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Thinking with my ears: Guidance on sound for landscape architects

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ABSTRACT

Landscape Architects, through their design and management interventions, play a crucial role in shaping the soundscapes that surround us. Sound, however, is seldom regarded in the design or management process. Traditionally, sound has been considered either an element of design in the creation of sensory gardens that include features that target all the senses or an existing noise that needs to be mitigated. Landscape Architects lack the tools, skills, and knowledge required to expand beyond those traditional considerations and assess existing soundscapes, predict how those soundscapes will be altered through design interventions, or envisage what projected landscapes would sound like. This paper seeks to develop those skills and knowledge by providing a work in progress guide aimed at training future soundscape architects. The guide offers practical advice applicable to each stage of the life of a design project.

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1. INTRODUCTION

This paper borrows its title from an article by composers and sound artists Bruce Odland and Sam Auinger: "Hearing Perspective (Think with your Ears)." In the article Odland and Auinger question, "*Why does the MOMA sculpture garden, for example, sound like any taxi stand in midtown NYC? Why is an expensive 'quiet' car quiet only when riding on the inside?"* (2010). The answer to those questions, they propose, is that we live in a culture that privileges the eye in decision-making and budget allocation, and the solution, to think with our ears.

Canadian composer and educator Raymond Murray Schafer in "*The Soundscape: Our Sonic Environment and The Tuning of the World*" also invited us all to think with our ears (1994). He proposed that we all have a role as composers of the soundscape and it is undeniable that landscape architects, together with urban designers, architects, and engineers, play a primordial role in that composition. Through our design and management interventions, we compose the geophony (geophysical sounds), biophony (biological sounds) and anthrophony (anthropogenic sounds) of the landscape (B. L. Krause & Hoffman, 2012). But how many of us think of ourselves as soundscape composers, as "soundscape architects"?

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Landscape Architects mainly consider sound as noise to be mitigated. Sound as a positive feature is seldom thought of, except in the creation of sensorial landscapes that seek to include features that target all the senses. In the last twenty years, landscape architects have become increasingly good at visualising and simulating projected landscapes. However, we lack the skills and knowledge to assess existing soundscapes, predict how those soundscapes will be altered through our designs, or envisage what projected landscapes would sound like.

This paper is a work in progress guide aimed at training future "soundscape architects." The guide is the culmination of a five-year research project carried out through soundwalks, creative interventions, and collaboration in design projects. The advice draws on a variety of interrelated disciplines concerned with the study of sound and the environment, including Acoustic Ecology, Bioacoustics and Ecoacoustics, and on the work of sound artists and other landscape architects.

The guidance starts with general recommendations, followed by practical advice applicable to each stage of the life of a project. The advice is not exclusive to each stage but intended to be read in conjunction to provide an overall foundation on sound for landscape architects and other design professionals. The stages described below follow the stage classification detailed in the Landscape Institute's *"The Landscape Consultant's Scope of Services"* (2018). The following advice will be illustrated with examples during the conference presentation.

2. GENERAL RECOMMENDATIONS

Classifying a soundscape as good or bad is a complex task, as judgments on sound are ultimately individual and vary according to context (Blesser & Salter, 2010). However, as soundscape architects, we have a duty to train our ears to develop an understanding of how we alter soundscapes, and how users might perceive those soundscapes.

The first step towards training our ears and becoming a "soundscape architect" is to learn to listen attentively**.** In order to listen, we need to open our ears, a process that Schafer described as ear cleaning. Schafer carried out several exercises with the students of his experimental music module at Simon Fraser University to clean their ears. These included being silent for a day to focus on the sounds of others, finding an interesting sound to bring to class, or keeping a soundscape diary to annotate the sounds encountered (Schafer, 1967, 1994). We can easily incorporate these or similar exercises into our daily routines to open our ears. For example, suitable exercises could include focusing on a specific sound every day on our walk or commute to work, keeping a diary of particular sounds that we have enjoyed or that might have surprised us at the end of the day, or recording environmental sounds to develop a sound library. Through these exercises, we can unfold how our immediate soundscapes alter throughout the day and in time.

