



DESIGNING CITIES THROUGH SOUND: A Comparative Study of Urban Spaces and Soundscapes

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Abstract

Sound shapes space, and inevitably, a person's perception of it. However, the architectural training of designers usually prioritizes visual aspects of a building or urban space without considering the sonic environment and auditory responses of humans who may engage or occupy the built environment. The concept of the "soundscape" brings together the visual and sonic environments, allowing designers to develop more nuanced, responsive, and effective spaces (Southworth, 1967, pp. 6-8).

Acousticians define soundscape as "a person's perceptual construct of the acoustic environment of that place" (Kang & Schulte-Fortkamp, 2017, p. 5). People's interpretation of auditory sensations can lead to either positive or negative feelings regarding that specific place. Because urban spaces include both a great number of sound sources and a high number of people occupying and moving through them, the sonic environments and urban soundscapes are complex, layered, and dense.

This research evaluates the sonic qualities of urban spaces to provide designers with a means by which these complex environments can be better understood, analyzed, and created. It draws on an expanding body of research in architectural acoustics, and direct observation of cities in the United States and Italy conducted during the COVID-19 pandemic. By comparing cities based on their architectural character, this research establishes two typologies: modern and historic cities. Rather than relying solely on numeric calculations, this work probes the notion of the "perceptual construct," seeking to make visual these constructs. Drawings and photographs from different cities are used to study the form of the city through urban edges and the emerging concept of green acoustics. The work provides a way of creating a new architecture of public space through the lens of the sonic environment.

Keywords: soundscape, public space, green spaces, acoustics, architecture

Introduction

Sound shapes space, and inevitably, a person's perception of it. According to distinguished architect and theorist, Juhani Pallasmaa, "we stroke the boundaries of the space with our ears" (Pallasmaa, 2005, 51). In other words, through the propagation of sound, listeners can perceive the scale and characteristics of the spaces they are inhabiting. However, in many cases, the architectural training of designers prioritizes visual aspects of a building, landscape, or urban space without considering the sonic environment and auditory responses of humans who may

engage in or occupy the built environment. The concept of the “soundscape” brings together elements of the visual and sonic environments, allowing designers to develop more nuanced, responsive, and effective spaces (Southworth, 1967, pp. 6-8).

Acousticians define soundscape as “a person’s perceptual construct of the acoustic environment of that place” (Kang & Schulte-Fortkamp, 2017, p. 5). People’s interpretation of auditory sensations can lead to either positive or negative feelings regarding that specific place. Because urban spaces include both a great number of sound sources and a high number of people occupying and moving through them, the sonic environments and urban soundscapes are complex, layered, and dense.

The soundscape approach presents a paradigm shift in how issues of noise in the built environment are approached. The traditional noise management method consists of viewing sound as a “waste” whereas the soundscape approach starts to use noise as a “resource” (Kang & Schulte-Fortkamp, 2017, p. 12). The unique part about soundscapes is that they are a more subjective method of evaluating the acoustic environment. The perceptual construct of a person is formed by how the sounds in a place are perceived, understood, and experienced. By adopting this human-centered approach, designers can listen to the needs of the residents and implement their findings into creating a design that enhances the community for locals and tourists alike.

Most often, people move through a public space using unconscious listening. The noticeability of sounds depends on their visibility, saliency, and factors that vary according to each individual, such as the typical use of a place, the typical trajectories, the culture, and the expectations (Kang & Schulte-Fortkamp, 2017, p. 32). An interesting concept is also that of context. The term “context” does not just mean the physical surroundings and the sensory characteristics that a place evokes – such as smells and noises. Context is also shaped “by the knowledge people have accumulated about the place, its use, its purpose, its cultural meaning, their own motivations and purposes to be there, [and] the associated activities” (Kang & Schulte-Fortkamp, 2017, p. 18). This new perspective on context is fascinating because it is true for people experiencing a soundscape; each person has different knowledge about the same place and that will inevitably influence what elements of the space they notice. An artist will notice things that an engineer might not and vice versa. This idea adds another layer of complexity to what soundscapes can be.

Urban public spaces are the ideal area to study and engage in soundscapes. According to Project for Public Spaces, “Great public spaces are those places where celebrations are held, social and economic exchanges occur, friends run into each other, and cultures mix. They are the ‘front porches’ of our public institutions” (Project for Public Spaces, *What Makes a Successful Place?*). By studying urban edges, façades, and elements of green acoustics, it is possible to see which public spaces are successful at creating diverse soundscapes. Urban public spaces function as a pocket of rest within the city fabric, creating areas of quiet to allow people to escape the bustling city for a short while. Because of that function, it is important that acoustics are considered in their design from the beginning. Now, more than ever, with the COVID-19 pandemic, it is vital to explore ways to create acoustically diverse and tranquil outdoor spaces that allow people to escape and find peace and quiet within the city. It raises the question, what could public spaces look like post-COVID?

