

ABSTRACT

Title of Thesis: PERCEPTUAL RESONANCE | SPATIAL
TYPOLOGIES AS AN INTERPRETATION OF
MUSIC

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This thesis seeks to evoke a sense of place, identity and memory through a connection with music to capture the essence of place. Music can act as the link between architecture and people, to allow people to experience place in a more intimate way. By engaging all the senses, there can be a connection through our bodies to the building around us. Through the process of abstraction, we can link the audible world with the visual world, allowing music to resonate in architecture.

PERCEPTUAL RESONANCE | SPATIAL TYPOLOGIES AS AN
INTERPRETATION OF MUSIC

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Dedication

I dedicate this to my mother, for all the love and support she gave me during my childhood to pursue my dreams with music.

Acknowledgements

I would like to thank many of my Maryland professors for helping during this exploratory process to find my way. Professor James Tilghman enlightened my path, guiding me in a direction that would eventually lead to me figuring out how to link music and architecture using painting. I could not have done it without him. Professor Peter Noonan gave me guidance that helped me see a clear path to the end. His class initially inspired this thesis, triggering an excitement for sensing architecture.

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Chapter 1 | Theory

An artistic experience that truly moves the soul is something hard to find. Why is that when one person sings a song, although it might be completely in tune and on tempo, it does not make you feel any certain way, but when someone else sings it, you end up in tears from the emotional experience that moved you. All art can imprint this emotional experience on a person interacting with it, but what makes that experience reach into the soul of a person and make it memorable? That is what this thesis seeks to explore. Can architecture make a person feel a sense of exploration and discovery, tension and release, nostalgia and forward thinking, silence and sound, light and dark? Can a space be filled with binary oppositions that create a contrasting experience that provoke a physical spatial experience but at the same time an internal personal journey.

Can you hear a song while walking through a space? Can you draw a space while listening to music? Can the spatial experience in music help to create the spatial experience in architecture, not as a way to mimic one another, but to inform and build a language of experience. How does one experience a song versus a building. We as humans use primarily two different senses to experience music and architecture. We favor our hearing when listening to music and we favor our sight when looking at architecture. But what if we used a full range of senses to experience music? Why does watching the singer sing make a more impactful song? As a singer steps out onto the stage, she finds the appropriate position for her feet, a straight alignment of the legs up to the spine and through the neck, fully supporting the diaphragm and lungs. A long breath, and sound resonates through the room, one person filling the room with song. You realize that each breath is carefully orchestrated into a musical phrasing of song, a certain amount of measures before a carefully planned next breath. It appears seamless, the way

the pause of breath and the flow of sound coalesce into a composition, but her whole body moves with the breath as if it were an instrument and on that breath comes music. As she sings through each phrase of music, it is not only in tune and on tempo, but it moves you emotionally. But why? The words she is saying are suddenly relatable, the phrasing and melody of the song are crescendoing and decrescendoing, long and short, as if she is shaping each phrase, carefully molding it.

What if we perceived that song with an engagement of all of our senses. What if we could see the way that song could be molded or shaped with our eyes, what if we could feel it with our hands. What if you took the music away from our ears, could we still experience it with the rest of our senses?

Architecture is primarily experienced with our eyes, we favor our vision to experience, and although our other sense truly make the experience, we frequently ignore or are not aware of our other senses. We see the grandeur in a space through our eyes, looking at intricate detailing, rhythmic ordering principles, or focal points. We experience these moments through a sixty degree cone of vision, a description of what is in front of us. But if we close our eyes, we experience the space in a different way, each of our senses is engaged to feel and hear our surroundings. Our ears put us in the center of our sensory experience of space, giving us a full 360 aural experience. We can then compare the frontal visual experience to the centric aural experience. What if we walked through a building that didn't let us ignore the rest of our senses. What if the materials of the building emanated a smell that brought to the foreground of our minds a memory of another place or time. Would we notice our steps through the building if they left the remnants of a footprint as we walked? What if we could hear a difference between when we walked between one room and the next, changing the material and therefore the way

our feet feel and sound on the different materials. The ephemeral light of the day touches our face, letting us feel the warmth of the sun and then it gets cut off, making us feel cold in the sudden contrast.

This thesis seeks to explore how one artistic gesture can become an informant for another. As we analyze space, we realize that it can be found in music and architecture separately. “Sound as a means to expand the boundaries of architecture, creating an immaterial and dynamism of space.” Sound, or music, can be used as a means to expand the boundaries of space. We perceive both arts as sequence of discoveries, although at first we might think of them as linear, they in fact become something that we can experience in anyway that we please. We can stop, turn around, go back, walk at different pace. Yet still, both are built off of moments and create a succession of events. “Music ought to serve as a catalyst for reflection and a means of self realization” (pg 39). If when we listen to music we close our eyes for a aural experience, and we are suddenly letting that music into our soul, letting it touch your emotions and create meaning to you as an individual. Architecture can start to do this as well. Using comparative analysis within music and architecture can allow a narrative to emerge that connects the two crafts.

Chapter 2 | Program

Visioning

Defining the User



Figure 1| Musician (source: Creative Commons Zero) Figure 2| Street Band (source: creative commons zero) Figure 3|Listener (source: Sarah Koenig)

Learner

Collaborator

Experiencer

Goals and Objectives

The goals of this thesis spread across a variety of objectives including providing a space for the defined users: learners, collaborators, experiencers. This thesis seeks to identify what these users need and what that would entail in the use and experience of space. The goal for this thesis is to orchestrate a spatial experience using connective elements in music and architecture and a full engagement of the senses. The intention is create a spatial sequence that allows the visitor to become a part of the performance within the building. However, the space acts as a platform for the juxtaposition between the planned performance and the impromptu performance, allowing the visitor to be a part of both. For the collaborator, giving a home for musicians and

providing a space for interaction with other musicians meets this goal. For a working musician, a planned practice can become an impromptu, informal performance for listeners. An impromptu jam out session between musicians can become a planned performance for listeners. For the learner, providing a place to learn about music through typical and innovative styles, classes and experiences meets this goal. To evoke a sense of place, identity and memory through a connection with music meets this goal for the person experiencing this space.

Another main objective of this building reinforces the community's cultural identity by providing a space where people can listen, practice, work, perform and sell music, functioning as a cultural hub within a community. Relating to this goal, the building acts as a bridge between the exterior urban space and the interior programmatic uses. This allows for opportunities for transformation between the blurred boundaries of inside and outside, in the same way that impromptu and planned performances have a blurred boundary depending on who is experiencing it. Creating a dialogue between historic and contemporary architecture can also start to blur the boundary both, or maybe even use a connective tissue to stitch the two together.

After broadly identifying that there will be three main uses of the building to provide a space to learn, collaborate and experience, we can start to imagine what types of spaces would be included in this program.

Types of Spaces

This program is a kit of three types of uses: learning, collaborating, experiencing. However, identifying different types of spatial experiences and what emotion they might evoke. Emotion is such a strong part of music, so to attempt to create experiences that evoke that emotion is the first step in creating a link between art types. Therefore, it is important to

consider both the user's needs and the experience of the spaces. These will be the two main drivers in developing the program.

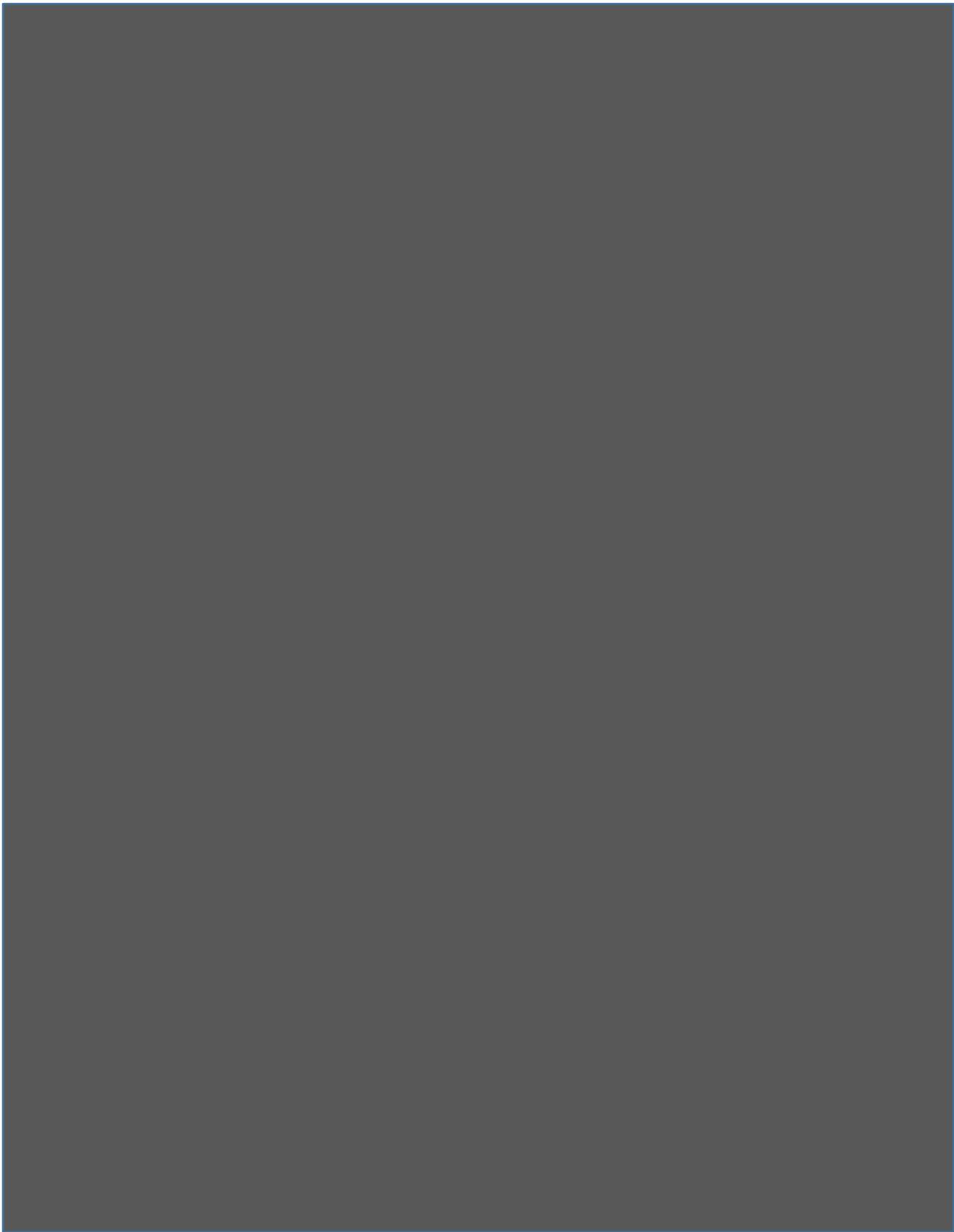


Figure 4: name (source: various)

Analysis

Types of Users |Background



Figure 5| Ryan Schugar
(source: Erin Barkman)

Ryan | Free Lance Audio Engineer

Recently graduated from the University of the Arts with a BS in Music Technology and Business, Ryan also runs a freelance consultant business, giving advice to companies about their sounds systems. His problem now is that he doesn't have an official space to meet with his clients, or enough space at home to house all of the equipment that he needs to run the business.

Needs: Private meeting space, workspace, storage space



Figure 6| Danielle Wynne
(source: Erin Barkman)

Danielle | Vocal Performance Major

Danielle is currently attending the University of the Arts, pursuing a BS in Vocal Performance and Musical Theatre. She is a senior this year, and worried about practice space for her future career. She wants to stay in the city, but needs a place where she can continue to develop her skill and knowledge, being able to practice, take voice lessons, and get opportunities to perform to get her name out there as a performer.

Needs: private practice room, teacher



Figure 7| Singer Entrepreneur
(source: Public Domain)

Lynique | Music Entrepreneur

Starting up a new business, it has been hard for Lynique to find enough clientele to keep her music business recording and supporting artists up and running. She is looking for a place where people will feel comfortable but professional coming to her studio, and where she can get her name out there. She likes to be able to jam out with other musicians

and uses that as a way to find real talent to record. She also likes to take opportunities to perform herself, but there are a lack of informal venues in the area that allow for pre professional performance

Needs: Studio space, work space, meeting space, place to sell music



Justin | Street performer

Constantly on the lookout for new impromptu venues, Justin seeks spaces that amplify his music with acoustics, and places that are heavily trafficked by pedestrians. He'd love to be able to get gigs at real performance venues, but for now he is getting his name and his passion for music out to the public using the street as his platform. There is something about how the sounds of the city mix with his music, that make his music more powerful than a performance in a sterile interior environment.

Needs: individual practice space, group practice, network events, performance venue



*Figure 8 | Amateur musician
(source: Chinese Wikipedia,
Public Domain)*

Laura | Community Member, Music Background

Previously involved in performance in college, Laura is now thirty-five and working a typical office job. She loves music, but cannot find anywhere to get involved in the community, whether it be in a choir or just a place to play piano and sing individually. She is also the type of person who goes to watch street performers at lunch and after work. She wishes she could go to more performances to get her music fix, but in the

city they are always so expensive that she can only afford to go every couple of months.

Needs: individual practice, local events, performance opportunities, class



Figure 9 | Resturant Owner
(source: Oikawa, public domain)

Marcus | Restaurant Owner

After three years of owning his own restaurant, Marcus wants to change things up. He wants to move to a more central location to the arts district and create a unique eclectic brand within the space, reinforcing that brand with live performance. Although Marcus would like to recruit performers, he is not sure where to look or advertise.

Needs: Live performers, new prime restaurant venue



Figure 10 | Gretchen
(source: Erin Barkman)

Gretchen | Community Member

Even though she loves to listen to music, Gretchen has no musical experience. In her mid-50s, she has put three kids through college and now with all of them gone, finally has time to herself. She was involved in music when she was young, and her daughter was very involved, but does not know where she could go to take one casual class or listen to a casual inexpensive performance. She works in the city, and likes to go out and eat at cafes with live performers, but finds trouble finding many like that.

Needs: Venues to listen to musicians, local performances, restaurant, class



Figure 11 | Musician
(source: Kelley, Creative Commons)

Chris | Musician

Studying under many practicing artists, Chris plays cello. He lives in a small apartment in the city, which does not allow for him to have space to practice his instrument. Because he does not attend the local university, he is not allowed to use their practice rooms, and he has trouble finding space to rent so he can practice. Playing cello is Chris's livelihood, and he needs a space that makes it easy for him to practice but then also collaborate with others to find opportunities to perform and maybe even join in groups, like a quartet of string instruments.