Participating in or organising soundwalks is also a useful starting point for listening attentively. Soundwalks can take many forms and aim to bring attention to the acoustic environment. In a guided soundwalk participants are taken through interesting soundscapes in a variety of locations in silence, perhaps stopping at specific points to come together and gather their experiences. Soundwalks can take place in urban and rural environments, and they bring attention to the acoustic properties of different

spaces and the unique sounds of a particular place. Through soundwalks, we uncover the “soundmarks, keynote sounds, and signals” of the soundscape (Schafer, 1994, p.37). “Soundmark sounds" are the sound equivalent of landmarks and are unique to a place or community; "keynote sounds" are background sounds, and "signals" foreground sounds that one listens to attentively such as warning sounds (sirens, horns, etc.) (Schafer, 1994, p.36-7).

Listening attentively is harder than it sounds as it implies welcoming the unwelcome, being open to all sounds. When one gets frustrated with unwanted sounds, with noise, one stops listening. Listening “is a continual and gentle process of opening... it inevitably includes an opening to surprises, to the unexpected, to the difficult an uncomfortable, to noise or potential discomforts with silence. It means staying with the sound for a time no matter what reactions it may elicit in us” (Westerkamp, 2015). If we try to shut out unwanted sounds, we become frustrated, as we cannot shut our ears, therefore our body is “still perceiving” (2015).

Once we have learned to listen attentively, we can actively consider sound throughout all the stages of a project, as detailed below.

3. DESIGN STAGES

3.1 Stages 0 and 1: Strategic Definition, Preparation, and Brief

During the initial stages of a project landscape architects carry out the site and contextual analysis, and help firm up the brief for the new development. Sound has traditionally been considered during the site analysis in terms of noise that might need mitigating, for example, in a site close to a busy road.

A soundscape assessment of the site at this stage, however, should not only be concerned with noise. Sound, as an expression of the activities and events that happen within the space and in the vicinity (Blesser & Salter, 2010), can tell us a lot of information about the character of the site and what is happening around it. Accordingly, sound can influence the development of the design and brief.

There are two important sound considerations at these initial stages, as described below:

(1) Sound respects no site boundaries, and it is, therefore, difficult to control on a site, which is of relevance both when assessing a site, and when designing it. Acoustic space, defined by how far a sound can be heard, does not correspond with physical space. Depending on the characteristics of the site, for example, whether enclosed or open, sound waves can be contained within it, or travel far beyond it. The sound resulting from our interventions therefore can reach far beyond what the eye can see, or reverberate within the site, hence the important as landscape architects of thinking and designing with our ears. During this stage, it is important to note the acoustic properties of the site: how sound waves are reflected on site, or travel within and outside the area.

In turn, this also means that we might be powerless to control sound filtering into our site (as it is the case of the MOMA sculpture garden in NYC mentioned above). Accordingly, we might need to think of strategies to control or direct sound within the site or adapt the type of uses and locations that the site can accommodate.

(2) Sound reflects the health of a habitat, and the soundscape of a habitat takes time to develop, as the Acoustic Niche Hypothesis (ANH) suggests. After observing that in a wide variety of complex soundscapes the vocalisations of animals did not overlap, musician and soundscape ecologist Bernie Krause formulated the ANH in 1987. ANH proposes that organisms adapt their calls to avoid frequency and temporal overlaps with other species that share their habitat, thus finding their acoustic niches. The tuning of the resulting animal orchestra, therefore, can be a sign of the health of the ecosystem, as species need time to find their acoustic niches. Consequently, temporary or permanent habitat disruptions (such as tree removal and subsequent replanting) could have considerable soundscape implications. A recently disturbed ecosystem, where the species make up has been altered, would have an out of tune orchestra, and would, therefore, require time for it to recover and retune (B. L. Krause & Hoffman, 2012).

