

Sonic Canvases: Visualizing Noise Pollution through Digital Mixed Media Photography and Audio-based Image Distortion

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Abstract

Environmental injustice is prevalent in the Philippines, but among the different kinds, noise pollution is the least talked about. Manila has one of the worst noise levels in the ASEAN region. The World Health Organization (WHO) recommends less than 30 decibels during the night for a sleep of good quality, but Manila averages 99.3 decibels—above the ASEAN average of 83 decibels. Constant exposure to loud noises can damage eardrums and induce loss of hearing. It can also affect health and show signs of aggressive behaviour, sleep disturbance, increase in stress level, and fatigue. I aim to capture images that my viewers can hear by creating a mixed media of photography and painting with field recording audio-based image distortion through an audio software. Therefore, my viewers can experience the visualization of soundscapes of differing locations in the Philippines without having been to the places.

Keywords: environmental injustice, noise pollution, decibels, mixed media, visualization, audio-based, soundscape

Introduction

Since I was a kid, I have had a bad habit of becoming easily distracted when there is insufficient visual stimulation. Learning through pictures is the method that works best for me. I also live in a noisy neighbourhood, enough to make me lose my sanity and become an artist. I have not grown fond of this noise that surrounds me, and as I grew older and learned how to commute, I was just presented with more. Throughout my life, I had to deal with these noises that I dread every time I encounter them – what more for the low-income communities with thin walls?

The earth is evidently worsening as seen with natural disasters, climate change, and pollution in a short span of time; and it is only recently that people have become aware of it. Children usually have irrational fears such as falling in a quicksand, death, supernatural beings – me, I was constantly thinking of the end of the world especially when the 2009 film by director Roland Emmerich's '2012' was released. I used to think that a huge meteor would cause the end of the world. It was not until I got older and realized that we would be the cause of our own extinction. Five elements in particular are driving environmental degradation and in all of them

humans are the common denominator: the actions of human beings affecting the sea and land, altering their ecosystems, the plunder of resources from the sea, emission of greenhouse gases causing climate change, pollution, and the introduction of foreign invasive species in ecosystems where they do not belong. (Nature Is Deteriorating Faster Than Ever, n.d., sec. Humans on trial).

As an artist, the best I could do to show care for the environment and my own well-being is by amplifying my artistic voice. So, through this project, I wanted to combine the thing that I hate the most (the noise) with the thing that I love the most (photography) to produce a collection of works that would encourage more discussion about environmental injustice of noise pollution in low-income communities.

One lens in particular—the 50-mm lens—is often seen as the most objective of objectifs, and it is said to be the lens that best approximates human visual perspective (Daigle, 2018). In most of my photographs, the 50-mm focal length is what I primarily used so that my viewers can hopefully see what my eyes see from my perspective. Its widespread popularity stems from the promise of greater mutual understanding and insight (Daigle, 2018). This focal length lens, more commonly known as the "nifty fifty," recreates the perspective and field of view of the human eye by acting as an accurate simulation. It has become a must-have piece of equipment for photographers primarily because of its capacity to capture scenes in a manner that is both beautiful and recognizable to the human eye. I do not have a 50mm prime lens, but I do have a 16-50mm lens which, for me, will do the trick.

For my viewers to visualize the sound, I took photographs and then recorded the soundscape, while simultaneously measuring the decibel level of the area using a decibel meter. Then for the audio-based image distortion process, I turned the photographs into raw data, and imported them to an audio software along with the audio of the scene. I added effects to the audio according to what it feels like hearing them, e.g., hearing vehicular noise felt like the noise was echoing through my ears.

Noise pollution adversely affects the lives of millions of people. Studies have shown that there are direct links between noise and health. Problems related to noise include stress-related illnesses, high blood pressure, speech interference, hearing loss, sleep disruption, and lost productivity (Clean Air Act Title IV - Noise Pollution | US EPA, 2023, sec. Health Effects).

In his **theoretical work**, Stallen (1999) emphasizes the psychological phenomenon of environmental noise annoyance. It considers displeasure with loud noises to be a kind of psychological stress, because being constantly interrupted may be draining, and different people have various strategies for dealing with it. Perceived control is emphasised to show that for persons exposed to ambient noise, 'noise management at the source' is frequently as important an external stimulus to respond to as 'noise at the source.' Noise pollution is seen as a sort of emotional strain; exposure to disruptions may deplete a person's reserves, and individuals respond to stress in several ways.