Needs: individual practice space, large group practice, social space, place to sell



Figure 12 | Professor
(source: public domain)

Harold | Professor at the University of the Arts

Harold, sixty-five-year-old professor, teaches choral conducting and diction at the University of the Arts. Intrigued with the sounds of the city, he wants to teach a seminar about the link between the city soundscape and its relation to music. Unfortunately, the Dean of the department told him that there is not enough classroom space. Harold loves to explore these seminal ideas in real application of playing music in the soundscape of the city and recording it. He would love to sell his recordings, but does not know how to go about getting his work out there in the community.

Needs: students, classroom space, place to sell, outdoor performance space

Program

	# of Total Unit			# of Total Unit			# of Total Unit			Total Types
	1st floor	units	SQFT	2nd floor	units	SQFT	3rd floor	units	SQFT	
Public Venues										
Reception lobby	1500	1	1500							
Resturant	2000	1	2000							
Café	1500	1	1500							
Market	2000	1	2000							
Black box theatre	1500	1	1500							
Performance Venue	5600	1	5600							
Total Public			14,100			0			0	14,100
Learning Spaces										
Classrooms	400	10	4000							
Individual work space	1000	1	1000							
Library	800	1	800							
Total Learning			5800			0			0	5800
Typical Workspace										
Flexible Workspace				1500	1	1500	1500	1	1500	
Private office				120	5	600	120	5	600	
lounge				500	1	500			0	
kitchen				1000	1	1000			0	
meeting space				1500	1	1500	1500	1	1500	
phone booth				100	5	500			0	
private rooms group				400	4	1600			0	
private room individual				200	10	2000			0	
Total Workspace						9200			3600	12800
Music Studio										
practice room groups	400	4	1600	400	4	1600	400	4	1600	
practice room large group	1000	0	0	1000	3	3000	1000		0	
practice room individual	150	10	1500	150	5	750	150	5	750	
									0	
Control Room				200	4	800			0	
ISO room				100	4	400			0	
Sound stage (recording studio)				400	4	1600			0	
Total Music			3100			8150			2350	13600
TOTAL per floor	17,850		23,000	7,570		17,350	4670		5,950	46,300

Total Square Footage	46,300
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Circulation (12%)	5,556
Mechanical (10%)	4,630

Total Square Footage	56,486
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General Description

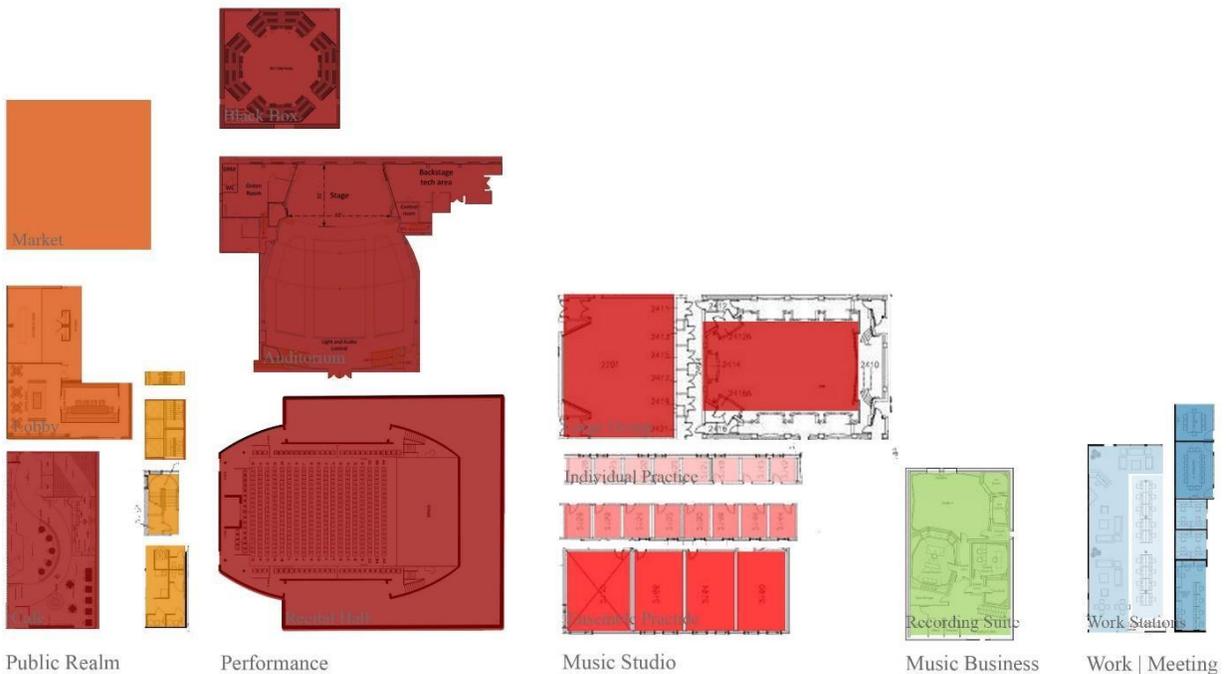


Figure 13 | Program Kit of Parts (source: Erin Barkman, various authors)

Public Realm Description

The Café or Restaurant, along with a comfortable lobby draw people into the building. The Restaurant or Café would have spaces for live performance and would possibly integrate with a large market space for the selling of goods and musical products, such as artist's albums.

Performance

Three different types of performance spaces will be analyzed to fit to into the site, and if they meet the needs of the users. Each type of space has a different character and holds a different variety of programs. This chapter explores these concepts later on.

Music Studio

At least 10 individual practice rooms will be required to meet the user's needs, as well as several group practice rooms for small bands. Then there will be at least two large ensemble rooms, for choirs or symphonies to practice. This will accommodate the needs of impromptu users, and may even become an

office like atmosphere for professionals that would rent the space hourly per week. There would be a mix of amateur and professional artists needing a space to practice, requiring different amounts of commitment.

Music Business

There is one music suite required that can be rented out by professional recording artists who can then recruit people to record from there. This suite could also be used by a more important professional coming to use the space for a limited amount of time, possibility for a weekend concert tour. The space includes practice rooms, recording control room, several different size studios, and isolation rooms for individual artists. Classrooms are also included in this portion of the program to facilitate a learning environment.

Work Space

This program features flexible workspace, similar to a co-working space. This gives people a space to work at a desk and computer, or in a lounge experience or in a group experience. It facilitates collaborative working. This space also includes public and private meeting spaces that can be rented out by working professionals in the music world.

This kit of parts for the program elements, dealing with learning, working and experiencing, needs to be refined and more defined. Collectively, these program elements transform into a Think Tank environment. This a place where people can come together to learn and grow from each other, building off of each other's skills and knowledge to develop as an individual but also as a person within society. However, with scale overlays of these basic precedent models on the different sites, the program can start to adapt and form to the sites as much as to the user needs.

Precedent

There are four types of performance venues that would be a viable option for these program needs and the limitations of the site. This section of the paper will describe the types of performance spaces, and why they might accommodate successful in meeting the needs of the program as well as the square footage restrictions due to site. Using a process of diagrammatic scale comparisons on the three site options in Philadelphia creates a test fit system that will allow addition and subtraction of program elements per site, along with the adjustment of program needs to find a successful combination of program.

Each site in Philadelphia has a unique location and different dimensions. Site A, 311 Broad Street, is 15,300 sqft. It would require three floors minimum to meet the allotted program needs. Site B, Schuylkill River Waterfront, is 22,814 square feet and would require two floors minimum to meet the allotted program needs. Site C, Delaware River Pier, is 52,000 square feet, which may accommodate the program needs within one floor.

Recital Halls

A recital hall design accommodates smaller ensembles and individual performers. In this situation, the amplitude, or loudness, of the performers has to be taken into consideration on both extremes for successful design¹. This means that the acoustics must be able to accommodate anywhere from one soloists to a larger symphonic program, usually dictating mid-frequency reverberations, leaving a balanced sound within the hall.

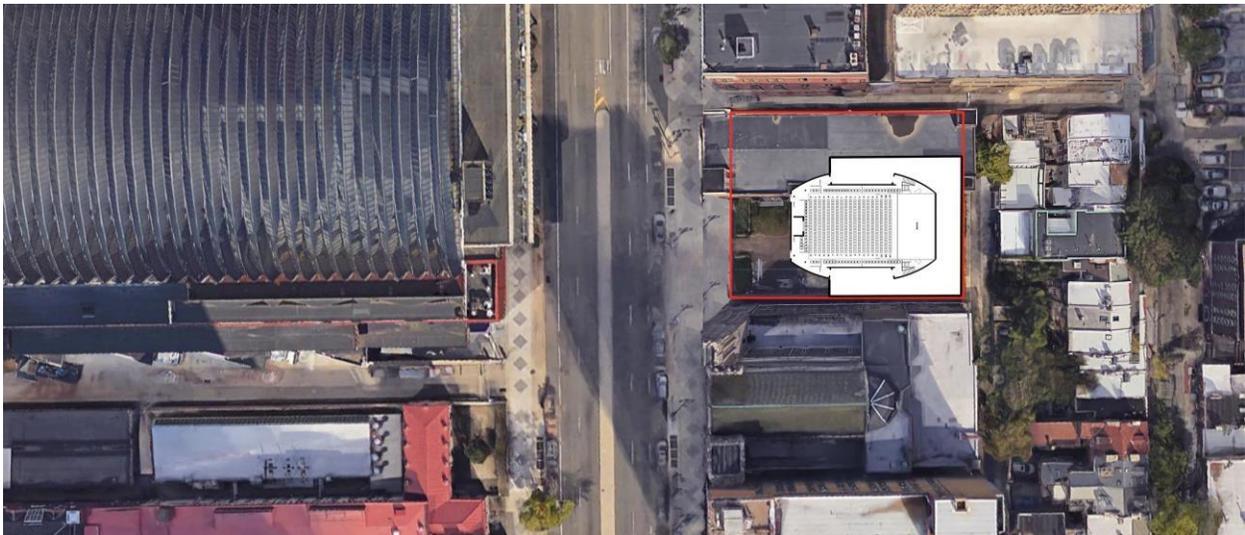
Zankel Hall, in the basement of Carnegie Hall, was designed as a traditional music hall, but was unsuccessful because of the lack of acoustical separation from the hall above it. After being used as an art cinema, it was renovated in 2000 transforming into a recital hall that houses

¹Jaffe, J. Christopher. 2010. *The Acoustics of Performance Halls: Spaces for Music from Carnegie Hall to the Hollywood Bowl*. New York: W.W. Norton & Co., 74.

many different types of programs. The shoebox style form, along with the adjustable arena style stage, a dense secondary acoustical ceiling, diffuser paneled walls to allow for slightly lower reverberation times, created a successful space to hold a variety of types of programs².

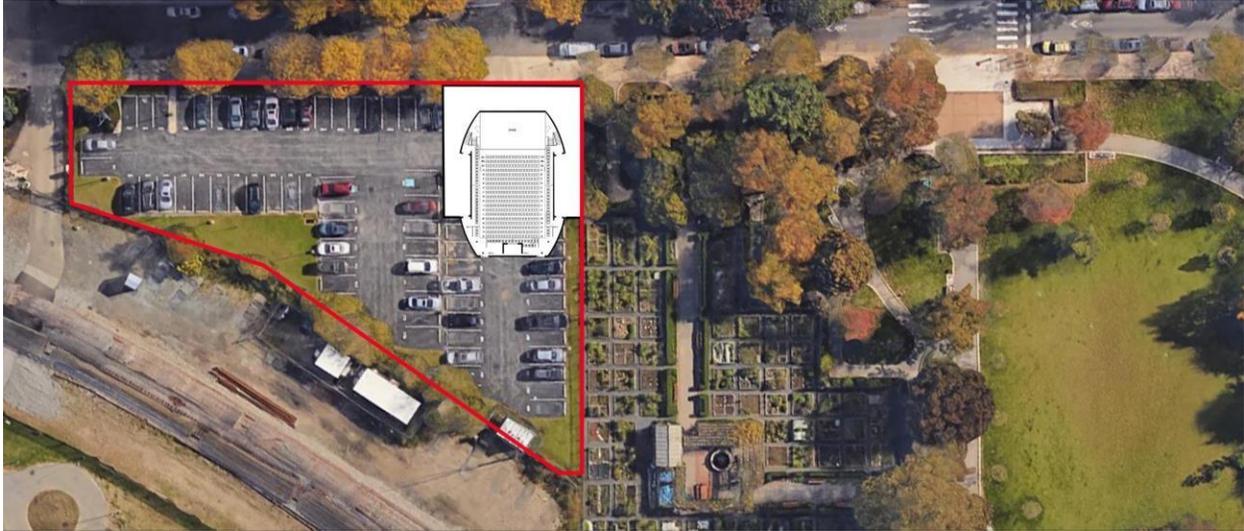
A chamber hall, like Zankel hall, could accommodate the needs of the different types of performers who will be drawn to this building. Choosing a performance venue that will not limit the type of performance or program that will happen there would be a strategic move to be inclusive to all types of music, allowing for innovative musical expression.

Using Zankel Hall as a scale overlay on the three different sites chosen illuminates where this size hall would work with the square footage of the site and where it might be overcrowding the footprint.



Site A | 311 Broad St, Philadelphia | Large program element for a smaller site

²Jaffe, *The Acoustics of Performance Halls : Spaces for Music from Carnegie Hall to the Hollywood Bowl*, 75.



Site B | Schuylkill River Waterfront | Hall fits well with size of the site



Site C | Delaware River Historic Pier | Large for the thin site, not giving much room around it

Auditorium | Multipurpose Hall

An auditorium is used for a variety of purposes, including music, lectures, and cinema. This means that the acoustics of the hall must be balanced and have a relatively mild resonance. This type of hall is not designed to be crisp or to project a performer's music, instead it seeks a middle ground on acoustics to try to accommodate many purposes.

Grace Rainey Rogers Auditorium in New York City, was renovated in 1954 and acts as a multipurpose space that accommodates activities such as music, lectures and cinema³. The form of this auditorium was derived from an existing shell structure, which dictated the “basic size and shape” of the space. The acoustics in this hall allow for a wide range of types of performances, from large ensembles to soloists, through a balance and compromise of acoustical form. The sound is reflected into the audience as well as back onto the stage. With this focus on acoustics, the size of the audience plays less of an important role in how the sound resonates. This hall has good reviews from performers and listeners, allowing soloists to have a full sound within the space, but getting excessively loud with louder passages within a larger symphonic piece. Korina wood, similar to thin plywood paneling, makes up the material throughout the space, supported by steel structure. As this material has aged, it has increased the quality of tone that exists within the space (the met). This material reduces the loudness of the lower frequencies and tends to give the sound a slightly thinner, less warm aspect.