3.2 Stage 2: Concept Design

This stage involves the preparation of concept design proposals for the site. Concept proposals indicate the potential uses and activities that will feature in the array of spaces proposed, and they might involve alterations and expansions to existing habitats, or introduction of new habitats.

Some sound considerations are included at this stage, as described below:

(1) With regards to the potential uses and activities that might feature in the spaces, we need to consider how those will be experienced through sound and in time. For example, we might consider what uses could share a space, or happen alongside one another. These uses and activities need to be regarded in relation to the acoustic properties of the proposed spaces where they are to take place. During the initial stages of the project we examined the existing acoustic properties of the site, and now, we consider the acoustic properties of the concept proposals. For example, if we propose an enclosed space bound by hard surfaces, such as a courtyard, sound waves will be reflected, creating an echo. If that same space is enclosed by soft surfaces, vegetation, sound waves will be absorbed. Sound absorption by plants will vary across the seasons (in the case of deciduous planting) and with the growth of the plants. Ultimately, even when judgments on sound are ultimately individual and vary according to context, we should think about the potential ways those sounds might be experienced, and how they might affect the behaviour and activities of the people experiencing those spaces.

(2) With regards to habitats, as landscape architects at this stage, we usually consider the ecological and amenity benefits of projected habitats. In considering amenity benefits, we think of activities that could take place in those spaces without disturbing the biodiversity, as well as the visual qualities of the habitats, and how those might vary throughout the year. For example, we frequently employ the phrase “to provide year one interest” when discussing planting. We should regard those habitats as soundscapes to be experienced and enjoyed, as natural sounds are the source of much enjoyment, in particular, the sound of water or birdsong (Nayar, 2017). The engagement with the landscape through sound provides a direct and emotional response of importance here. This aspect is discussed further at the next stage.

(3) Environmental Impact Assessments, if required, are also started at this stage. Landscape Architects are responsible for producing the Landscape and Visual Impact Assessment (LVIA). The landscape assessment considers impacts on the existing landscape character of the site during construction, after completion, and off-site, and proposes mitigation measures to minimize significant impacts. The visual impact assessment considers how existing views and visual amenity will be affected by the development, and again recommends measures to mitigate or reduce impacts. Landscape architects, therefore, consider visual effects at length. Noise is a separate chapter of the environmental statement, carried out by engineers to consider the repercussions of construction and operational noise of the development. Landscape architects are not required to regard the impact of the development on the existing soundscape(s), even though, as discussed, habitat disruptions can have major effects. As Landscape Architects we need a better understanding of soundscape impacts and their magnitude to expand our LVIAs to include sound. This last will be discussed in the last stage of the guide.

(4) The last consideration at this stage is the other living organisms that might share the development site. Sound affects not only us but also the many living organisms we share our environment with, as attested by many recent studies looking at the impact of sound on others. For example, Dominion et al (2016) found that airport noise influenced timing of bird singing and, through the study of plant root growth Gagliano et al. (2017) found that plant roots ability to locate water is also affected in the presence of noise, as roots rely on acoustic vibrations as well as soil moisture to locate water.

3.3 Stage 3 and 4: Developed and Technical Design

Once the concept design has been agreed, the proposals are developed into a final design, and materials detailed. A set of technical drawings and specifications are produced, as well as visualisations aimed at illustrating and selling the proposed scheme. Visualisations are used for a variety of purposes, including planning applications, client presentations, community engagements, and marketing.

