visual assessment showed that modal and deaf-made respondents experienced all the areas adjacent to the river Scheldt and the docks around the museum MAS equally pleasant, while the Schipperskwartier or mariners’ district, in the South of the area was perceived as visually unattractive. The quays along the river Scheldt were perceived as somewhat less positive by modal persons than by deaf-made persons. This could be explained by the fact that it is difficult to disconnect sound from the overall experience. Auditory assessment indicated that modal as well as blindfolded respondents perceived the area ambient to the main traffic roads as the loudest zone. Here the noise is widespread because there are only a few obstacles. In general, the auditory experience was perceived as less pleasant by the blindfolded people. Visual and auditory evaluations show that water was considered both visually and auditory as the main structuring element within this area of research. Acoustic and visual divergence revealed that extreme differences were highlighted at the St. Pietersvliet and the Brouwersvliet. Because these streets are centre operating roads, the volume of the traffic sound is the highest in this area. To enable the experience of the city sound itself, it is required to temper the annoying noise of traffic. This allows the city itself to be a source of sound and show the identity of genius loci through auditory representation. .

By means of superpositioning the city mat layers, like cultural heritage, functions, mobility, green and water, the map reveals key spaces that require special attention regarding the creation of urban “qualitative sonic areas”. Heritage was often the protagonist herein. The main problem zones were indicated as key places.

#### 4. Aural concepts

Design concepts can provide a solution to incorporate soundscapes into public spaces. A ‘concept’ is the driving force behind formulating, creating, receiving, devising and shaping. Whereas an idea is an abstraction; a concept provides its aim, form and tangibility [6]. A concept serves as a kind of guidance throughout the design process.

Four experiential benefits have an influence on the contact of users with the soundscape and the cultural heritage: cultural identity, escape in time, aesthetic appreciation and narrative experience. Based on our study and reflection upon these benefits they can be translated into four concepts: resonance memory, refuge, staging and interweaving.

The concept of ‘resonance memory’ relates to cultural identity and identifies its genius loci or what Per Hedfors [7] defines as sonus loci. Here sounds are a metaphor for the resonance of the past. Sounds can stimulate the imagination in the construction of narrative tales. Creating a reflective space is one of the basic objectives of ‘opening-up’, hence the implementation of cultural perception and experience.

The concept ‘refuge’ is inspired by ‘auditory refuge’ as defined by Per Hedfors [8]. A refuge offers a restorative environment, unique vulnerable areas where the need for protection results out of the property of pleasant sounds.

This concept is also in line with social dimensions of sustainable development improving social welfare.

In the concept ‘staging’ the public spaces are the stage; whereas the city and its cultural heritage serve as an urban theatre. Every detail introduced to the scenery might cause a modification of the plot and must be chosen with care. Soundscapes can be triggered by special aural fragments, which allow new interpretations through a temporal scenographic concept. “The sequence of scenes composed by alternating zones will intensify the experience and amplify the interpretation of the present and the past cultural heritage” [9].

‘Interweaving’ is chosen as a concept for the synchronization of sound and image where different senses represent different parts of the fabric. Vandaele [10] pointed out that interweaving is a much richer metaphor than merging, since merging not necessarily leads to an added value arising out of the complementarity and different aspects. Interweaving presumes the generation of a tissue: a coherent whole in which patterns can be identified.

These three concepts summarize the results of our survey and analysis formulating the recommendations and interventions for the re-evaluation of the soundscape of this part of the city of Antwerp.

## 5. Strategy: Canalsing the sound

The design strategy challenges to answer the musical question sung by the Antwerp musician Wannes van de Velde: “I want to get lost in the city, does the sound of the city make your soul amorous?”. This quote links the timbre associated with the city and refers to the transient attitude by which users encounter the city and its heritage.

Key place 1: The area of the St. Pietersvliet needs to be rehabilitated by using the concept ‘resonance memory’ for the renewal strategy. Today, the network of waterways, existing of the “vlieten” or brooks and the ‘ruien’ or canals, that were used as an inland port and water supply system that dominated the city of Antwerp for centuries, is totally invisible in the city’s image. As a result, this cultural heritage has disappeared from the collective memory. The building that obstructs the view to the river must be replaced by water to restore the St-Pietersvliet. This modification also restores the view on the Scheldt and inserts the water deeper into the city centre.

Reconversion of the dialogue between the surface and the underground network is essential. Underneath St Pieters’ square there is a wonderful chapel, an architectural masterpiece of the past in terms of vault construction, where four ‘ruien’ come together. This chapel can be used as a gateway to provide access to these forgotten canals for pedestrians and cyclists, This reminds to the concept ‘London Underline’ for unused tubes of the subway in London as designed by the Gensler architects [11]. The concept of interweaving can be used to integrate these tunnels within the structure of the city by introducing visual and acoustic layers of Antwerp. This can be realised by projecting panoramic dynamic renderings of the historical evolution of the cultural heritage. In terms of aural experience, the introduction to Antwerp can be made by playing typical soundmarks. This ambient soundscape also improves the public safety [12].