Stats: Volume = 193,000 ft³, Square footage = 6900 ft², Seats = 708 seats⁴



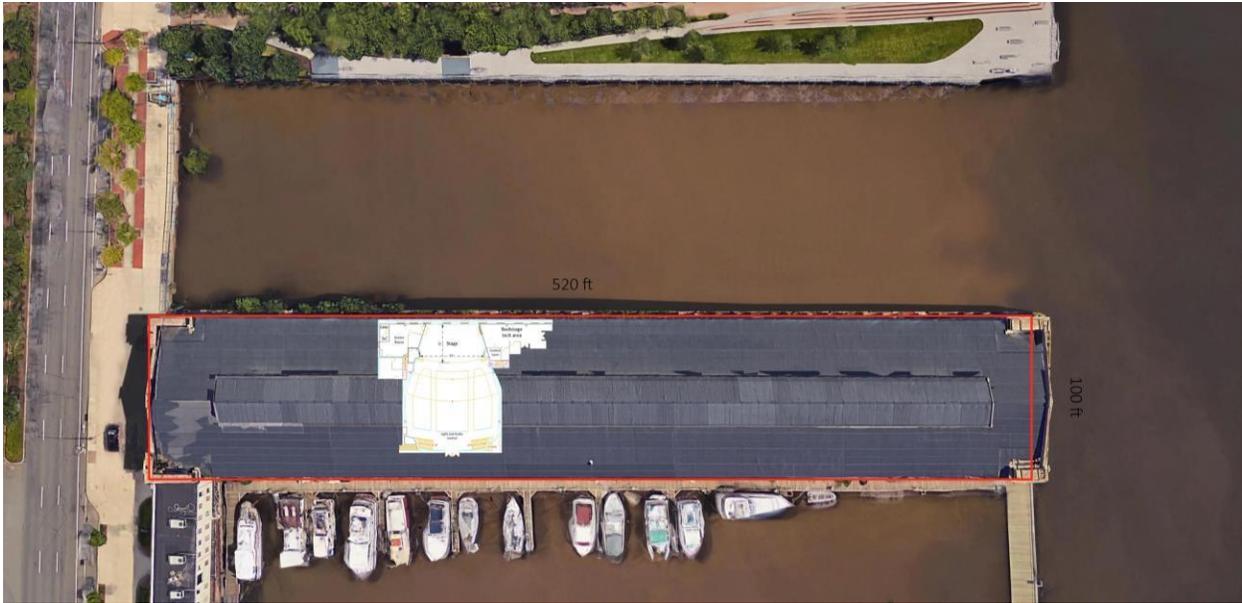
Site A | 311 Broad St | Dominant element within the small site

³ Beranek, Leo L. 1962. *Music, Acoustics & Architecture*. New York: Wiley, 153.

⁴ Beranek, *Music, Acoustics & Architecture*, 156.



Site B | Schuylkill River Waterfront | Gives a presence on the site



Site C | Delaware River Pier | Large element on a narrow passage

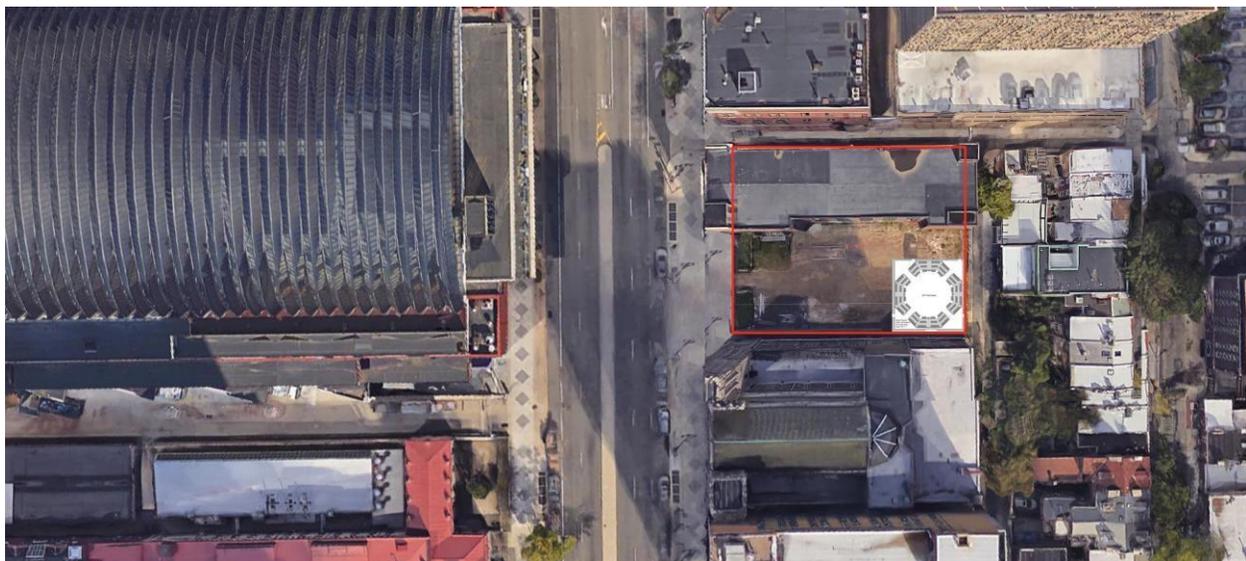
Black Box Theater

A black box theater has no permanent seating and can be easily rearranged for each program staged within the space. This allows for innovative flexibility of arrangement to create a different experience for the audience depending on the type of performance happening within

the space. This type of seating is a generally unadorned, basic black form allows for an intimate, private setting with the audience.

Clarice Smith Performing Arts Center houses Kogod Theater, a mid-size black box theater. It is a flexible space, able to be set up for performances, musicals, plays, dining, lectures, art displays or cinema. The management of this space provide a variety of set up variations to allow people to pick how they would like to set up the space if they rent it out. It can seat up to 181 and 144 seated dining⁵.

Kogod Theater is a good example of how a black box theater can create an intimate setting for different types of venues, which would be able to accommodate a variety of musicians or artists in a different way than some of the formal theaters. The acoustics are not as balanced and pure as a formal theater, and it would only be able to house smaller performance ensembles. But the intimate experience allows for a better engagement of the senses between the audience and performer.

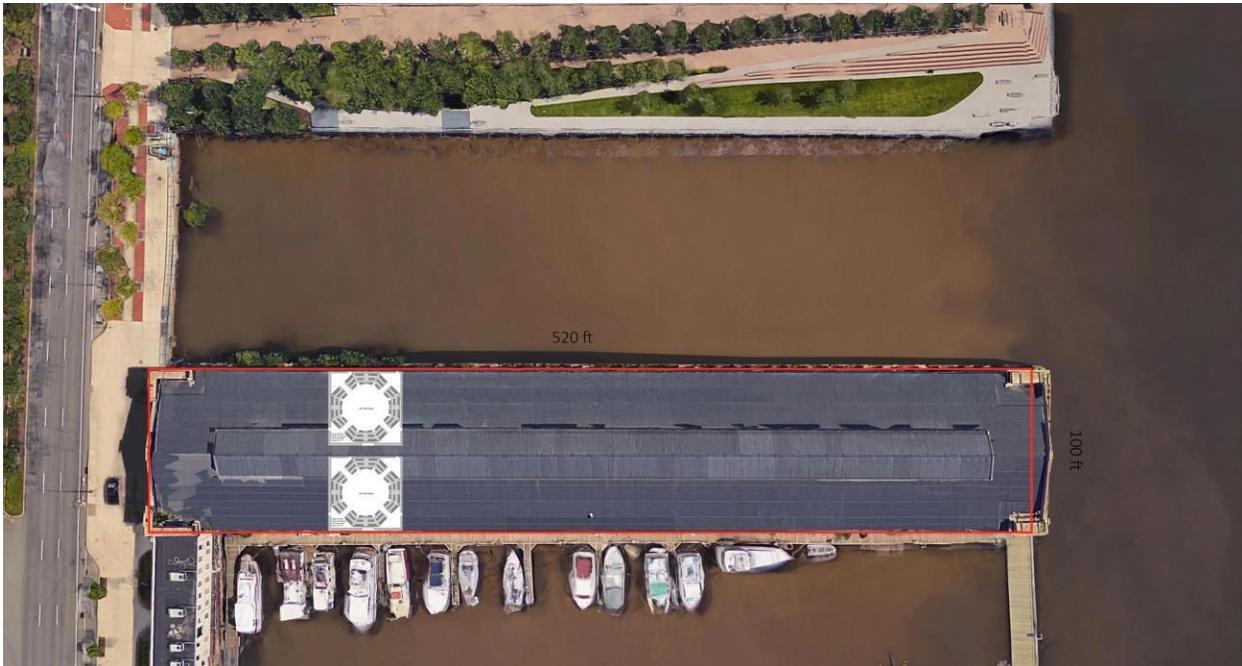


Site A | 311 Broad St, Philadelphia | Accommodates the spatial needs of the plan

⁵“Kogod Theatre: Seating.” The Clarice Smith Performing Arts Center. Accessed November 04, 2016. <https://theclarice.umd.edu/venues/kogod-theatre/seating>.



Site B | Schuylkill River Waterfront | Need two elements to let the space stand out within the site



Site C | Delaware River Pier | Smaller program element balances well in the narrow space

Market Precedent

As a part of the program, a market place will be included to create a place for musicians to buy and sell their music, as well as giving the community a place to buy and sell anything to do with music. This may include musical instruments, historic records, current albums, musical

accessories, handmade musical crafts and possibly unique brews of coffee or beer. This space will be big enough to become an anchor for pedestrian activity on the site.

Schrannenhalle | Munich, Germany | 2011 | OlivArchitekten

This market in Munich, Germany mixes different types of retail and experiences to create a unique experience. This allows customers to walk around to many different stalls, all with a different way of presenting their product. It seamlessly creates an intimate experience at the human scale, while also creating a larger, grander experience at the building scale. Simple geometries and natural, neutral materials are used to create a sense of honesty and continuity.⁶



Figure 14 | All above images of Market Hall (source: Archdaily.com)

⁶Archdaily.com/schrannenhallegerman

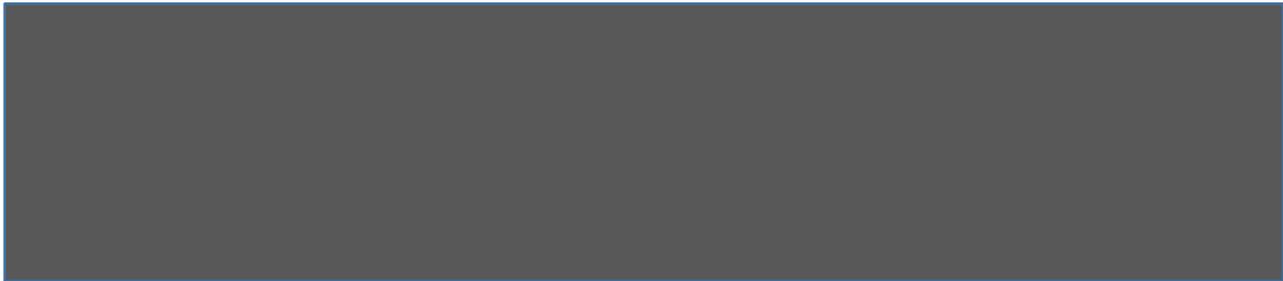


Figure 17| Isreal Plads Market Hall, Copenhagen.
Arkitek- turVaerkstedet

Figure 16| Temporary pop up Market Hall,
Stockholm. Tengbom

Figure 15| New Market in Celje, Slovenia

Co-working Case Studies

Harvard Business Review | Why People Thrive in Coworking Spaces

Through an interview with several hundred workers from dozens of coworking spaces around the US, the Harvard Business Review came up with “three predictors of thriving”: passion for their work, job control, a sense of community. Those who work in co working spaces find more meaning in their work; they have the ambition to be out doing what they want to do. They also make their own hours and schedules on a daily base, and they are accountable for their own work. Those who chose to work in co-working spaces also pay to be part of a community. They are there because of the community, which brings a unique experience with the eclectic group of people, as opposed to working from home. WeWork states that it “seeks to create a place you join as an individual, ‘me’, but where you become part of a greater ‘we’.” In a co-working space, people choose when they want to socialize and when they want to be alone according to the space, giving people the potential for interaction whenever they want. This prompts the question how different spaces inspire different types of work, thought, and experience. A new place can spark new ideas.⁷

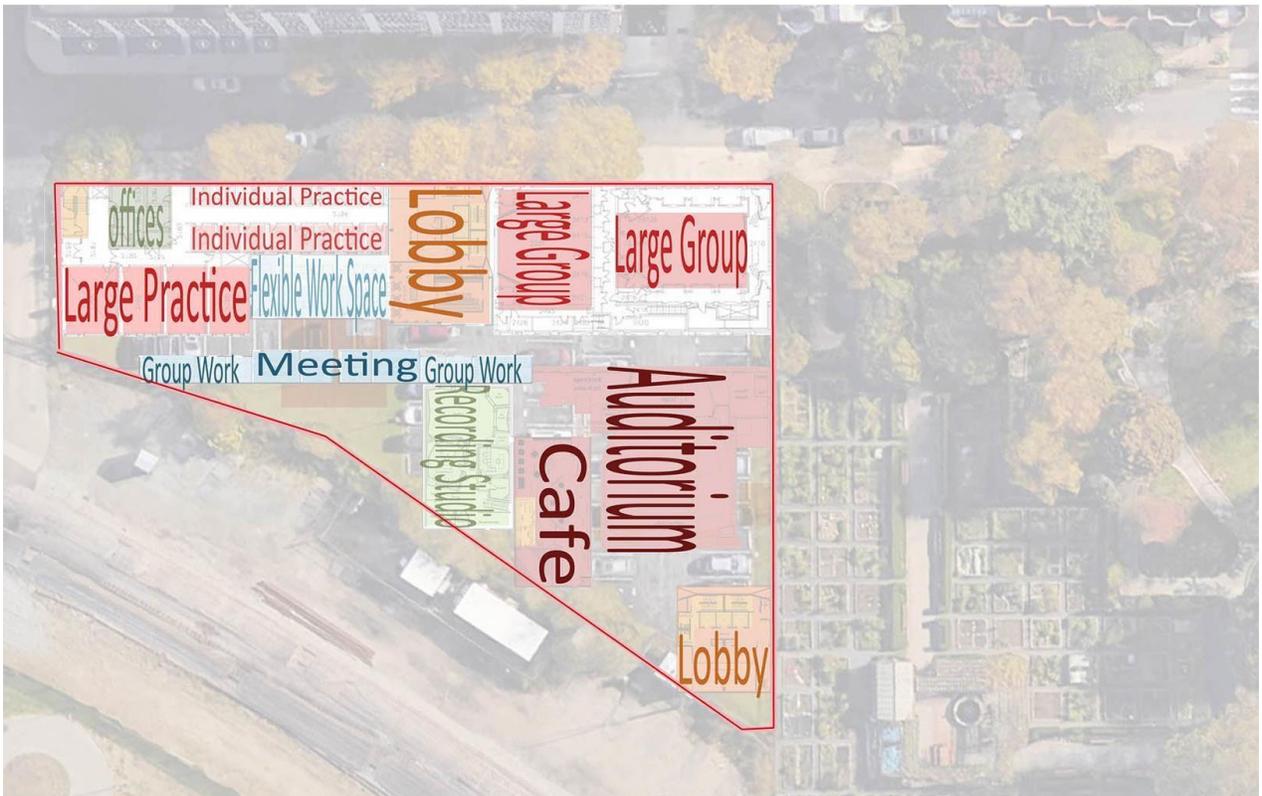
⁷ WeWork DC, Harvard Business Review, <https://hbr.org/2015/05/why-people-thrive-in-coworking-spaces>

Program Implementation | Scale Comparisons

This portion of the chapter explores taking the program elements discussed throughout the chapter and placing them on the site. The specific theaters discussed as precedence were placed on their best-suited sites, and then generic rooms for the music practice rooms, the workspaces, the recording studio, the café and the lobby were placed onto the site. This will help develop and refine the program, analyzing whether the prescribed program can fit onto the given site. If the program elements do not fit comfortably on the site, either the program needs to change or the site needs to change. This will be part of the design process moving forward.