Is noise pollution an issue that impacts the low-income community? Do they find it bothersome? This literature review establishes the foundation for my study's investigation of "Sonic Canvases: Visualizing Noise Pollution through Digital Mixed Media Photography and Audio-based Image Distortion" by examining noise pollution and its visualization through my photography.

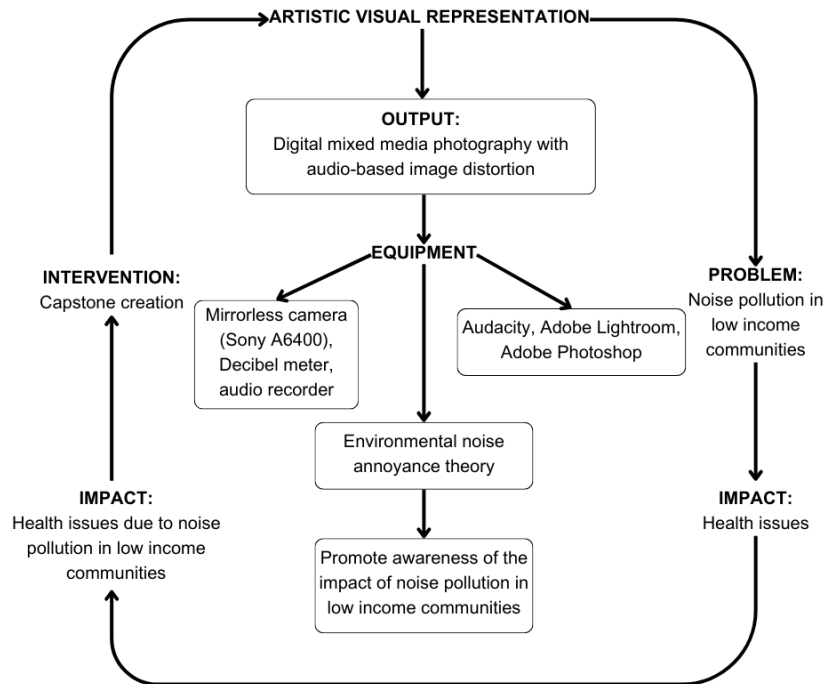


Figure 1 Framework of the Visual Representation of the Impact of Noise Pollution through Mixed Media Photography and Audio-based Image Distortion

The creative framework I constructed visualizes the underlying components of my project's topic. This section provides the thought process of my study, as well as the methodology and how I produced my output with the intention to spread awareness to the low-income communities regarding the invisible threat that is noise pollution.

This project stemmed from my personal experience. For someone with sensitive hearing, living in a noisy neighbourhood has only made me feel empathetic towards those who are more prone to noise exposure while residing in houses with thin walls. With this wondering, I conducted research regarding noise pollution in low-income communities and discovered environmental justice. There are many sources of noise pollution including traffic noise, industrial noise, construction noise, and air traffic noise. When someone is exposed to too much of these noises, it can be detrimental to their physical and/or mental well-being – not a lot of people are aware of this. To help spread awareness about this issue, I produced a visual

representation of the impact of noise pollution through mixed media photography and audio-based image distortion.

For my **target audience**, I aim, for all intents and purposes, to reach urban planners and policy makers. They could benefit from the research paper to better generally understand the impact of noise pollution and its implications for city planning and policy development, which generally is significant.

My **design process** began with taking, as much as possible, visually appealing photographs of things that produce loud noises that personally feel uncomfortable to my ears.

I carefully selected eight of the photographs which I felt spoke the most volume to me. I then did the necessary colour correcting and colour grading for these images using Adobe Lightroom Classic. Then for the audio-based image distortion process, I turned the photographs into raw data, and imported them to an audio software along with the audio of the scene. I then added certain effects to each audio file for a more distorted look. After the distortion, I used Adobe Photoshop for certain edits of which I decided to place or remove parts of the distortion.

Pre-production Stage Research is essential prior to undertaking the project in order to gain in-depth knowledge of the various aspects of noise pollution that I must investigate. To ensure their effective implementation throughout the project, research will be conducted on noise pollution, environmental noise annoyance, environmental justice, and photography

1. NARRATIVE SHAPE:



Riches to rags: introduction, rising movement, climax, and catastrophe.