This research evaluates the sonic qualities of urban spaces to provide designers with a means by which these complex environments can be better understood, analyzed, and created. It draws on an expanding body of research in architectural acoustics, and direct observation of cities in the United States and Italy conducted during the COVID-19 pandemic. By comparing cities based on their architectural character, this research establishes two typologies: modern and historic cities. For the purpose of this paper, modern cities are those comprised of large-scale buildings and avenues accommodating a dense urban population while historic cities are characterized by a compact urban core with highly articulated facades and small-scale buildings. Rather than relying solely on numeric calculations, this work probes the notion of the “perceptual construct,” seeking to make visual these constructs. Drawings and photographs from different cities are used to study the form of the city through urban edges and the emerging concept of green acoustics. The work provides a way of creating a new architecture of public space through the lens of the sonic environment. Soundscapes are thus a result of “the coherence with all other senses and with the reality of the place and the user” (Kang & Schulte-Fortkamp, 2017, p. 200). Designers are tasked with the question: “how can cities be designed through sound?”



Figure 1. Lexington Avenue, New York, NY, near 46th Street. The nighttime view illustrates the abundance of glass on most building façades. Photo by author.

Urban Edges and Façades

A public space is given form by the architecture that surrounds it – by its urban edges. When considering a public space as a typology, it can be said to be an outdoor room; an outdoor room in which the walls and ground become the reflecting surfaces. A city is characterized by its architecture and public spaces because, in most cases, they become a large part of the cultural identity of the place and the people that live there. The design of a building façade is vital to shape the exterior experience of a pedestrian. Studies have shown that façades can affect a person’s mood. If the façade is complex and interesting, then people tend to feel positive whereas if the façade is simple and monotonous, then

people will often react negatively (Ellard & Montgomery, 2013). This statement can be used in parallel to compare historic and modern cities. As Figure 1 illustrates, the prosaic and harsh urban edges of Lexington Avenue in New York City create an uninviting public space for pedestrians because of the profusion of hard reflective materials and the lack of porosity and open spaces.

Experiencing architecture means not just seeing but also listening. A space is shaped by its sound as much as it is by its form. In “Eyes of the Skin,” Juhani Pallasmaa states,

“Every city has its echo, which depends on the pattern and scale of its streets and the prevailing architectural styles and material...But our cities have lost their echo altogether...Our ears have been blinded.” (Pallasmaa, 2005, p. 51)

He argues that contemporary city streets are so wide that they do not reflect and return sound while the interior of buildings now absorb and censor echoes as well (Pallasmaa, 2005, p. 51). It

is an interesting way of reading cities and a valid statement. Because streets in such contemporary cities are wide, the “outdoor room” created is large enough that direct sound and reflected sound are added up. This becomes a problem because it does not allow a person to understand the scale of a place using the sounds they hear. When the sound is reverberating from the surrounding walls, the person and the space establish a direct interaction and the person is then able to measure the space and its scale (Pallasmaa, 2005, p. 51). In New York City’s Midtown Manhattan, the sound of traffic and construction completely overtakes a person’s acoustic environment. Why? Because the space of the street is remarkably large to accommodate the vehicular density of the city that it then inadvertently fills the space with noise in a room that has too many hard reflective edges that create a conglomeration of direct and reflected sounds, as shown in Figure 2.

The architecture, in certain ways, reflects the lifestyle of the people – fast and with a purpose. People tend to walk at a fast pace but because they have places to be, they have a purpose to their walk. There is also a sense of anonymity created in a bustling global city, such as NYC, that allows everyone to live in their own bubble. In these cases, the architecture of buildings is not a