Site A | 311 Broad St | Scale Comparisons | Kogod Theater Precedent | 15,300 sqft



Site B | Schuylkill River Waterfront | Scale Comparisons | Grace Rainey Auditorium| 22,500sqft



Site C | Delaware River Pier | Scale Comparisons | Zankel Hall Precedent | 52,000

Chapter 3 | Site

Philadelphia contains rich layers of history, time and place. After diagramming these elements at the city scale, certain layers and content started to inform where the best sites might be located from referencing the given site selection criteria.



Figure 22 | Balance Diagram, Google Earth (Source: Erin Barkman)



Figure 20 | Large Green Space, Google Earth (Source: Erin Barkman)



Figure 19 | Historic Districts, Google Earth (Source: Erin Barkman)



Figure 18 | Important Spaces, Google Earth (Source: Erin Barkman)



Figure 21 | Historic Important Spaces, Google Earth (Source: Erin Barkman)



Figure 23 | Corridors & Traffic, Google Earth (Source: Erin Barkman)

Criteria assisted in the site selection process, bringing forward the most important elements to create a thriving environment for the building. Ability for a public space, flows of humans and machines around the site, soundscapes, and zoning created the criteria for the site. As the program relies on a healthy community willing learn, collaborate and experience music and architecture, an optimal site is a place with students, consumers, artists. Locating schools, other performance venues and cultural hubs were an important starting point to narrowing down certain areas within the city.



Figure 24: Figure Ground | Philadelphia (Source: GIS Maps, Erin Barkman)

Site Selection Criteria	Site 1 Pier No. 9, Delaware River		Site 2 Broad Street, Infill Adjacent to Kimmel		Site 3 Broad Street, Corner Site		Site 4 Schuylkill River Site		Site 5 Rittenhouse Square	
	Metrics	Rank	Metrics	Rank	Metrics	Rank	Metrics	Rank	Metrics	Rank
Proximity to Public Space	1,000	1	100	4	760	2	50	5	100	4
Flows										
Public Transportation Access	1900	1	660	2	10	5	2180	1	3000	1
Public Flow around Site		1		5		4		5		5
Natural Flow	water, wind, sun	5	wind flow	2	wind flow	2	water, wind, sun	5		2
Zoning FAR	500%	4	1500%	1	500%	5	500%	2	500%	2
Senses		4		3		3		5		4
History	Existing Historic Building	5		1	Existing Building	5	Industrial Wharf History	4		2
Site Square Footage	53,000	2	18,000	4	8,976	3	44,473	2	15,312	
Total		23		22		29		29		20

Figure 25: Table of Criteria, along with ranking of the sites (source: Erin Barkman)

Site Options⁸

Site 1 | Pier No. 9

121 N Christopher Colomubus Blvd | Delaware Waterfront



Info
 Total SQFT: 53,000ft
 # of Floors: 1 floor
 Zoning: CMX-3, 500%
 Public Trans Dist: 280ft
 Public Space Dist: 1,000ft
 Existing Building: Yes

Site 2 | Infill at Broad

313 S Broad Street | Avenue of the Arts



Info
 Total SQFT: 18,000ft
 # of Floors: 3 floors
 Zoning: CMX-5, 1200-1600%
 Public Trans Dist: 660ft
 Public Space Dist: 100ft
 Existing Building: No

Site 3 | Broad Corner

503 S Broad St & Lombard St | Avenue of the Arts



Info
 Total SQFT: 8,976ft
 # of Floors: 5-6 floors
 Zoning: CMX-4, 500%, 65' Max
 Public Trans Dist: 10ft
 Public Space Dist: 760ft
 Existing Building: Yes

Site 4 | Schuylkill

2518 Locust St | Schuylkill River Waterfront



Info
 Total SQFT: 44,473ft
 # of Floors: 1-2 Floors
 Zoning: RMX-3, 500% FAR
 Public Trans Dist: 660ft
 Public Space Dist: 50ft
 Existing Building: No

Site 5 | Rittenhouse Sq

503 S Broad St & Lombard St | Avenue of the Arts



Info
 Total SQFT: 15,312ft
 # of Floors: 3 Floors
 Zoning: CMX-4, 500%, 65' Max
 Public Trans Dist: 3000ft
 Public Space Dist: 100ft
 Existing Building: No

Figure 26: Site Options, (source: Google Maps, ArcGIS, Erin Barkman)

⁸“Quick Reference Guide,” *City of Philadelphia Zoning Code*, March 2014,

Five sites were selected and ranked based off these criteria. These sites were located on the Delaware River, on the Avenue of Arts, Rittenhouse Square and on the Schuylkill River. And from these sites, three of them were chosen to be more deeply analyzed.



Figure 28| Three Sites (source: Erin Barkman)

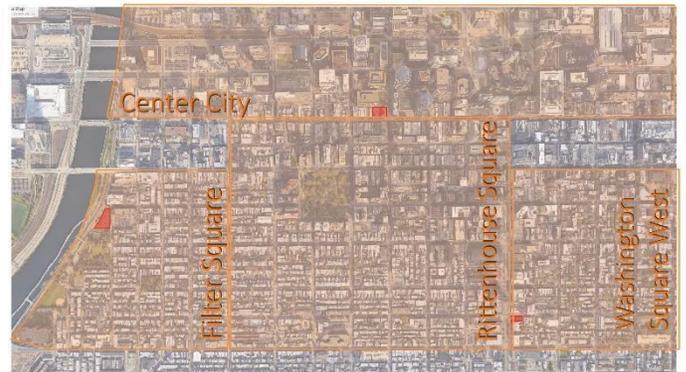


Figure 27| Neighborhoods of Three Sites (source: Erin Barkman)



Figure 29| Surrounding Green Spaces (source: Erin Barkman)

The different neighborhoods were analyzed around each site, as well as their proximity to green space, and their proximity in walking distance important buildings within the city.



Figure 30| Walking Distances (source: Erin Barkman)

Site Option 1 | Schuylkill River Waterfront Site



Figure 31 | Site Photo Collage (source: Erin Barkman)

The areas selected were the Schuylkill Waterfront because its rich layers of industrial history, its proximity to University of Pennsylvania and the high volume of traffic around the water. The waterfront on the Schuylkill River was historically filled with wharves to support the thriving industry lining the bank. The first wharf was built in 1810, and later became a hub for coal distribution and export. By 1838, the business grew exponentially to import and export Anthracite to homes. With the invention of the railroad, ships were slowly dissolved and by 1896, they were essentially all gone. Today, the east side of the bank has remnants of its industrial past, but is primarily filled with office and residential use.⁹



This series of diagrams describes the site on the Schuylkill River. These diagrams will discuss how this site meets the criteria stated to evaluate and rank each site. These criteria include proximity to green space, flows and access, soundscape, history and time, and existing program on and around the site. From here, I diagrammed in plan and aerial these aspects of the site to try to uncover all the layers on the site. When visiting the site, I could immediately tell that the surrounding green space and park

⁹ Wall Plaque, Schuylkill Banks, Philadelphia Parks & Recreation, Philadelphia PA

systems were extremely active and highly used at all times of the year and all times of day. The riverfront walk on the West side of the site has become an amenity for Philadelphia, as a first step in the development along the East banks of the Schuylkill River. The linear park space around the riverwalk also holds events like pop up biergarten festivals, movie nights, and firework displays on the 4th of July. The community park to the south of the site consists of a

Figure 32| Filter Neighborhood (source: Erin Barkman)



community garden, a dog park, a large green space for recreation and events, a community building and a playground.

Figure 33| Rittenhouse Historic District (source: Erin Barkman)



Figure 34| Greenspace, Public zones (source: Erin Barkman)

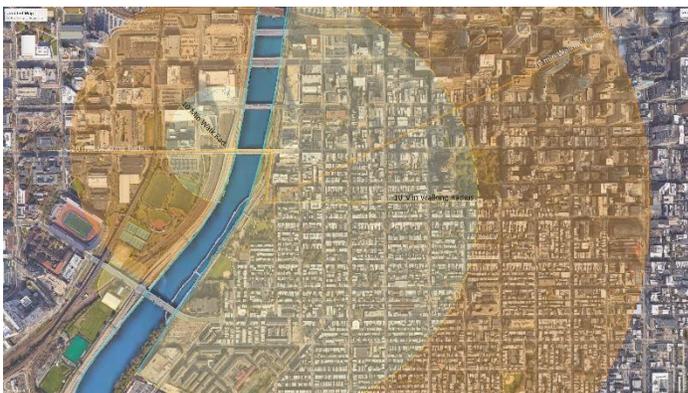


Figure 35| Walking Distances from site (source: Erin Barkman)





Figure 37: Schuylkill River | Activities along the Banks (source: Erin Barkman)

These images depict the activities that happen along the waterfront, including a large kayaking community and the Schuylkill River Waterfront Park containing dog parks and playgrounds.

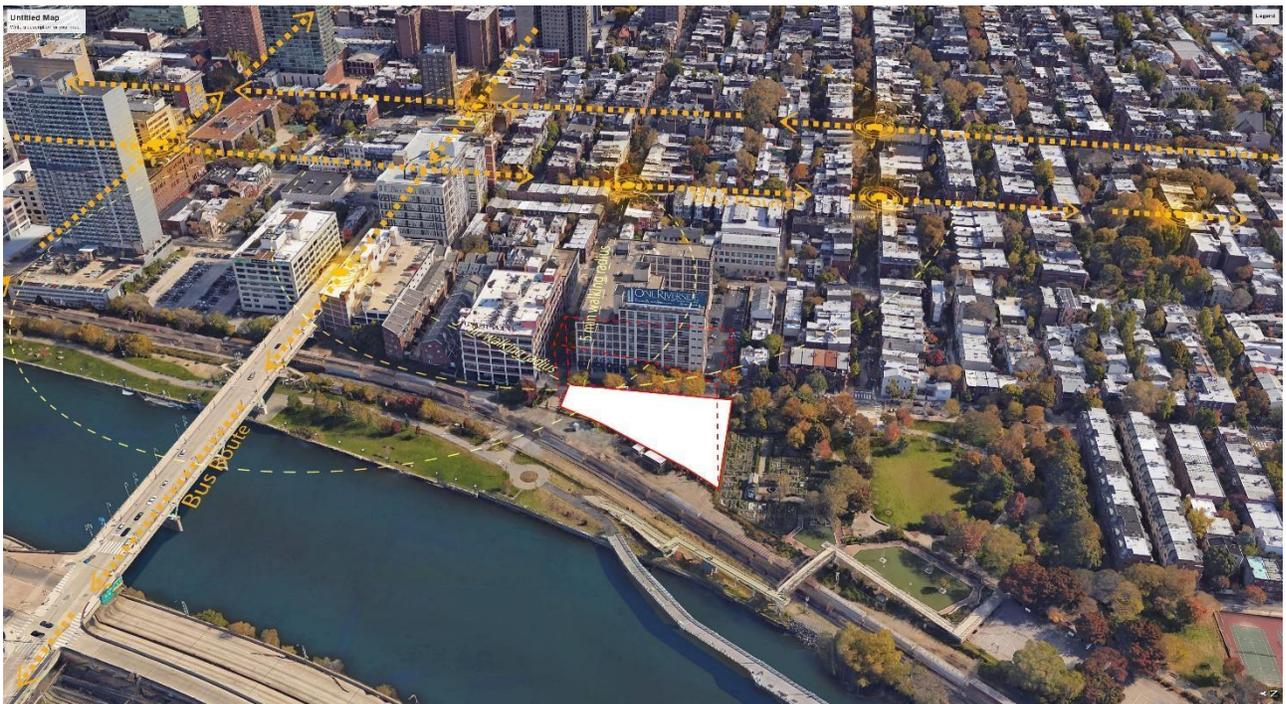


Figure 36: Schuylkill River | Bus Stops & Walking Distances (source: Erin Barkman)

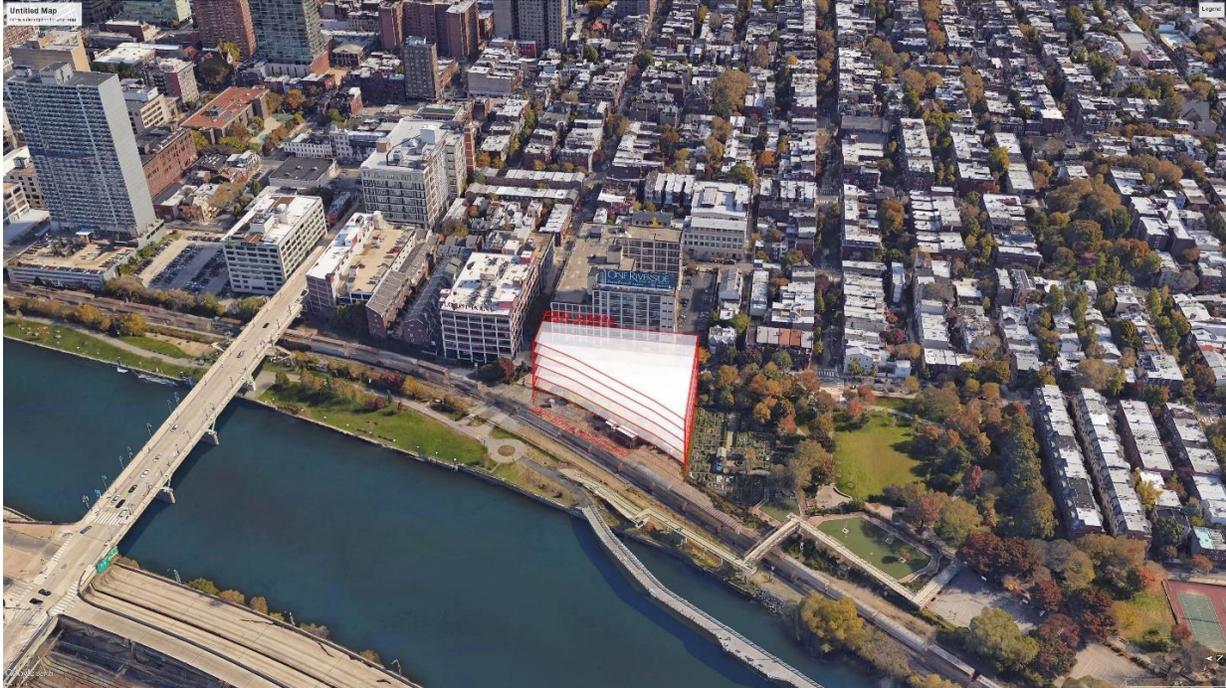


Figure 38: Schuylkill River | FAR

The FAR of this site is 500%, allowing 5 stories at full capacity of the site. The zoning is a residential zoning, which would need to be pushed for commercial rezoning.