2. PURPOSE OF COLOUR:

Associative Colours

By using associative colours, i will be able to evoke emotions, and to enhance the emotional impact of my photographs.

3. COLOUR TITLES:



Noisy Grey Dirty Brown Hopeful Olive 50% Dirt

Noisy Grey - decay
Dirty Brown - monotomy
Hopeful Olive - humankind
50% Dirt - glum

4. COLOUR THEME:



Tetradic



Figure 2 Colour direction (SCENGRP)

The colour direction task from my Scenography class includes the narrative shape, purpose of colour, colour titles, and colour theme.



Figure 3 *First prototype (STUDIO1 midterms)*

The first prototype was my first attempt to record the soundscape and link it to a QR code that is placed on the photograph of the scene. However, I was still experimenting with the colours.





Figure 4 *Second prototype (STUDIO1 finals)*

I created the second prototype for my STUDIO1 finals. I was finally satisfied with the colours that I wanted, and the QR codes are working properly.



Figure 5 *Third prototype (MMAPRO1)*

I produced a third prototype for MMAPRO1 since my panelists were not satisfied with my second prototype. They instead tasked me to find a way to distort my photographs through audio, but at the same time I also must manipulate it. I used Audacity to distort the photograph.

Production Stage My production stage is mainly about taking photographs in locations of low-income communities with loud surroundings, audio-based image distorting, and editing the images to create eight mixed media artworks.

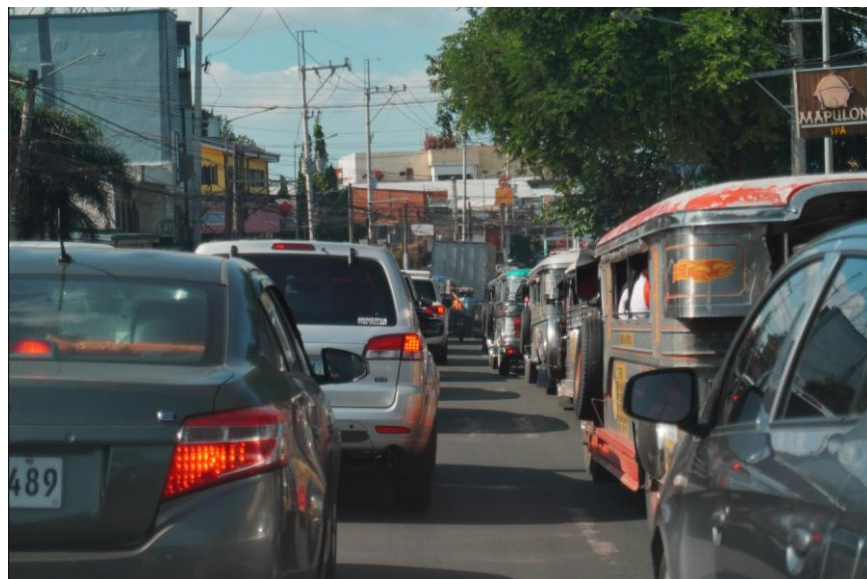


Figure 6 Raw photo taken with Sony A6400 16-50mm lens

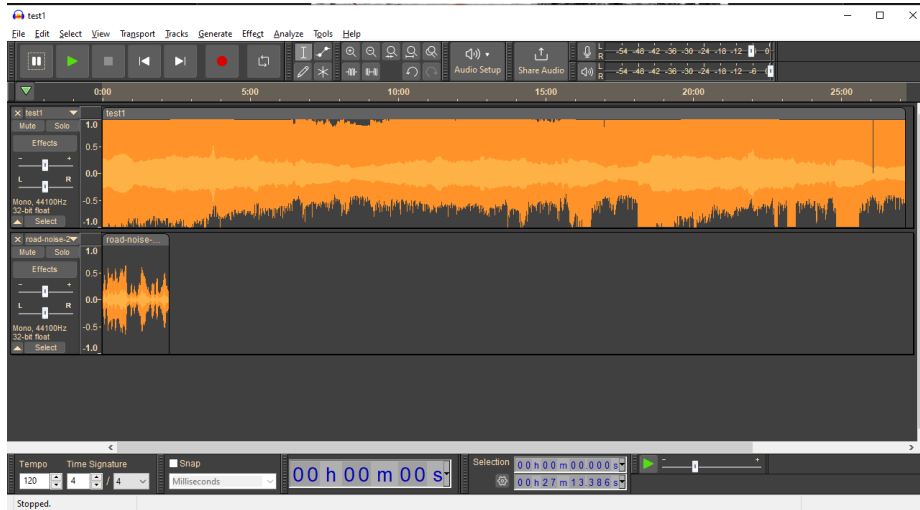


Figure 7 Audacity workflow

I imported the raw data of the photo and as well as the soundscape of the photo. To add more distortion, I added effects depending on the image.