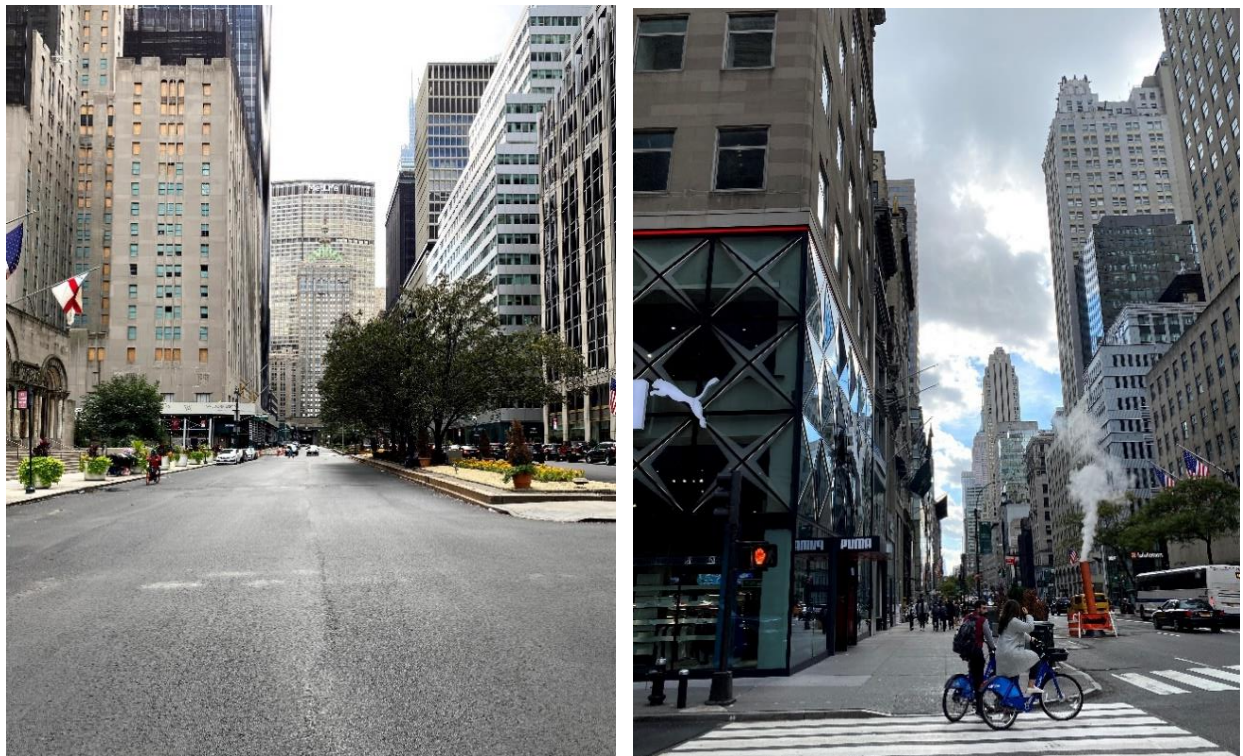


Figure 2. Wide Avenues of New York, NY. Left: Park Avenue, near E 51st Street. Right: 5th Avenue, near 49th Street. The large scale of the buildings and the wideness of the street create a conglomeration of direct and reflected sound coming to the listener from all directions, such as motor traffic, construction, and airplanes. The hard reflective materials and monotonous articulation of the façades contribute to the fast pace of walking typical in metropolitan cities. Photos by author.

point of focus and is therefore seen very quickly. With this mindset, there seems to be a lot of buildings that end up having a monotonous façade, mainly made of hard reflective materials. In the book “Happy City,” the author reflects on that same idea by stating that “As suburban retailers begin to colonize central cities, block after block of bric-a-brac and mom-and-pop-scale buildings and shops are being replaced by blank, cold spaces that effectively bleach street edges of conviviality” (Bond, 2017). Those types of façades, like the people, have a purpose but are meant to be seen fast. They do not engage with pedestrians to create a moment of pause and socialization. Additionally, because buildings in such cities are at a large scale and are often towering over the street, it is difficult to reach a human-scale experience at ground level. The soundscape experience of a user in those spaces tends to become impersonal and distant, where the people are a small component of the remarkable matrix of buildings. On the other hand, it is possible to also say that because there is such an amalgamation of sounds, environments, and people in the modern city of New York, there is greater diversity in the different soundscape experiences. There is a greater range of variability in the sonic environment, which consequently can evoke a wide spectrum of feelings, such as curiosity, excitement, and panic.

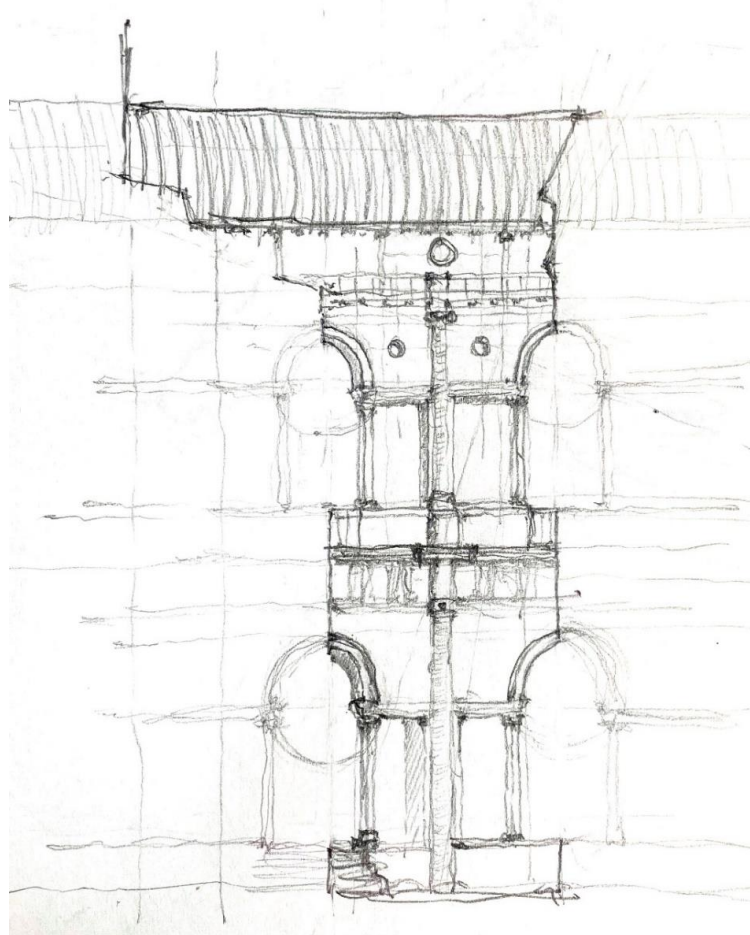
The acoustic experience in the historic, mid-sized city of Vicenza is completely different. The scale of the city is much smaller, and the articulation of urban edges is unparalleled. Most European cities today have a historic core, dating back hundreds of years. These historic cores