Figure 39: Schuylkill River | Zoning



Figure 40: Schuylkill River Soundscape

the bridge, the flow of water, the CSX train that runs right next to the western boundary of the site and the heavy flow of people along the pedestrian path. All of these flows bring life to the soundscape around the site. When visiting, there was constant barking of dogs and people laughing. There were subtle sounds of people jogging, biking and running, as well as the slight murmur of talking. Wind and sun also play a roll on this site. With no infrastructure to the south of the site, there is full sun on the site for most of the day and there is opportunity to capture the winds off of the river. Capturing the light and sounds from this site are a positive opportunity, but the existing context of primarily residential and office oriented buildings surrounding the site is not ideal because there is nothing to compliment the commercial and cultural program that might be created within this site. More research would have to be done about rezoning this site and analyzing whether this would be a successful site for an arts building through interviews and market analysis.

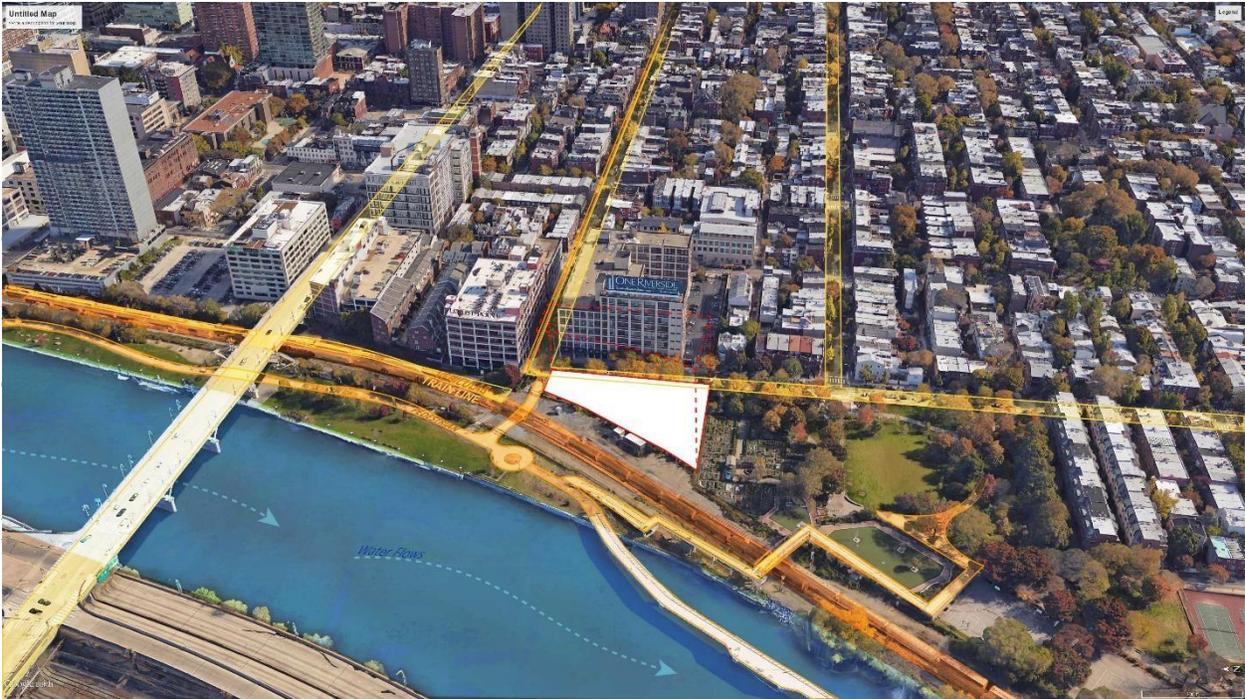
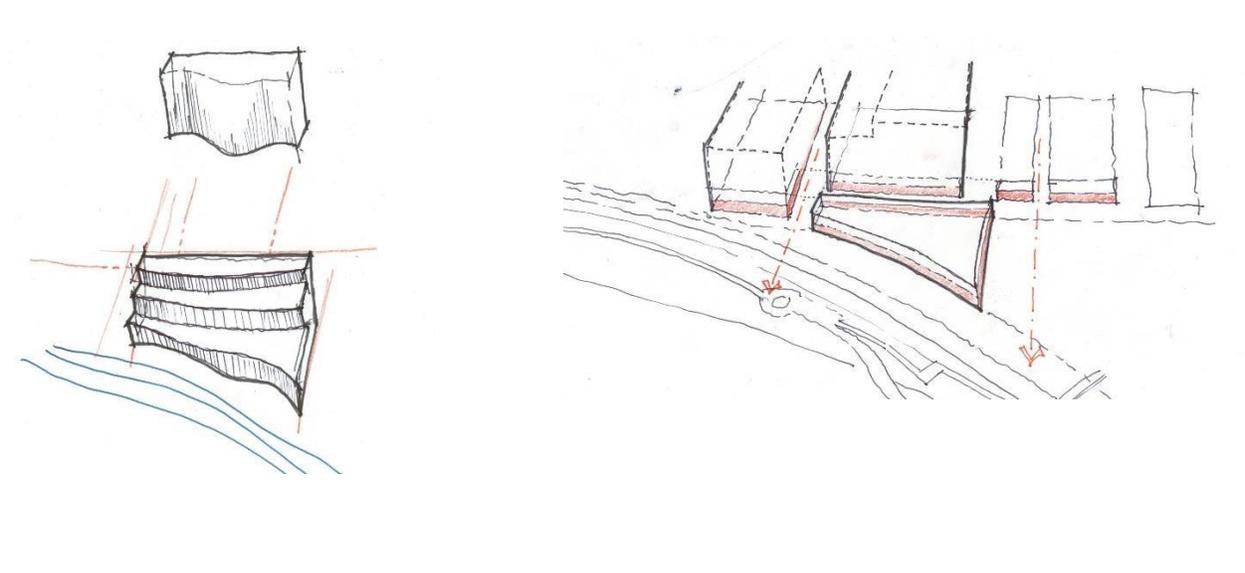


Figure 41: Schuylkill River | Flows & Access

The massing studies indicate that there are not many restraints on the site besides the zoning and FAR. This can end up being a fault of the site, leaving the options too open for the project. Although this site has a lot of potential with the activity and community surround it, it leaves the scope of the project very wide open when it comes to the form and mass of the building.



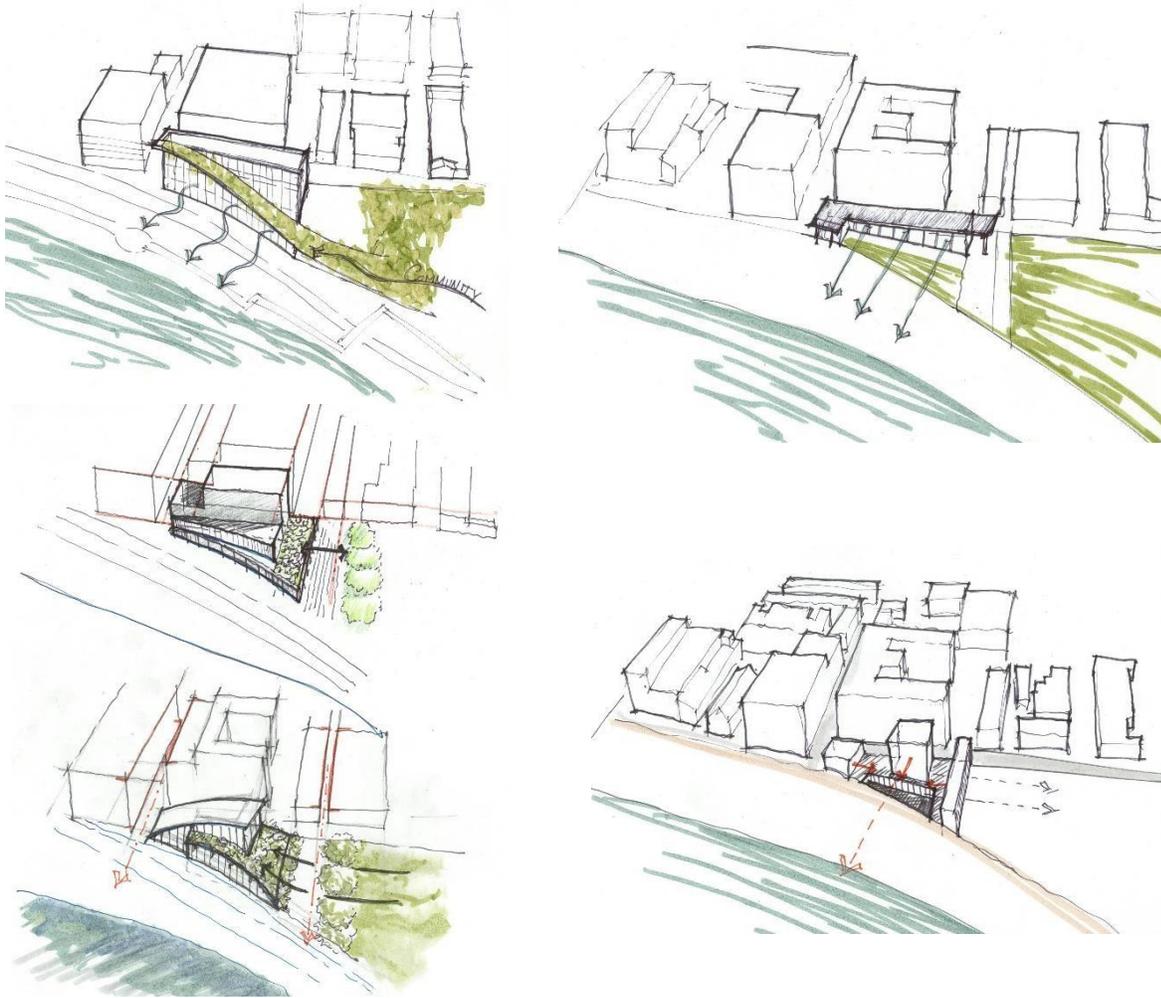


Figure 43 | Schuylkill River, Massing Studies (source: Erin Barkman)

Site Option 2 | Broad Street Corner Site

Broad Street was historically part of the first city plan of Philadelphia in 1681, the original cross axis organizing the city. The city hall interrupts the North South street in the middle of the city. Over the past 100 years, theatres, arts oriented programmed buildings, and cultural buildings were built up along this street, which is now known as the Avenue of Arts.¹⁰ It is home to several historic theaters including Merriam Theater, the Wilma Theatre, the Academy of Music and the Kimmel Center.

¹⁰“South Broad Street: Philadelphia, Pennsylvania”, *American Planning Association*, 2016.



Figure 44 | Broad Street Site, Bus & Subway Stops (source : Erin Barkman)

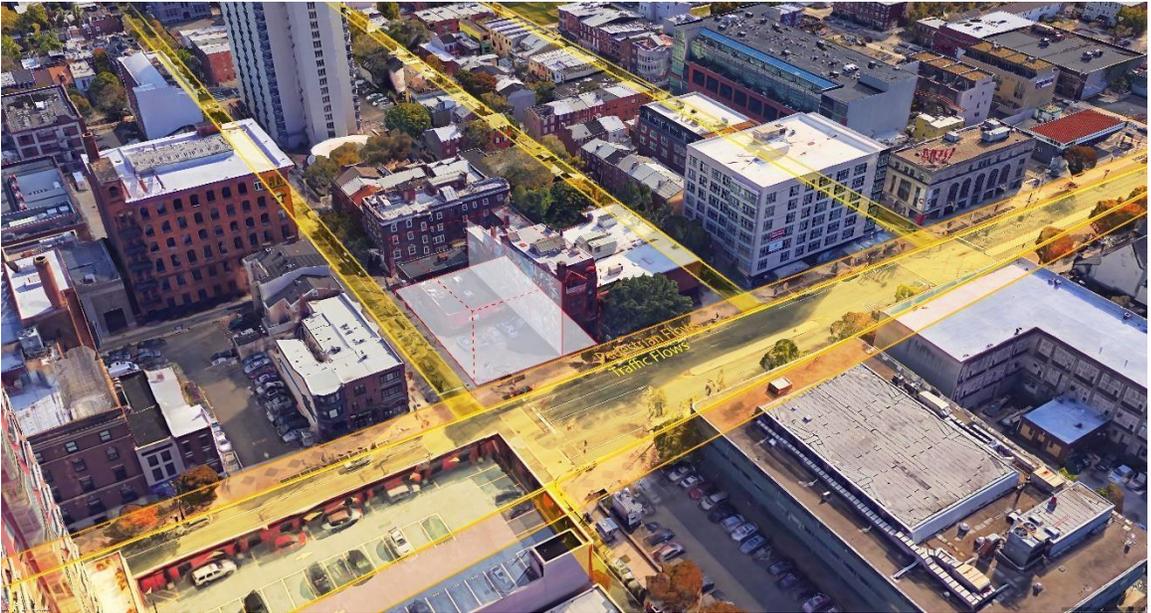


Figure 45 | Broad Street, Flows & Access (source: Erin Barkman)