Figure 8 Outcome of Figure 7



Figure 8.1 *Edited with Adobe Photoshop*

After the distortion, I proceeded to edit the distorted image through Adobe Photoshop for certain edits of which I decided to place or remove parts of the distortion.

Post-production Stage This stage consists of setting up the canvases, and finally the exhibition which will begin after I produce the eight mixed media artworks. Then following the completion of all the required preparatory work, the exhibition proper will get underway to present the result of this project in Asia Pacific College School of Multimedia Arts (SOMA) exhibit.

Review of Related Literature

This chapter's goal is to investigate the existing body of research conducted on noise pollution, sound, and the idea of hearing photographs.

Environmental Justice

To address the relationship between low-income communities and noise pollution, it is crucial to understand the term environmental justice. "Environmental justice is defined as the fair treatment and meaningful involvement of all people regardless of ethnicity, colour, national origin, or socioeconomic status, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies" (EPA, 2017, para. 1). Environmental illness can occur when you are exposed to toxins or substances in the environment that make you sick. These health hazards may be found where you live, work, or play. (Environmental Illness | NYP, n.d., para. 1) Environmental benefits are features in a

community that have positive health and social benefits such as bike lanes, well-maintained roads, and parks.

Noise Pollution

The term "noise pollution" refers to the negative impact that being exposed to excessive or loud noise can have on the health of humans. Every single day, noise pollution has an adverse effect on the lives of millions of people (Peris, 2020). The most typical health effect of noise is hearing loss (Noise pollution, n.d.). These health concerns are not restricted to a certain age group and can potentially affect people of any age.

Noises that can be potentially damaging to human health are common in daily life. During the course of a normal day in an urban area, inhabitants may be exposed to a broad variety of noises from stores, schools, companies, parks, and the like. The Philippines has a big problem with noise pollution, and it is possible that the primary cause is that Filipinos are comfortable with noise. Not only do Karaoke bars and motorcycle exhaust pipes make noise pollution, but so do many other things. People who drive jeepneys and shops that sell things seem to think that making more noise will bring in more customers (Beltran, 2022).

Noise pollution may seem like something that causes detrimental effects on the health of people, yet this noise can also have positive implications. Considering the context of Filipino culture, Filipinos love singing in karaoke, which can produce a strong sound and disturb the peace of their neighbours. There are some advantages to such noise, such as a vibrant and energetic atmosphere that, for some, may be appealing. Although some experts describe noise as simply "unwanted sound," one person's enjoyment or desire for a certain sound may vary greatly from that of another, such as boom boxes, car stereos, drag races, and lawn mowers (Chepesiuk, 2005). Quiet areas may also depict a lack of energy and isolation from the activities of busy areas. Thus, noise pollution has some positive and negative consequences.

The A-weighted decibel (dBA) is a unit of measurement that measures how loud a sound is to the human ear. The human hearing threshold is reported to be 0 dBA. Chepesiuk (2005) states that a busy highway has a decibel level of around 80 dB at fifty feet, but a chainsaw has a maximum level of 110 dB or more. Without hearing protection, even brief exposure to noises greater than 120 dB may be uncomfortable.

The World Health Organization or WHO has labelled Manila as having one of the worst noise levels in the ASEAN region. While the U.N.-based organization recommends less than 30 decibels during the night for a sleep of good quality, Manila averages 99.3 decibels—above the ASEAN average of 83 decibels. According to the WHO, long-term exposure to noise levels of 70 decibels may induce hearing impairments. (Manila Traffic, Noise One of the World's Worst, n.d.-b, para. 5)

Photography

We have all heard of the saying that a picture is worth a thousand words. Indeed, photography is an integral part of modern life. With so many uses for it, it is not just widespread but also highly diverse (Shusterman, 2012). Now that photography as an art form is more accessible, more people can take advantage of photography's incredible potential as a vehicle for personal and social expression. Photographs can serve as powerful instruction tools, inspire

people to act and influence policy. It is far harder to underestimate the power of an image than the power of words when it comes to affecting change (Down, 2022).