Figure 3. Vicenza’s Corso Palladio & Piazza dei Signori. Compared to NYC streets, the scale of the streets and public spaces in Vicenza is much smaller and geared towards the pedestrian experience. The materiality and articulation of façades diffuse sound and create a more pleasant sonic experience. Images by author.

tend to have narrow streets, very limited vehicular traffic, and very articulated façades and materials. The narrow streets make historic cores more pedestrian oriented and thus already create a different acoustic environment leading to a unique soundscape experience. Figure 3 contains images of the main public space in Vicenza, Piazza dei Signori, and the preeminent shopping street, Corso Palladio, where it is possible to see the scale of the surrounding architecture to the scale of a person. It clearly conveys the intimacy of the street and how such an environment can incite a sense of community and familiarity.

One of the key differences between historic and modern cities is the articulation of the façade. The sketch in Figure 4 is looking at the Basilica Palladiana in Vicenza designed by famous architect, Andrea Palladio. The building is from the Renaissance era, which can be seen through the presence of the semi-circular arches that become very prominent on the façade. The surface of the façade has depth and articulation through the use of columns, arches, and cornice lines. These elements allow sound to bounce off the surface in various directions, creating a



diffused effect. Another characteristic of the Basilica is that it has a very permeable ground level because of the loggia that circumnavigates the entire building. This permeability allows sound to travel through the space from one piazza to another; By allowing sound to move through it, the overall sound level is reduced in the adjacent public spaces. This has a perceptual effect of an urban sound absorber, for many people. Consequently, sound is softened and creates a sense of intimacy in Piazza delle Erbe on one side, and a sense of openness in Piazza dei Signori on the opposite

Figure 4. Basilica Palladiana, Vicenza, Italy. Sketch studying the facade articulation through columns, arches, and cornice lines. Image by author.

side. Hence, its design creates a very effective façade for acoustics.

Vicenza, a historic city in Italy, has architecture that invokes a more leisurely stroll through its streets. The same is true for Verona and Padova, metropolitan cities nearby. In the Italian culture, *la passeggiata* is “a traditional evening stroll in the central plaza by a town’s residents” (Speak, 2019). The architecture of historic city cores then must accommodate the cultural traditions of the residents. In Vicenza, the streets in the historic core are mostly cobblestone, the buildings are only a few stories tall, and the façades are heavily articulated in geometry and materiality. With a smaller scale for the street and buildings, there is a better dialogue created between architecture and pedestrian. Thus, the soundscapes become more inviting and mellow.

The Design of Acoustically Effective Façades

The façade of the building has a strong influence on the acoustics of a public space. As façades create the edges of public space, it is important that they encourage occupation of the space by providing an acoustically comfortable and diverse atmosphere. An acoustically effective façade can be defined as one that “minimize[s] the impact of environmental noise sources on people in their vicinity through defined absorption properties or controlled reflection capabilities of sound energy” (Krimm, 2018, p. 54). In the field of architecture, acoustics are

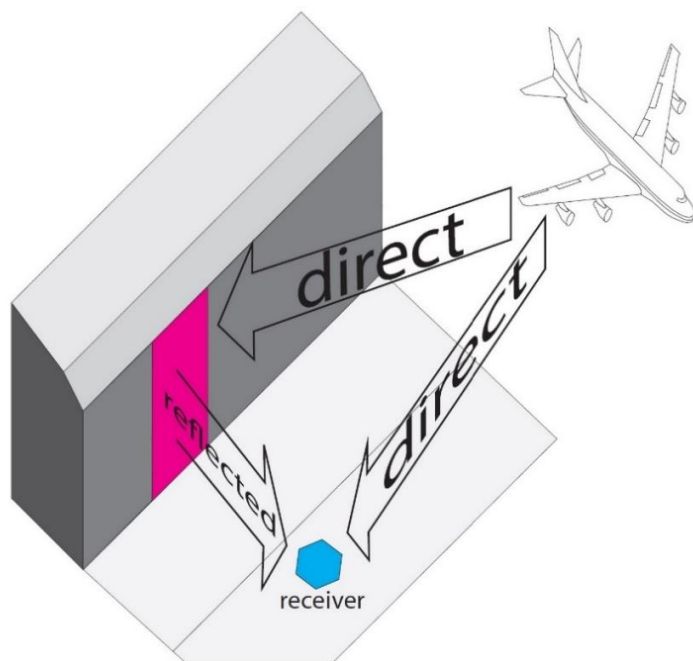


Figure 5. The acoustical role of a facade in how sound is perceived in an urban space. Source: (Krimm, 2018, p. 58)

often overlooked and when it comes to the design of public urban spaces, the effect of a building on the soundscape of that space is usually not considered. The acoustics of an urban space are affected by the spatial organization of the buildings and by the other interdependent elements situated in the space. In the case of a new project, experimenting with the position of the building or buildings on the site might be a possibility, but with an existing urban space, the best way to influence and alter the acoustical quality is to

modify the impact of environmental noise sources. To do this, the architect and acoustical engineers must work together to manipulate the reflection properties of the urban surfaces that are interacting with each other (Krimm, 2018, p. 165). Instead of treating sound like a waste, the soundscape approach gives architects and designers the opportunity to treat sound as an opportunity. By manipulating the reflection properties of urban surfaces and incorporating techniques such as sound sculptures and green acoustics, the sonic environment can be a source of inspiration for new design ideas that will become integral to the public space.