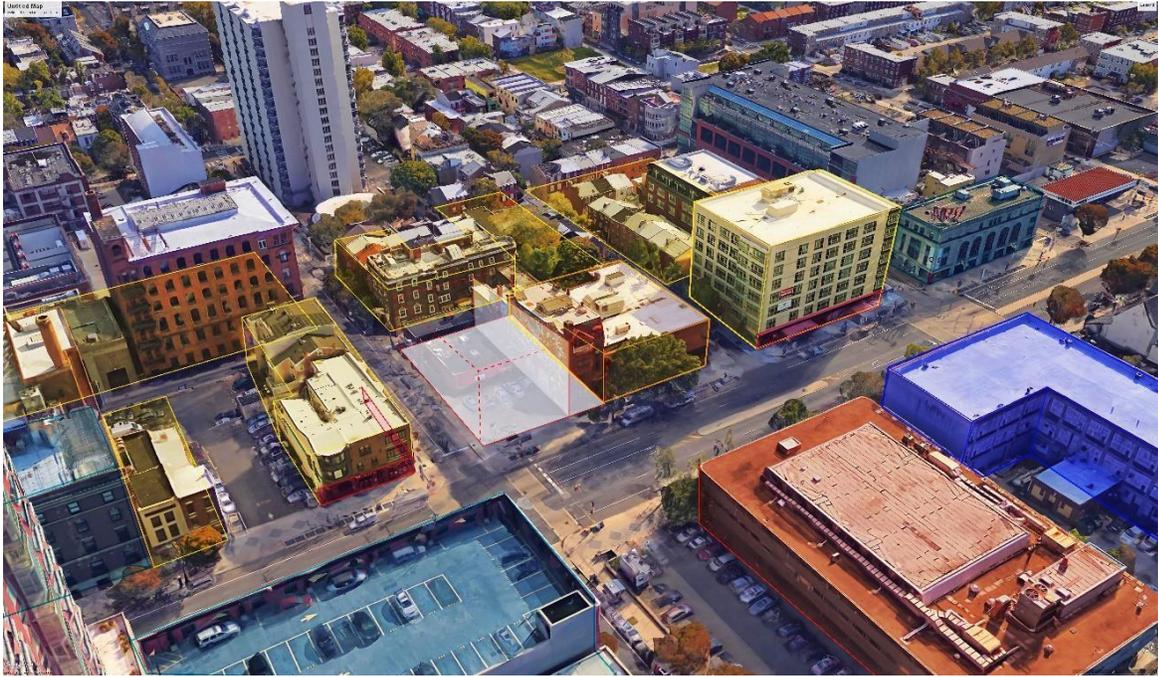


Figure 46| Broad Street, Zoning (source: Erin Barkman)



Figure 47 | Broad Street, Sounds (source: Erin Barkman)

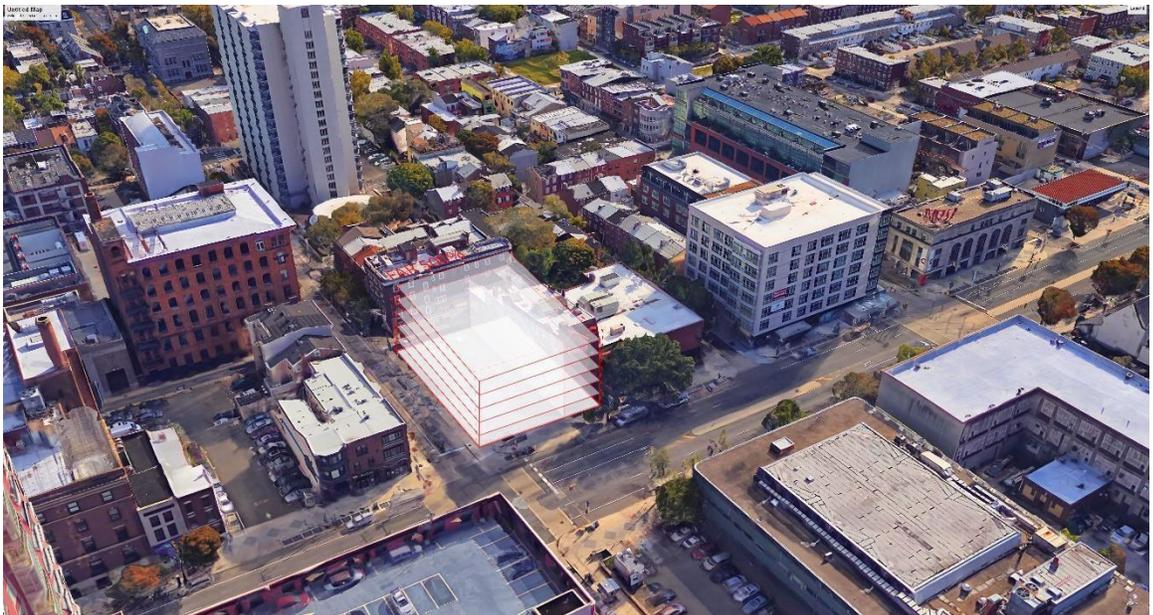


Figure 48 | Broad Street, FAR, (source: Erin Barkman)

After visiting the site, one can observe how active the surrounding area is. There is a subway station for the Broad Street North South line right in front of the site. There may be

opportunities to connect with that subway line from a lower elevation directly into the building. There are medium flows of people around the site, depending on the time of day. It is two blocks away from the University of the Arts, a university specializing in performing arts and visual arts. This brings a high density of students to the area, which could bring in people to fill the user groups of the building: learners, listeners and collaborators. There is also an opportunity to capture the sounds of the city within the dense fabric, like traffic, horns, sirens, diesel trucks and people talking. The surrounding area has a diverse array of user types, anything from an office building across the street, to a small business owner adjacent to the lot, to a senior living center to a hotel and theatre across the corner. This produces a wide variety of people living, working and playing near the site, making it an optimal location for people to work at this building, but also come to this building for entertainment. The FAR of this site is 500% with a maximum height of 65 feet.¹¹ This allows up to five stores of programmable space. But, with the square footage of the open lot only being 9,000 square feet, even at full FAR capacity, there will only be 45,000 square feet of space, which does not leave a lot for flex circulation space. This is a negative of the site, but also allows for a certain amount of constraints to be placed on the project and the site. Lastly, after observing the site, there seem to be more dilapidated and outdated buildings closer to the site, traveling south of city hall on Broad Street. This may not be ideal when it comes to views from the site.

Site Option 3 | Chestnut Street, Center City

Located at the intersection of 17th Street and Chestnut, this corner site was the third main option because of its location within the dense center city, allowing dense flows of pedestrian and vehicular

¹¹“Quick Reference Guide,” *City of Philadelphia Zoning Code*, March 2014

traffic, and its proximity to green space. The corner site currently has two one story, older buildings on it, but sits along a block of several smaller scale buildings. The buildings have a varied, engaging street edge, filled with restaurants, shops, and popular retail stores. To the south of the site is a street edge with the similar language to the adjacent street edge of the site, taller buildings at the corners and smaller three story infill buildings. There are popular retail stores, along with infill shops, stores and restaurants that engage the pedestrian, including café tables that spill out onto the sidewalk and street trees to act as a barrier between pedestrian and vehicle. East of the site is the One Liberty Plaza, a popular indoor shopping center with a contemporary glass façade, paired with a hotel directly across the street, and two sky scrapers in the corner of the site that sit prominently on the Philadelphia skyline. Chestnut Street in general, East and West of the site, holds an engaging street edge made up of older brick and stone buildings, as well as glassy contemporary buildings. To the north of the site is a small park, owned by the office building adjacent to it. The site is approximately 20,000 square feet, with a small pocket park in between the two dilapidated one-story buildings.



Figure 50| Southeast Corner View (Source: Barkman)



Figure 51| North View from Park (Source: Barkman)



Figure 49| Character of Chestnut Street (source: Barkman)

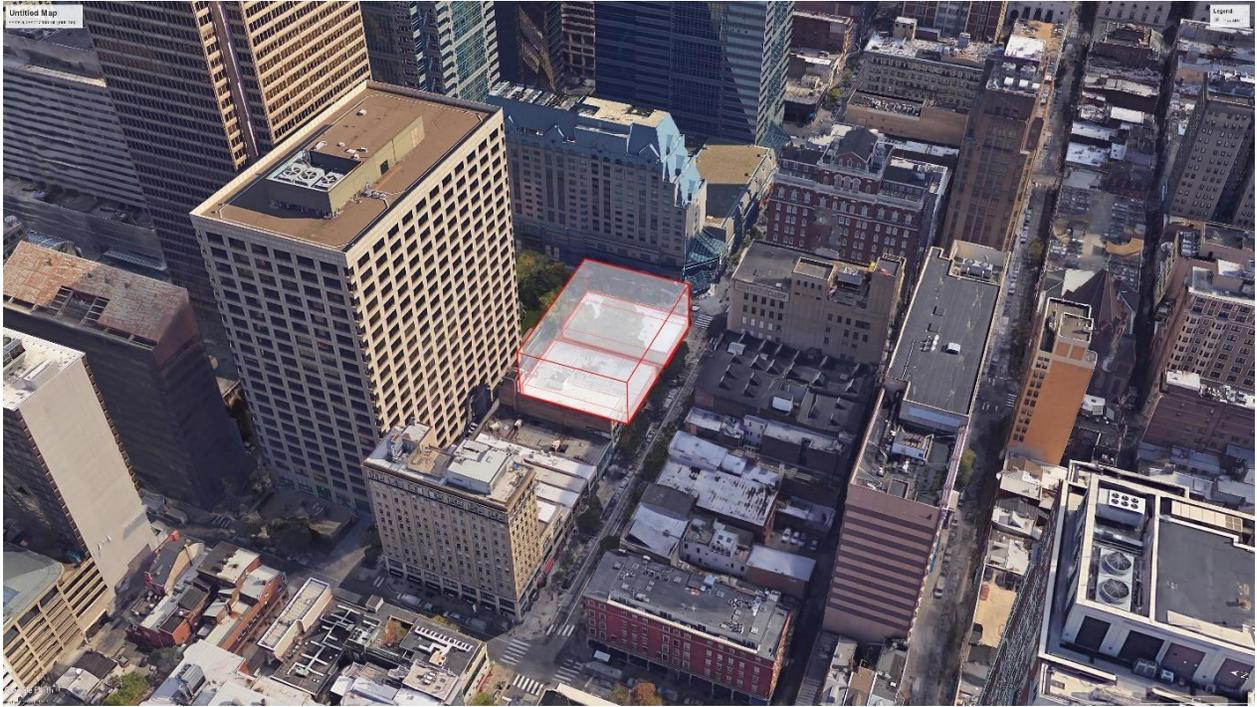


Figure 52| Chestnut Street: Existing Site & New proposed Site (source: Erin Barkman)

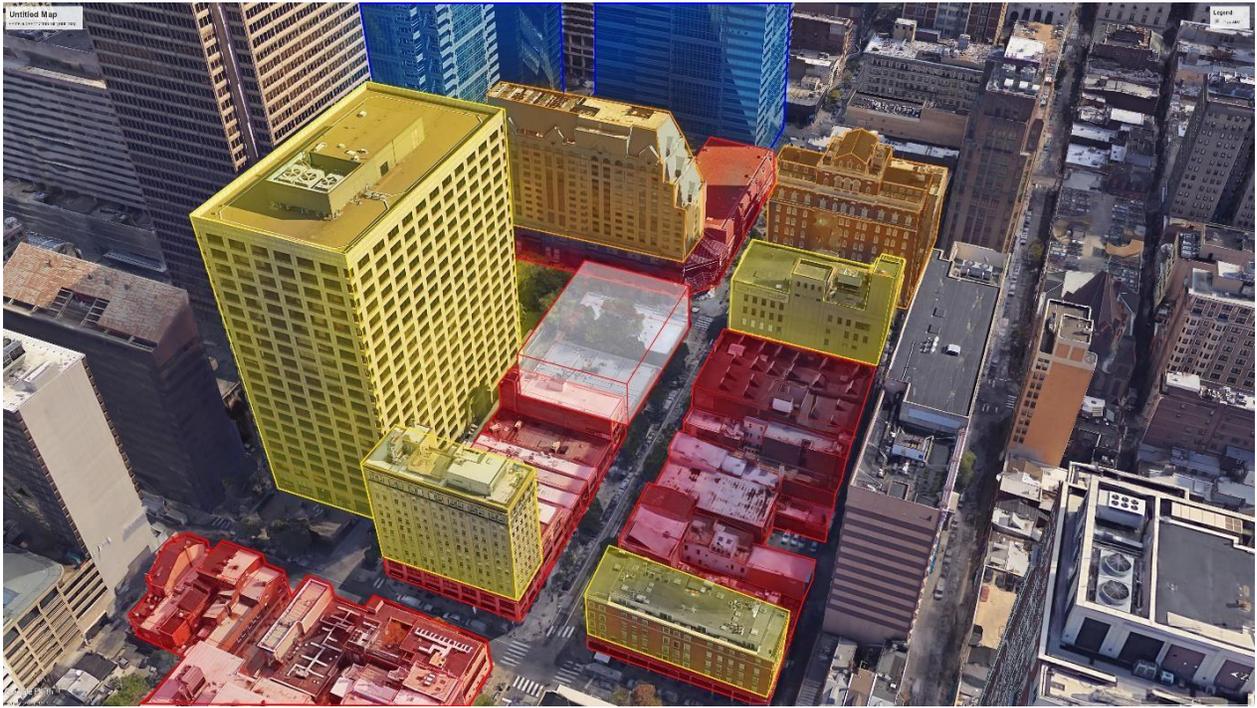


Figure 53| Chestnut Street: Surrounding Building Use (source: Erin Barkman)