Photographers use a variety of artistic techniques to get their point across to viewers. Only the most important parts of a picture are kept. Moreover, photographers use emphasis to draw attention to where they want it to go. Since cameras are an effective means of communication, people should be increasingly encouraged to share their ideas for self-expression through photography (Ballenger, 2014).

The goal of expressive photography is interpretation, not explanation. It is not just a bunch of data as there is a unique story behind it (Douglis, 2010). A picture can mean different things to different people, depending on their experiences and perspectives. It is also important to remember that the purpose of expressive images is to evoke thought, feeling, and imagination in the viewer; therefore, while it may be simple to agree on the basic meaning of certain photographs due to frequently shared backgrounds or thinking patterns, this should not be taken as a norm. This only means that every person who sees a photograph will form their own unique idea of what it means to them. In the end, every possible interpretation is a relative one.

Marxism

The ecological problems we face are those of capitalism – not human behaviour as such – and we need to understand how capitalism interacts with nature if we are to address them. Marx made an important start on this. In the 1860s he wrote about soil degradation, a big concern at the time. His work showed how the division of town and country led to loss of soil fertility while at the same time imposing a great burden of pollution and disease in the urban centers. (Benton, n.d.). Correlating Marxism with environmental injustice, specifically in the context of noise pollution, involves examining the relationship between economic structures, social class dynamics, and the unequal distribution of environmental burdens. Marxism, as a socio-economic and political theory developed by Karl Marx, emphasizes the role of class struggle and the exploitation of the working class by the capitalist system. When applied to environmental issues, Marxism can help analyze how certain communities, often those with lower socio-economic status, bear a disproportionate burden of environmental problems, including noise pollution. Marxism highlights the disparities in access to a clean and healthy environment based on socio-economic class. Wealthier individuals and communities often have the means to live in quieter and less-polluted areas, while lower-income individuals may be confined to neighbourhoods with higher noise levels due to factors such as proximity to industrial zones or transportation hubs.

Mixed media

Mixed media art is a visual art form that combines various media in a single piece, such as drawing with ink, painting with watercolors, and adding colored pencil highlights. It is closely related to assemblage and collage, which involve assembling found objects in unique ways. Mixed media can take various forms, but it requires sturdy foundations and small-scale tests to achieve desired effects. By using a combination of media in one artwork, you can utilize the best of each medium, allowing you to create unique and visually appealing pieces. (*Mixed Media Art Information and Gallery — Art Is Fun*, n.d.). In my case, my version of mixed media will be digital. I would describe digital mixed media as a form of experimental style with unusual methods.

Review of Related Works

This chapter's focus is to discuss existing techniques, art principles, and approach that I had implemented on my project.



Figure 9 *New York Mixed Media III (Sven Pfrommer II)*

New York Mixed Media III by Sven Pfrommer is photography combined with painting. His mixed media works are available on canvas, acrylic diasec, resin or aludibond. (Sven Pfrommer, 2022). I was inspired by Pfrommer's technique of making the images black and white to make the acrylic paint stand out while also equally giving attention to the image behind.