The issue with modern cities like New York City, as discussed earlier, is that high-rise buildings with hard reflective materials are negatively affecting the sonic environment. Hard reflective materials such as glass, metal, or stone used in façades are enhancing inner-city sound sources to the point that their intensity is perceived as double the amount (Krimm, 2018, p. 15). Why? Because in an urban environment, the level of urban noise is the combination of direct and reflected noise, shown in Figure 5.

As of now, there are two possible strategies for addressing façades acoustically: incorporating absorbing materials in the façade or modifying the geometry of the surface through angles to control the reflection of environmental noise (Krimm, 2018, p. 165). In order to meet code standards, façades must have a certain percentage of transparency to allow daylight in. With as much as 40% of the façade made of glass, the other 60% of the surface can be utilized to introduce acoustic techniques (Krimm, 2018, p. 165). One study proposed surface façade elements and materials for consideration. For surface design articulation, the authors suggest triangulated perforation of metal sheets and lamella structures. In terms of materials, they propose trapezoidal sheet metal, cast glass, and PTFE coated glass fiber fabric (Krimm, 2018, pp. 170-177). All of these modern techniques of articulation allow a façade to have convex shapes that would diffuse the sound in different directions.

Hard reflective materials are necessary for a façade, but it is in the articulation of the surface that designers can truly design with acoustics in mind. In most modern cities, the façades of high-rise buildings are mainly glass curtain walls and have very limited surface articulation, so the sound is not diffused and reaches the receiver more directly. In a large quantity of European historic cities, the façades have the necessary percentage of permeability to receive daylight, but the key difference lies in the articulation of the surface.

Historic Medieval, Renaissance and Gothic architecture seen most frequently in Europe is characterized by heavy ornamentation of surfaces. This ornamentation, as well as the

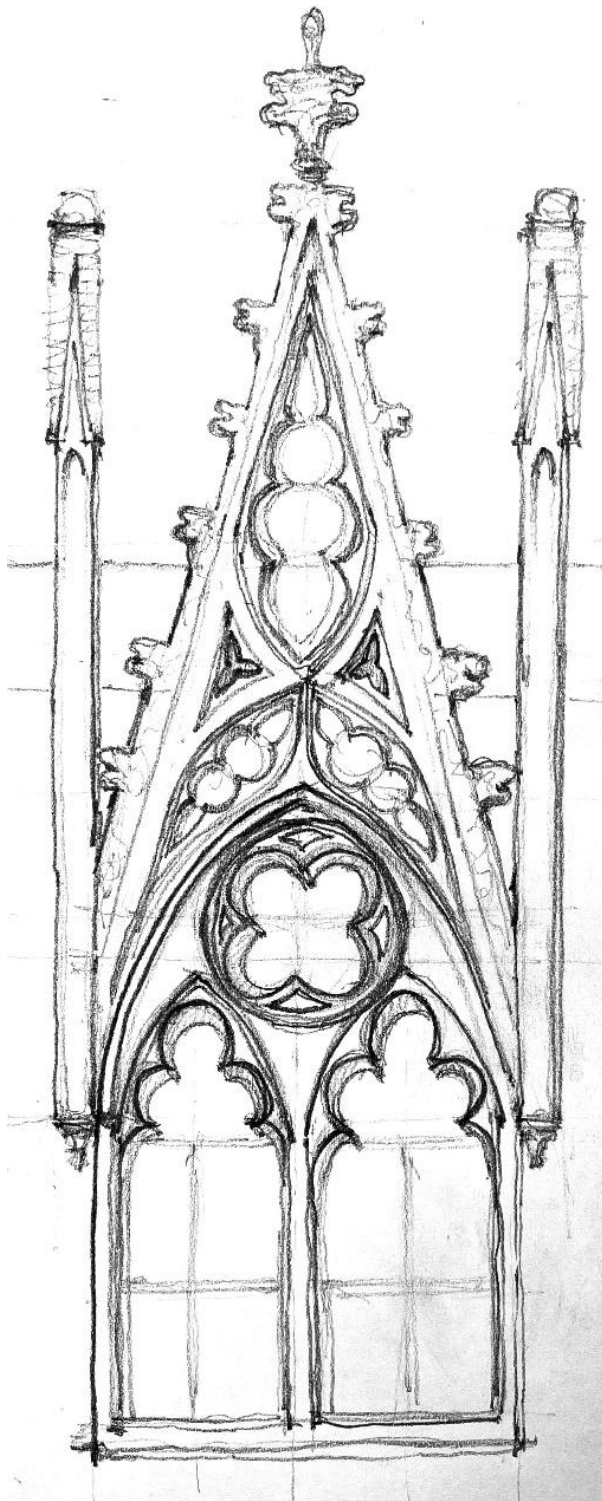


Figure 6. Caffè Pedrocchi's Neo-Gothic Window in Padova, Italy. Sketch by author.

incorporation of elements that give depth to the façade like balconies, are what allow direct sound to be diffused as it is reflected off the façade. Figure 6 shows a sketch of a Neo-Gothic window belonging to Caffè Pedrocchi in Padova, designed by Giuseppe Jappelli and completed in 1831 (Beltrami). There is a clear ornamentation of the window frame with articulation of the surface through depth and carving of details. Once again, this type of articulation and geometry of the façade allows sound to be diffused into the public space.