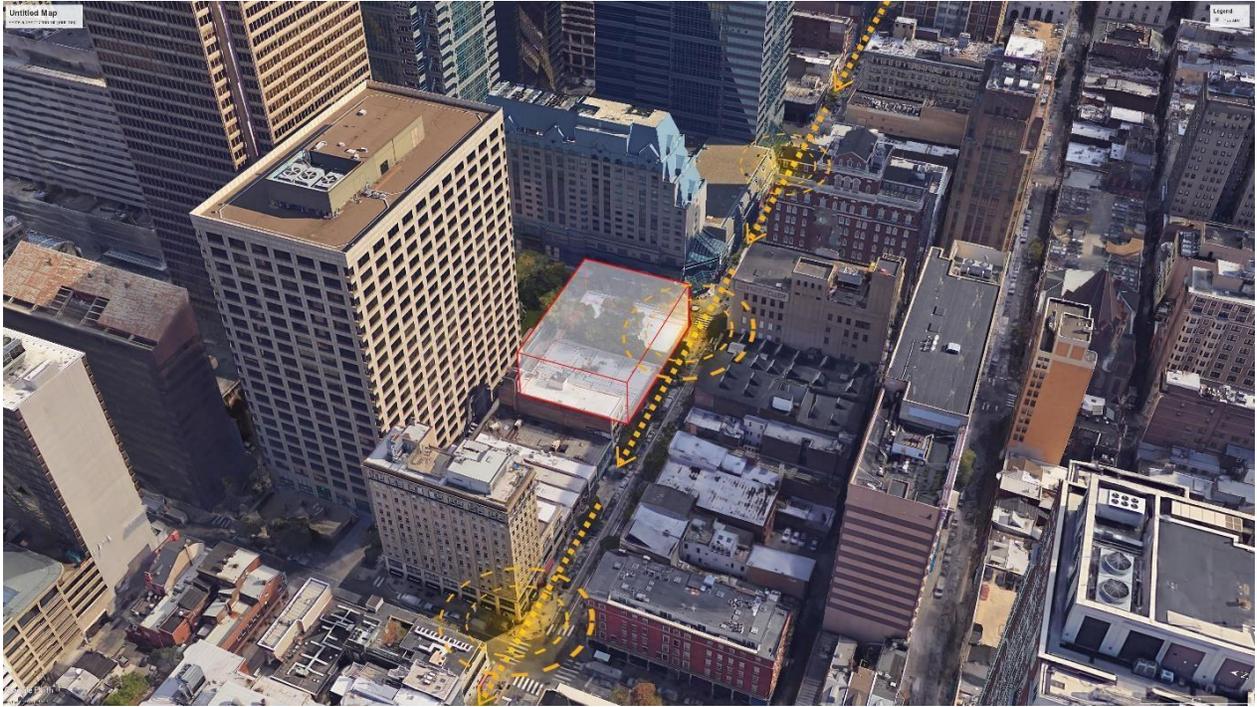


Figure 54 | Chestnut Street: Bus Stops

Chapter 4 | Precedent Study

Parc Andre Citroen | Paris, France | 1992 | Alain Provost
Exterior Spatial Sequence



Constructed in 1992, this park sits on the Seine River on the site of a former automobile manufacturing plant. This park acts as one of Paris's largest urban renewal project, reclaiming the historic site. The park is an orchestrated landscape, guided by an asymmetrical balance along the main axis. There are small pavilions and landscape elements that create a rhythmic pattern around the main space. Behind the main green space, there is a layering of vegetation and open spaces proceeding backward. This park also acts as a transitional space between the urban fabric and the rural landscape, situated where the residential and urban fabric meet. With this in mind, emulated in the garden to mimic rural and urban are a juxtaposition between open and intimate spaces. A series of gardens helps to create the rhythmic feeling inside the garden, while each

individual garden takes on a separate identity using experimental plants, water and materials. These gardens are connected with an above ground walkway that all links the gardens together in a linear sequence.¹²



Figure 55| Pavilion



Figure 56| Aerial



Figure 57| Sequence



Figure 58| Parc Citroën Diagram, Rhythm (source: Erin Barkman)

¹²“Paris Opens Park On Citroën Site”, Travel Advisory, The New York Times. 1993.

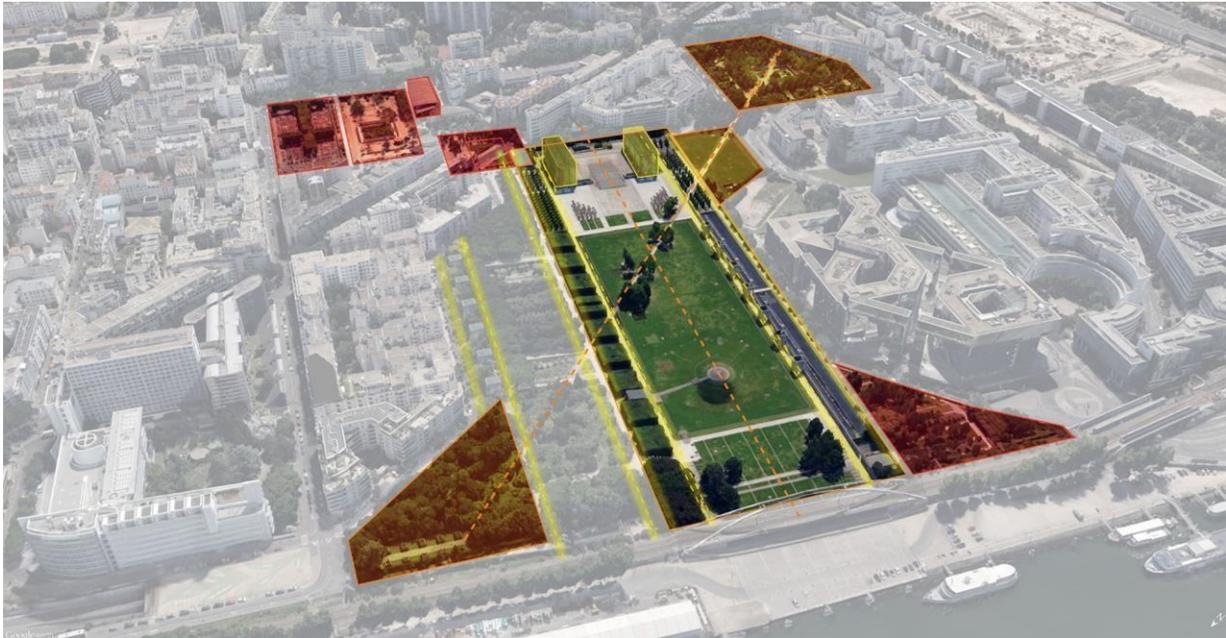


Figure 59 | Parc Citroën Diagram | Balance (source: Erin Barkman)

Church of the Light | Osaka, Japan | 1999 | Tadao Ando

Interior Spatial Sequence



Tadao Ando explores using light as a material to act as the intersection between nature and architecture in the Church of the Light in Osaka, Japan in 1989.

Tadao Ando explores the juxtaposition between light and dark, solid and void, stark and serene. It extracts all ornamentation, leaving it as a pure concrete form letting in light strategically. The pure forms and light give it the space a sacred nature, “raising the awareness of the spiritual and secular within themselves”. The use of concrete makes the space darker, allowing the contrast of the light to create a dramatic impact. with architectural purity, while also creating a “meditative place of worship”. Tadao Ando expresses that this is a place for the individual, to discover them- selves and therefore discovering their place in the world.¹³



Figure 60| Church of Light (source: Wikimedia, Public Domain)

¹³ Kroll, Andrew. “Church of the Light” *ArchDaily*. January 6, 2011.

The Church of the Light uses light as a material, creating strong contrasts between light and dark, creating a sense of intimate seclusion within the space. The two geometric forms within the plan interlock to create a dramatic intersection, letting circulation happen through the punctures. The circulation comes past the front, experiencing the moment of the cross, the only Christian motif within the church, from the outside, moving along a large concrete form, and bringing them into the main space, experiencing the cross from the other side.

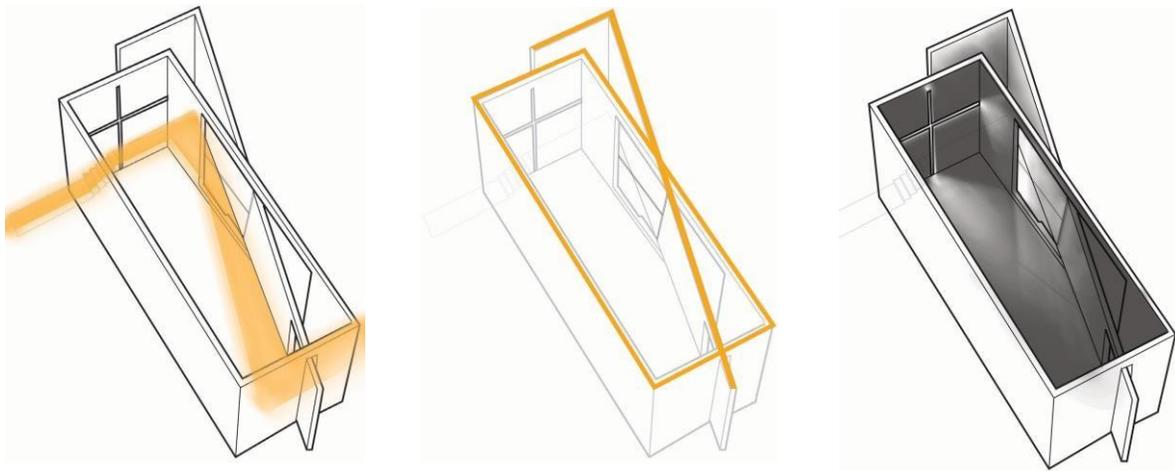
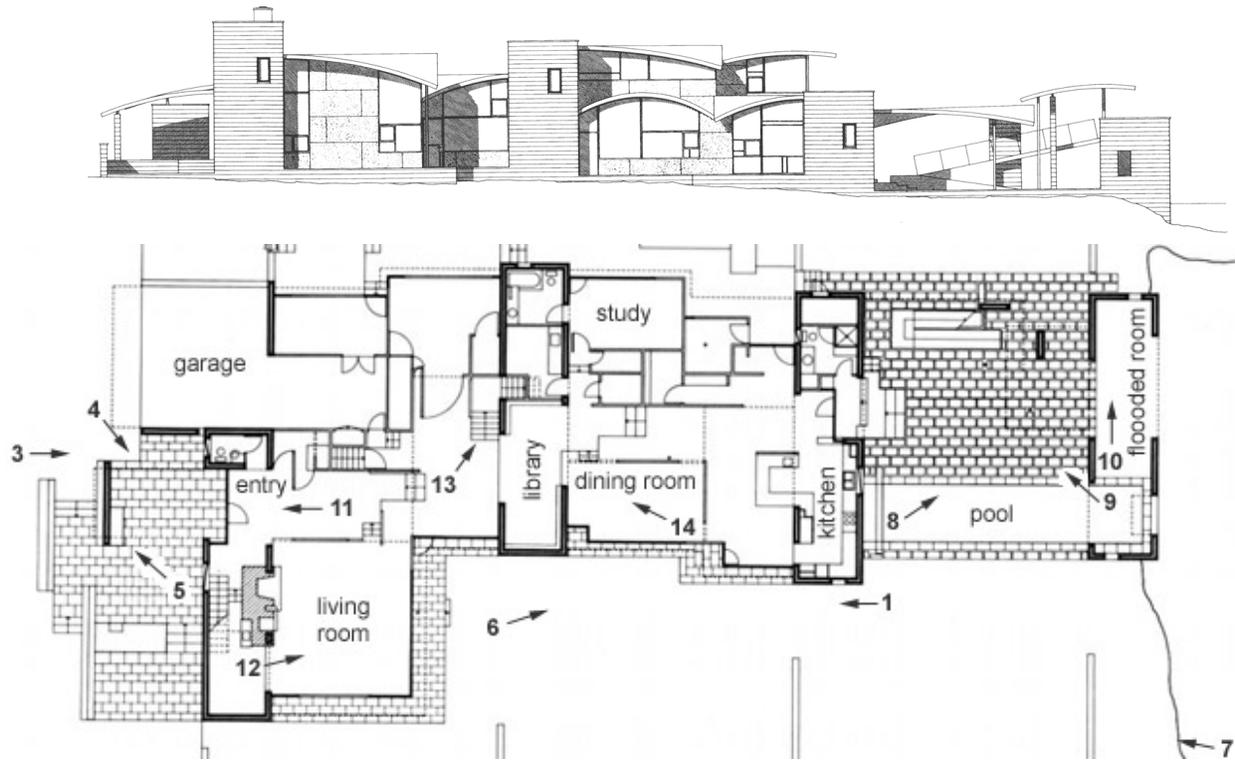


Figure 61 | Church of the Light Diagrams (source: Erin Barkman)

Stretto House | Steven Holl | 2001 | Dallas, Texas

Space based on Music



Stretto House, located in Dallas Texas, is situated in a natural landscape with a river flowing and make noises beyond. Steven Holl was commissioned to design this home, and based the design off the “Stretto”. Stretto, from Italian origin, “talks about the emotional tension that is intensified by means of an overlapping of instruments”. This design contrasts the heavy percussion with the light sound of strings within the composition of Bela Bartok’s Music for Strings, giving the design a strong rhythmic sense as well as irregular tensions between orthogonal masses and curvilinear elements mimicking the surrounding water and landscape. The sequence through the house involves ascension at moments where the roof overlaps with walls, where the curvilinear walls reflect sunlight down into the space.¹⁴

¹⁴Steven Holl Architects, “Stretto House” *Official Steven Holl Architects*.



Figure 62 | "Stretto House" by Steven Holl

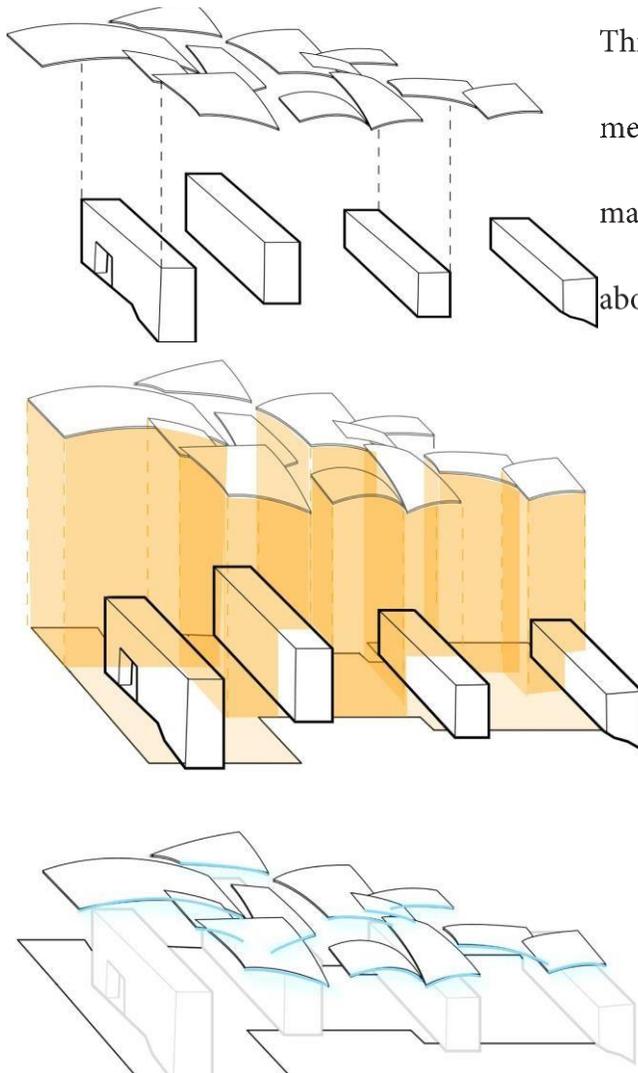


Figure 63 | Stretto Diagrams (source: Erin Barkman)

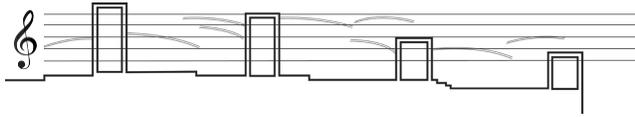
This diagram explains how the light, curvilinear metal ceiling floats above the heavy concrete masses in plan, mimicking how the strings float above the heavy percussion when all the instruments come together in "Music for Strings".¹⁵

The masses hold a strong-grounded nature in the plan, housing solid program elements like bathrooms, kitchen and storage. The "floating" ceilings clash and hang on these masses to create different light, airy and spacious program elements underneath,

¹⁵ Dmadsen, "Stretto House", *Architect*. September 10, 2012

including bed- room and living room.