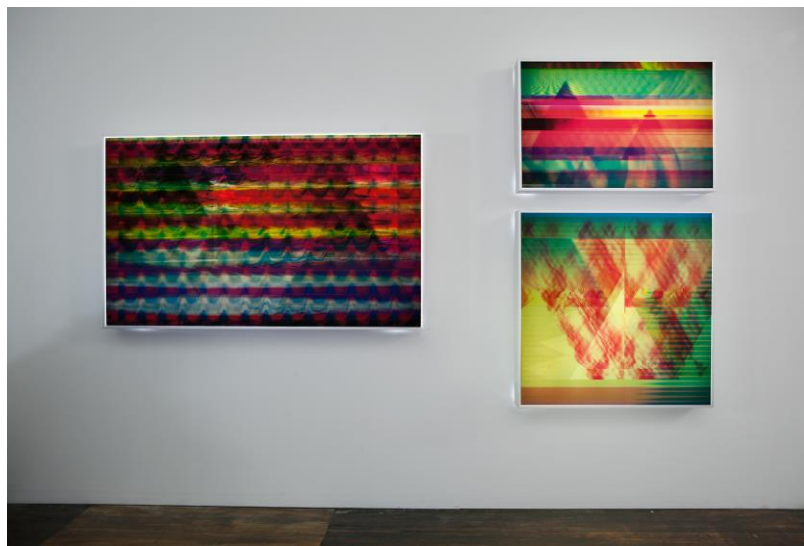


Figure 10 *Glitchometry Triangles #5 and Glitchometry Diptych (Daniel Temkin)*

Daniel Temkin's image begins as one or a few black squares. His images are also sonified by importing his files into an audio editor. For each colour channel, he added sound effects to transform the image in an unconventional way – there is no immediate way to monitor his effects.

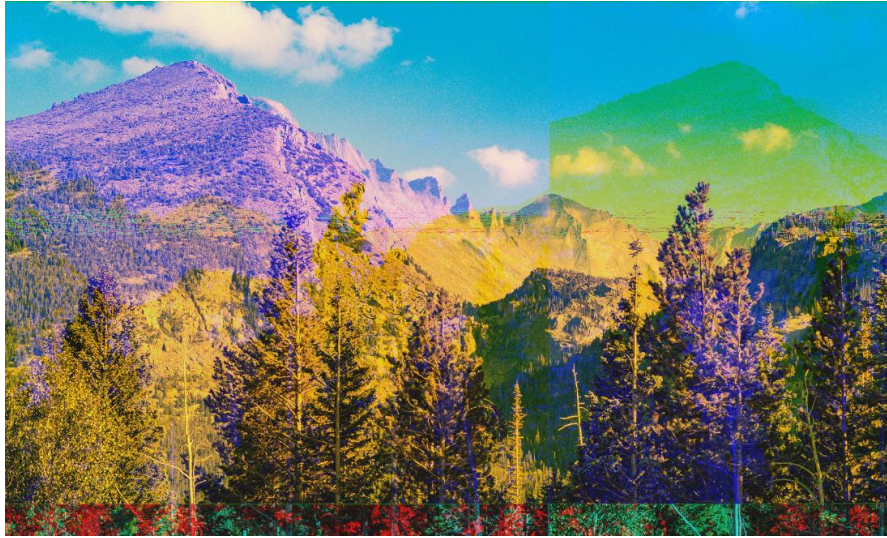


Figure 11 *Corrupted Landscape (Brandon Cranford)*

Brandon Cranford used audio data to glitch or databend this project. Cranford turned his photos into raw data and combined them with text or audio of environmental policies that contribute to climate change. I used a similar process that Roberts provided for this project for my audio to distort my photos. Just like the purpose of my project, according to Cranford, his process of glitching is destructive to the image just as these policies are destructive to the environment.



Figure 12 *Film Photos Captured with 5 Seconds of Sound Before and After (Mario Cipriano)*

Taking photographs that also capture sound is known as "audiophotography". Visually, it is perfect for making a digital short film out of a series of interconnected audiovisual storylines. These stories take the audience on a journey through a succession of visual sequences, some of which may or may not feature voiceovers.

Photographer Mario Cipriano used a technique he calls audiophotography. He used a digital audio recorder to capture the sound context behind each of his film photos (Zhang, 2023). He mounted a Rode VideoMicro microphone and a Sony digital recorder to his Leica M6 camera (with 35mm f/2 and 50mm f/2 Zeiss lenses and Ilford HP5 400 film inside).

Prior to capturing any shot, Cipriano activates the audio recorder to record 5 seconds of audio. He then left the recorder on for 5 seconds after the shot.



Figure 13 *Noise-capade*: An Experiential Documentation of Metro Manila Cities Depicted Through Noise and Paint Cymatics Abstractionism (Arys Abadier)

Noise-capade by Arys Abadier is an art gallery which consists of eight (8) paintings, with each painting representing a city in Central Metro Manila. The cities represented are Quezon City, Manila City, Mandaluyong City, Pasig City, Makati City, Pasay City, Taguig City, and Paranaque City; with each having a certain landmark where in the artist will be operating in. Each of the audio tracks and paintings falls under the Abstract Expressionism genre, with the

visual outputs having their corresponding noise art. (Abadier, 2023). The purpose of this project was to document the rapidly increasing noise in Manila as an effect of the industrial development and the pandemic recovery phase of the country at the time.

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