Figure 7 is an elevation sketch along Corso Palladio, the main commercial street in Vicenza, Italy. Because of the high influx of pedestrian traffic, it is important that the acoustics of the street are pleasant. One of the reasons it is successful acoustically is due to the façade articulation made by introducing balconies. The balconies give depth to the façade and increase the surface area from which sound can be reflected.

Having an urban space with good acoustic properties will encourage people to engage with the space, the architecture, and each other. Façades have the power to direct a visitor's attention to different sound events. One concept of the soundscape approach to design that is interesting is that it does not aim to mask



Figure 7. Elevation along Corso Palladio in Vicenza showing the surface articulation through balconies, arches, etc. Sketch by author.

the unpleasant sounds, it seeks to create sonic events that can attract attention, which would inadvertently mask those other unwanted sounds. Through a simple stroll in the streets of Vicenza, Verona, or Padova, sound resonates in the space and can be heard from a few blocks away. One of the most beautiful sonic experiences in Padova is street performers because their music draws the listener towards them as it is heard from down the street. Without the acoustical properties of the urban façade edges, the soundscape experience would be completely different.

Green Acoustics

In an urban setting, it is important to have spaces where the residents can feel tranquil and at peace, where they can go to escape the bustle of the city. Public spaces hold that role in a city, so it is important that the environment created is calming and acoustically comfortable. Greenery, in this research, is considered as the quantity and quality of vegetation, and the sensorialexperiences it creates through texture, color, light, shadow, and smell. The role of greenery in cities is becoming increasingly important, especially since the COVID-19 pandemic. Green spaces became the place of respite for people once lockdown had everyone in their homes for long periods of time. Now more than ever, there is a desire to create outdoor spaces.

Green acoustics refers to the use of natural elements, such as the singing of birds and the sound of water, to mitigate the more unpleasant city noise. The technique of using green acoustics for public spaces allows designers to create pockets of mental escape in a busy city. The soundscape approach is meant to introduce sounds to draw attention away from the unpleasant noise instead of trying to mask the unwanted sounds (Kang & Schulte-Fortkamp, 2017, p. 185). This idea is quite interesting in that it raises the question of, “how can I make this pleasant sound attract enough attention, so people do not notice or focus on the bothersome noise?”



Figure 8. Green Spaces in New York, NY showing the dichotomy between organic and built. Left: Bryant Park. Right: Bella Abzug Park, Hudson Yards. Photos by author.

Acoustically, the density and texture of the vegetation acts as an absorbent material to diffuse and soften incessant city noise. Even with the simple act of softening the edge of a building through the addition of trees, the visual and auditory experience of a pedestrian changes completely. When the space to create a public space or a park is available, some techniques include using ground coverage, artificial mounds, small noise barriers, loudspeakers or sound art installations, and water (De Coensel et al., 2010). Figure 8 highlights two important green spaces in NYC, Bryant Park and Bella Abzug Park in Hudson Yards. These green spaces use vegetation to break down the harsh edges and materials of the surrounding architecture. The organic edges of the vegetation create a beautiful dichotomy with the built environment and encourage leisurely strolls and a peaceful escape from the intense sonic environment of the city.

Water is one of the most effective methods for masking noise or attracting attention so that the focus of attention shifts away from the traffic and construction noise. Water is such a successful acoustic element due to the fact that it has sound stimuli and visual stimuli. According to Kang and Schulte-Fortkamp, the key to drawing attention to something and make it stand out is to combine a sound stimulus with a visual stimulus (Kang & Schulte-Fortkamp, 2017, p. 24).



Figure 9. Public space created by Rockefeller Plaza & Fountain in New York, NY. Photo by author.

During a visit to New York City's Rockefeller Plaza, shown in Figure 9, the water fountain present in the public space was the most captivating element there. The roaring sound of the water draws the pedestrian's attention and invites them to sit and enjoy a calm retreat in the middle of the city. The sound stimulus of the water plus the visual stimulus of the gold statue in the fountain illustrate the epitome of a good soundscape technique. In any public space, the water becomes a "concert of activity" (Kang & Schulte-Fortkamp, 2017, p. 264).