Beyond this, the soundmark of Saint-Peter’s church is hardly audible due to the traffic noise. “When citizens heard the chiming of the bells, they felt rooted within a cultural geography that could easily be walked...Soundmarks provided local cohesion” [13]. Through redevelopment of this street into a fleet, the Bell Tower can reverberate again in the northern part of the city of Antwerp.



Fig. 2. St. Pietersvliet: location – actual view to the river – desired view to the river – ‘ruien’ chapel

Key place 2: A particular key place is Brouwersvliet which was constructed in 1410 and overarched in 1881. The roads at Brouwersvliet intersect this urbanised area in a visual, auditory and emotional way. Despite the fact

that traffic-lines are important vistas between city and Scheldt, they do create barriers in this zone. Traffic has to be canalized towards the Rijnkaai over the Amsterdam- and Londonstraat. This action ensures the adjunction of the Eilandje to the historic centre and reinforces the axis MAS – Falconplein.

To restore this area into a low traffic zone, the green structure of the Brouwersvliet with its plane trees will act as a transition, a restorative environment, between the city and the Eilandje. Green environments play an important role in the field of soundscape. The rustling leaves introduce a soothing sound. Trees acts as natural sound sources, changing in time and depending on seasons. By implementation of the concept ‘refuge’ a new promenade to the river is created.



Fig. 3. Brouwersvliet: location – actual situation – situation at the end of the 19<sup>th</sup> century - green promenade to the city

*Key place 3:* The neo-renaissance building Loodswezen (Pilotage) was built in 1895. This important landmark and listed monument functions as a pivot point between the old city and the harbour. The straightening of the river Scheldt at the end of the 19th century moved the old port from the South to the North. As a result, the typical sounds of the harbour and the river were transferred to the northern part of Antwerp. This straightening also led to the isolation of the Pilotage building from the urban fabric.

In order to integrate the quay side with the industrial heritage, the road axis along the quays should be canalized and replaced by a tunnel. The application of the concept of refuge with the creation of a green infrastructure will reconnect this place to the river and the city. In addition, a larger green zone increases the restorative qualities of space [14]. Restoration does not only gain benefit from a positive soundscape, but also from the general composition of the place as a complex, coherent landscape, in which users would already visually recognize potentials for the variety in use, related to their contact with natural elements [15].



Fig. 4. Loodswezen: location – building – green promenade

*Key place:4.* The new museum, MAS, located near the river Scheldt at the place of the former Hanza house, is a landmark for this area. It is strategically important for the soundscape of the city because it connects two different parts of the city. That is the historical city and the new urban development. It also reconciles different atmospheres, silence and noise, past and present. On one site there is the strong annoying noise of the traffic derived from the isle ‘het Eilandje’, while at the opposite site a pleasant soundscape can be experienced. This museum is regarded as a public space and it is the only tower of Antwerp which allows visitors to climb on top. While ascending, not only the view on the city changes but also the noise diminishes and becomes more distant. Unfortunately, no permanent soundmark that supports the architecture and the genius loci was added. Integration of music ‘The raft of Medusa’ by Philip Glass, which was conducted at the opening of the MAS, as a repetitive sound event would add extra value to the gentle buzzing of the metropolis.

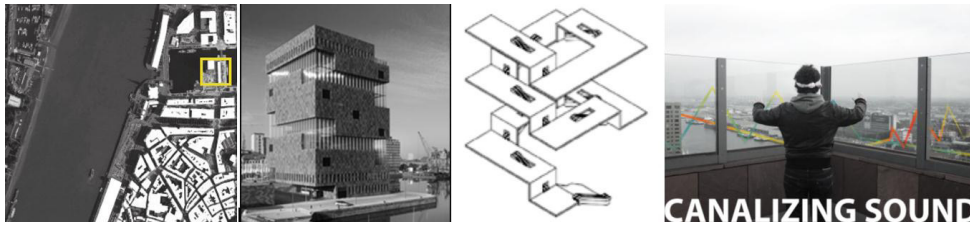


Fig. 5. MAS: Location – building - staircase = public space - view on Antwerp

## 6. Conclusion

This research explains into the significance of ‘sensing’ heritage through multisensory modalities. Heritage is a keynote in this project. The built heritage determines not only the image of the city, but gives also a reassuring time dimension to places that are part of the collective memory of the city. Public places defined by heritage can be seen as permanent anchor points within the urban network of a dynamic city. They have the potential to organise and give meaning to space. Therefore, on well-chosen locations, where the city assimilates the heritage and adapts the soundscape and vice versa, the visual and auditory perception is intertwined in a permanent way.

Research of soundscape in the opening-up or enclosure of cultural sites, creates perspectives to new design paradigms for historical valuable areas. By listening to the city we can plan and change the city, creating a diverse and attractive soundscape. Creating a scenographic immersive soundscape that matches with the intensity of the image of the city is an important guiding principle to emphasize the ecological and scenic values. Aural spheres and layers create a new urbanism because they can create inter-relations. By re-inventing the sound of the city, not only will Antwerp’s soul be saved, but above all it will make our souls amorous of Antwerp.

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