An important aspect to consider at this stage is the emotional role that sound plays in the engagement with the landscape. Sound provides direct involvement with the landscape, which triggers an emotional response to it in a way that sight does not. This direct engagement is because in listening there is direct contact between the source and perceiver (Blesser & Salter, 2009), a contact that we cannot prevent. The sound waves emitted by the source reach our skin and ears, and we cannot close them at will. This readiness to hear has an evolutionary purpose as, by not being able to close them, our ears were always alert to any warning signs, even in the dark (Feld, 1996). Through sound, therefore, we are always engaged with our surroundings. The eye also receives light waves; the difference is that these are not produced directly by the object but reflected from it, and we have a certain control over what we see, as we can focus on and close our eyelids, choosing whether to engage or not. There is a further difference between sight and sound of relevance to the emotional connection to the landscape: sight exposes the surface of objects, we see their outer envelopes, whereas sound can expose the interior of those objects, the invisible (Ong, 1982).

The direct and emotional connection that sound offers with the landscape has

applications throughout all the design stages. During the design stage, there are three aspects to consider.

(1) The first aspect concerns the detailing of materials. In the concept stage, we considered the acoustic properties of spaces and the uses that those spaces might host. At this stage, we consider the materiality of these spaces in detail. Soft and hard materials will alter how those spaces are perceived. For example, planting might soften the sound of an area, as it absorbs sound, as described previously. Additionally, planting will also provide joy; through for example the sound of crackling leaves or moving grasses in the wind. Hard materials will also elicit a variety of responses, as different material give way to different sounds. An example of this last is how different footsteps sound according to the pavement material walked on.

(2) The second aspect concerns the presentation of our proposals. When sound provides a sense of space and a direct and emotional response to the landscape, why not sell our proposals through the ears? To that end, auralisations could be used in conjunction with visualisations or as stand-alone products.

(3) The last aspect concerns the use of sound strategies as part of the design. To that end, sound artists can be the source of advice and inspiration. Sound strategies could be linked with the choice of materials as described above, or in the arrangement of spaces. For example, a sudden change from a loud environment to a quiet one can have a sound amplification effect, a principle used by sound artists Will Schrimshaw and Jamie Allen for their Acoustic Subtraction installations at Kielder Forest (UK) and other locations. A similar principle could be incorporated into the design of a site to bring attention to specific sounds.

3.2 Stages 5, 6 & 7: Construction, Handover & Close, and In Use

During the construction and post-construction stages of a project, sound can be used to monitor the health and changes in a habitat, as discussed, but also on our journey towards becoming soundscape architects. Monitoring and recording how the soundscape of a site and of our designs evolve throughout the day and in time will help us predict what future soundscapes will sound like, with applications at all stages of a project. The development of a sound library is beneficial to that end. Such a library will take time to develop, and would be enriched by collaboration with other landscape architects and professionals.

To develop our soundscape designs and auralisations, we can also review research and artistic projects in a variety of disciplines that use sound to monitor the health of ecosystems and assess change. The Biospheres Soundscapes project, for example, includes a large number of interdisciplinary schemes involving artists, scientists, and communities that explore the role of sound to monitor the health and changes of UNESCO's biosphere reserves (http://www.biospheresoundscapes.org). As another example, sound, due to its capacity to reflect and monitor changes in the health of an ecosystem, has also been proposed as a valuable tool for evaluating the effects of climate change in ecosystems (B. Krause & Farina, 2016), and can help us assess the climate change effects of future developments.

4. CONCLUSIONS

Sound in landscape and urban design should be considered a positive and central element of any proposal, and not only a negative feature, a noise that needs mitigating. Sound as a positive can be thought of throughout the life of a project in terms of activities bringing life to a space or as an expression of a healthy habitat. The development of future soundscapes or alteration of existing ones can include the application of sound strategies and can be presented through auralisations on their own or with the help of visualisations.

The journey towards becoming "soundscape architects" will require time, collaboration with other professionals, and the development of a new set of design tools, skills, and knowledge. Those skills and knowledge should be an essential part of the training and development of all landscape architects engaged in the management and development of meaningful landscapes. To that end, standard guidance that relates to the existing working practices, such as the one introduced in this paper is required to accompany landscape architects in their journey.

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