With continuous urban sprawl and urbanization in major cities, a large percentage of the population resides in city centers, which makes green acoustics and quiet façades important to consider in the

design of residential buildings and neighborhoods. A quiet façade means that it has a relatively low noise exposure, which in other words is at least 20 dB below the façade that is the most exposed to noise (Kang & Schulte-Fortkamp, 2017, p. 54). Why is it important to incorporate quiet façades and consider the effect of unwanted sounds for the health and well-being of people? Because too much exposure to such noise can have serious health effects, some of which include hearing loss, cardiovascular disease, and sleep disorders (Leardi, 2019). Urban green spaces are able to provide quiet spaces for the residents that otherwise may not have a quiet side in their home. A study found that in New York City, "people showed the highest levels of positive affect in green spaces" (Ellard & Montgomery, 2013, p. 19). Green acoustics are also important psychologically because they become pockets of fresh air where people can go when they need to step away from the realities of life for a short while.



Figure 10. New York City Mapping of POPS, specifically along Park Avenue. Made by Clara Martucci and Safia Boustique.

Many cities in Europe and the United States alike understand the importance of public spaces and parks. In New York City, Privately Owned Public Spaces (POPS) are an important part of the urban fabric. These little pockets of green space are dispersed throughout the city and function to create moments of rest. Many POPS incorporate green acoustic elements into their design to create the desired tranquility from the city noise. Paley Park and Greenacre Park are the two most well-known POPS in NYC. These two pocket parks are very successful in creating a serene soundscape experience. Both have a water feature and are enveloped in lush greenery, especially through a light overhead condition created

by the canopy of trees. Figure 10 shows a map of New York City and the POPS that are placed along Park Avenue. The consistent rhythm proves that they are becoming a more integral part in the city fabric. New York City is also very successful with its parks. Not only is there Central Park, a complete natural oasis in the middle of the city, but there are other smaller parks such as Bryant Park, the Highline, and Madison Square Park. The insertion of parks and POPS into the grid fabric of NYC creates a beautiful dichotomy between organic and built.

During Fall 2020, undergraduate design work was done by looking at POPS as a case study. In situ analysis indicated that there was a noticeable difference between being inside a POPS and

just being on the street. By conducting a soundwalk around 345 Park Avenue, it was possible to hear that the predominant sounds in the POPS were nature sounds, human sounds, and a very soft hum in the background created by road traffic. Once outside the POPS, however, the acoustic environment shifted turning construction and traffic noise into the dominant sounds.

In the design project titled, “Sonora,” soundscapes were a key element for the building design. Sonora is a word in the Spanish language that means “pleasant sounding,” and the design intent for the project was to use acoustic techniques to create a calming but diverse soundscape experience for all those that live in or visit the building. Inspired by POPS, the main method of



Figure 12. Main Entrance Plaza of Sonora. Designed by Clara Martucci and Safia Boustique.



Figure 12. Terrace Green Space of Sonora. Designed by Clara Martucci and Safia Boustique.

manipulating the acoustic environment used was nature. The objective was to bring more green spaces to a stretch of the city that did not have many. Using green acoustic techniques, such as water and greenery, the final design included a plaza at the front of the building with lush vegetation and a water feature to encourage occupants to stop and rest.

Additionally, an upper terrace, shown in Figure 12, brings the idea of an urban park to the project. The higher elevation of the terrace contributes to the diminished intensity of the inner-city noise. The terrace includes pockets of greenery, ground cover, and



Figure 13. Sonora in New York City. A design project by Clara Martucci and Safia Boustique.

small water features. Sonora seeks to achieve the goal set forward by the soundscape approach: “to create environmental comfort by influencing the mood, the emotion, the appraisal, and the restoration of persons visiting the place” (Kang & Schulte-Fortkamp, 2017, p. 35). POPS inadvertently fulfill this goal too because they generally affect people’s mood positively and are a source of respite from the fatigue of city noise.

Similarly, many European cities utilize green acoustic techniques in some of the public spaces. However, they also contain large piazzas surrounded by buildings and most do not have greenery. These piazzas are the center of life in these cities, and albeit they do not have elements of green acoustics, the articulation of their urban edges, as discussed earlier, generates a similar



Figure 16. Parco Querini, Vicenza. Photo by author.



Figure 16. Piazza Brà, Verona. Photo by author.



Figure 16. Prato della Valle, Padova. Photo by author.

diffusion of sound. There are green spaces in European cities, though, especially in more modern cities. In Vicenza, parks tend to occupy the periphery of the historic core because they were created as urbanization occurred, such as Parco Querini, shown in Figure 14. Verona and Padova are two historic cities as well but they are larger and a bit more modern. Due to that, their public spaces have greenery incorporated. Acoustically, because of their large scale, these spaces are able to create a small island of acoustic comfort. In both cities, the park inside the piazza contains a central fountain and lush trees spread throughout. Piazza Brà in Verona, as shown in Figures 15 and 17, has a concentric design, allowing the fountain to become a central focal point. As a pedestrian moves closer to the water feature, the sounds of the city become a background hum. The trees embrace the pedestrians and create a sense of intimacy, even within the large scale of the piazza. A similar experience occurs in Prato della Valle in Padova, shown in Figure 16. According to the European Quality of Life Survey in 2016, 83% of Italian residents said they had access to green and recreation areas within a close distance to their residence (*European Quality of Life Survey*, 2016). Hence, green spaces in residential areas are of increasing value to those that live there. Urban greenery attributes are even considered when doing economic valuation of homes.

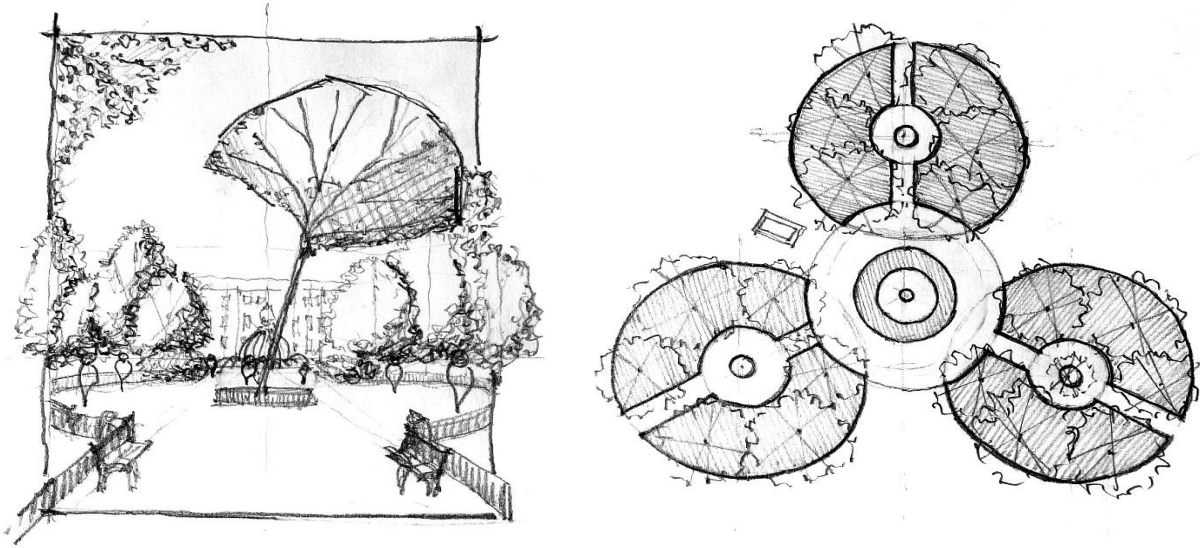


Figure 17. Perspective & Plan Sketch of Piazza Brà in Verona studying the design and experience created in that public space. Drawn by author.

Things such as the number of nearby trees, the distance to parks, the size of quiet areas are taken into consideration (Kang & Schulte-Fortkamp, 2017, p. 57).

There's truth in the soundscape approach to public space and noise in that a successful design for a public space is not about masking the unpleasant noise; it is about creating something that will visually and acoustically grab people's attention. By doing so, it is shifting the person's focus and as a result masking the unpleasant sounds. In both Italy and New York, public green spaces are doing just that and very successfully. There is an interesting dichotomy with scale in these two scenarios too. In a large-scale city, like NYC, people seek the small-scale spaces, such as the POPS, to escape the bustle of the city. But in small-scale historic European cities, like Verona, people gravitate towards the large-scale open public spaces.

Green acoustics is an ever-present concept that should be integrated in the design process early on. Not only is it important to create these spaces for the aesthetic quality, but they are also important psychologically to many people. Even if they do not reduce noise levels significantly, green spaces are an oasis in the city, a place where people can go for a breath of fresh air. Mental health has become a more prevalent issue with the COVID-19 pandemic. With a lot of people around the world confined to their homes, green spaces have an increased role to be that place to escape, to socialize safely from a distance, to exercise, and to just step outside. Moving forward, designers can learn from public spaces such as Piazza Brà, Rockefeller Plaza, or Prato della

Valle, and recognize the positive influence green acoustics have on public spaces in order to implement these techniques in their own designs.

Conclusion

The sonic environment is a hidden gem in the world of design, and it is up to designers to bring it to light. The soundscape approach is a way for designers to directly respond to the needs of the community – after all, they are the “real” experts when it comes to evaluating the spaces in their city. As Michael Frank Southworth said,

“The sonic environment, as well as the non-visual environment in general, is concluded to be an important area for new design work because of its apparently important effects on visual perception and because it may be an economical way of increasing persons’ delight and acceptance of the city without massive and costly redevelopment of the visible form” (Southworth, 1967, p. 3).

The soundscape approach is not new per se, but it is gaining recognition in the world of design because of the possibilities it presents and its economic feasibility. It has potential to transform public spaces and cities. It is an approach that listens to the users of the space instead of relying just on numerical calculations. If designers considered soundscape techniques in their designs from the beginning of a project, the outcome would undoubtedly have a better presence in the city. Since the COVID-19 pandemic, when outdoor spaces gained an utmost importance, there has been a push to bring restaurant seating, stores, and other activities and businesses to these public spaces, even streets. These public spaces are most effective when the sonic environment is pleasant, diverse, and complex.

In conclusion, urban public spaces form an integral part of the character of the city. Through focusing on urban edges, façades, and green acoustics, designers have the power to impact how a person perceives a space through all the senses – sight, smell, touch. Why not sound as well?

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