The curvilinear forms represent the natural landscape that the building sits in, and more so the river that flows nearby.



The curvilinear roofs rest on an invisible series of datum lines, similar to the lines of

staff, giving them order and sense.

Kiasma Museum | Helsinki, Finland | 1998 | Steven Holl



Figure 66| Niina Vatanen, "Museum of Contemporary Art Kiasma: Bow-tie skylight on Kiasma 3rd floor"



Figure 65| Petri Virtanen, "Museum of Contemporary Art Kiasma : Kiasma Entrance Lobby"



Figure 64| Benjamin Glide, "Kiasma, Museum of Contemporary Art in Helsinki"

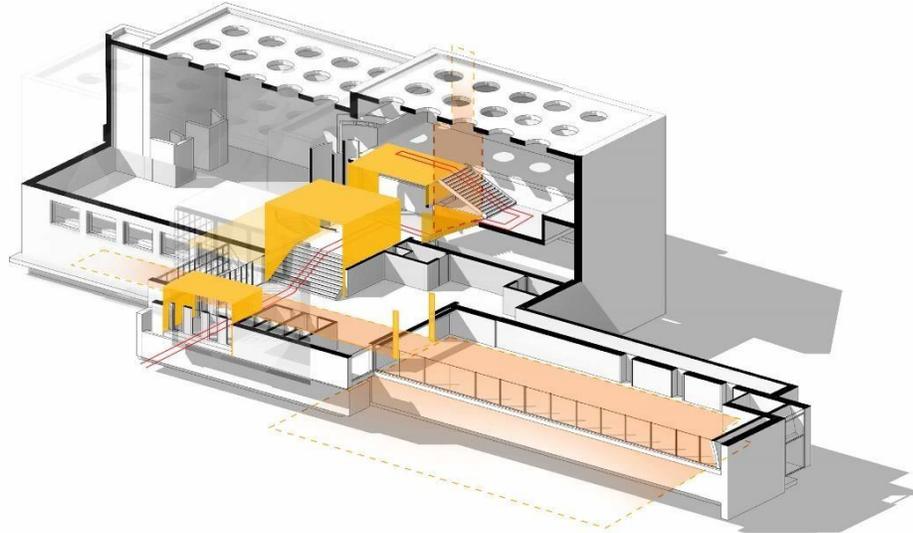


Figure 67| Pirje Mykkanen, "Museum of Contemporary Art Kiasma: Kiasma 5th floor"

This building can be used and studied to analyze how Steven Holl uses light as a material to design. He starts with watercolor perspectives of light designs from the perspective to develop a building, focusing on the human experience.

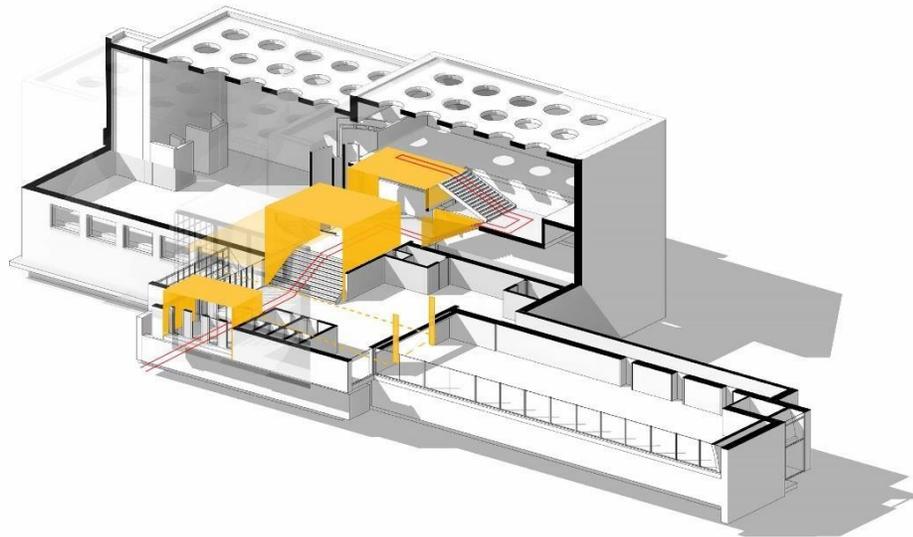
He creates a variety of different types of spaces using a contrast between light and dark.

Viipuri Library | Vyborg, Russia | 1935 | Alvar Aalto



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Figure 68| Spatial Sequence Using Light (source: Erin Barkman)



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Figure 69| Spatial Sequence Thresholds (source: Erin Barkman)

Chapter 5 | Design Strategy

This project started with a desire to link music and architecture, without knowing how that was going to be done, but knowing that abstraction was the link between listening to music and designing space. This next chapter goes into the different explorations used to create the link between music and architecture.

Placemaking

An important part of this project is the idea of place. This is contributing to the place that already exists and creating a new collaborative hub for a new type of musical experience. A material collage along with a study of existing theaters and cultural buildings within the area helped to understand the sense of place.



THE UNIVERSITY OF THE ARTS

Mission: "provides a well-balanced, high quality education by combining applied arts technology and techniques, and related business practices" - UoA's



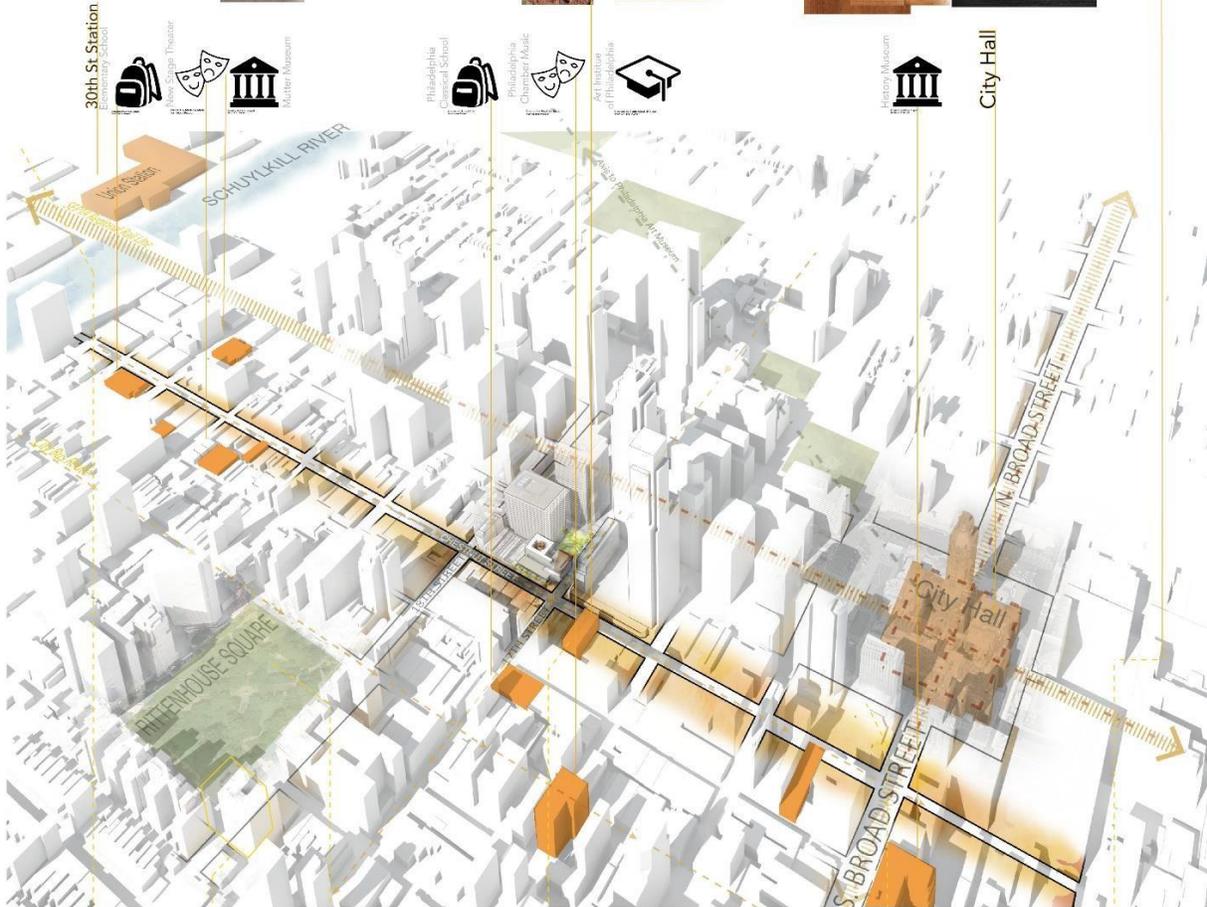
Mission: "The Center for New Music fosters contemporary music's growth by giving practicing artists access to professional resources and expertise, and by providing them with opportunities for sharing knowledge and exploring new ideas."



Mission: "The University of the Arts is committed to inspiring, educating and preparing innovative artists and creative leaders for the arts of the 21st century."



Mission: "The University of the Arts is committed to inspiring, educating and preparing innovative artists and creative leaders for the arts of the 21st century."



Professional Musician

Kyra
Studied at University of Pennsylvania, now pursuing a career as a performer.



Community Member

Navid
Lives in Rittenhouse Square. Music is a hobby.



Street Performers

Jack
Needs an impromptu spot to play his saxophone in a place that gets a lot of public traffic.



Composer

Lynique
Studied at UoA's, performed in a capella choir and now composes music for other artists.



Sound Engineer

Ryan
Attends Art Institute of Philadelphia, majoring in Audio Production.



Small Business Owner

Marcus
Cafe & Bar owner. Looking to rebound his business using live performance.



Bands

The Band
A band of friends that is part of the DIY music and art scene in Philadelphia. They frequently perform at small venues and house shows.



Student

Danielle
Vocal Performance major at University of the Arts, looking for places to practice.



Lecturer & Professor

Harold
Professor at the University of the Arts, intrigued by the link between city soundscape and music.



Designer

Laura
Works with the Community Design Collaborative as a volunteer. Partners as a designer for the building.

Linking Music and Architecture

Comparative Elements

There are key elements that exist between music and architecture that create a comparative language between them. These include elements like:

Rhythm | Density alterations

Harmony| Layering

The Staff | Datum

Attitude | Texture

Musicality | Emotion

Music | Architecture

This portion of the thesis will briefly describe the elements, and how each element informed the project.

Rhythm | Density Alterations

Rhythm is any pattern or repeated sound. Rhythm within a song creates movement in the song, it makes us want to tap our foot, it makes us want to get up and dance. When walking through a colonnade of columns we feel a certain sense of rhythm, from that shadow that those columns are casting, and from the slow repeating pattern that we are experiencing. When we drive in our car through a bridge, not only do we feel the car tires go over a series of connective seams, but the columns around us make a sound as we pass them with the windows down. Our pace is fast, and that makes the rhythm more audible.

Rhythm can also be subtle on a façade either with a consistent rhythm of windows that pulls our eye across the façade or with a change in density on the windows, like in Corbusier's La Tourette. This change in density is a way of creating unique rhythmic patterns. These patterns include things like change in time signature, syncopation, or a speed up in rhythm to a break in that rhythm.



Figure 72 | Colonnade (source: Wikimedia Commons, Public Domain)



Figure 71 | George Washington Bridge (Source: Wikimedia Commons, Public Domain)



Figure 70 | La Tourette (source: Flickr author μμ, Creative Commons)

A time signature change can be seen in a song like “Here comes the sun” by the Beatles. It changes from a 2|2 cut time rhythmic pattern, to a 3|8 pattern, but even if you did not know this, there is a clear change in the flow of the foot tapping. Syncopation takes a classic 4|4 beat and swings it.

1 + 2 + 3 + 4 +

1 + 2 + 3 + 4 +

If you were to clap on the bolded portion, you would see that syncopation jives with a subtle off beat.

One last way to inspire a change in rhythm is a buildup in the tempo, leading to a crescendo moment.

This happens when the rhythm get faster, which leads to a break in the sound all together. Then when the music comes back in, it is somehow different The breath can be anything from a choir taking a uniform breath together at a certain moment, to the pause after a loud crescendo. This appears in architecture in something like a threshold, or a place of reprieve between large moments. The drop is the large moment on the opposite side of the reprieve. The awestruck moment astounds you. It has a large contrast to the breath, no sound, to the drop, which takes on opposite characteristics.

Rhythm within the Project

After studying the rhythms of the site, including the vertical and horizontal rhythm of the surrounding blocks, and the rhythm of sunrise and sunset, of types of people coming on the site, I found that rhythm would lay a foundation for this project, just as it does in music. I needed to set a tempo or a time signature for other elements to refer to. The structure of the building followed a specific rhythm derived from the vertical rhythm of the adjacent block, with the bays getting closer together as they get closer to the entry. This addressed the fact that cars were only traveling from West to East with Chestnut Street being a one-way street. The market space wanted to be one with the block, and carrying the rhythm from the block into this building did that successfully. This rhythmic experience plays a huge role in the entry experience, creating a clear base that overlays a series of thresholds. The rhythmic structural elements always appear in the same metal material, which carries onto the floor in the market to make an aural awareness as you walk over it.

Harmony | Layering

Layering of different elements becomes an important part of creating a composition. Each view within the building has layering of elements to create a harmonic experience. Layering can be anything from layering instruments one on top of another, clearly seen in the song “Sympathy for the Devil” by the Rolling Stones. This can related to architecture in the layering of materials on a façade when your eye moves from right to left, each material comes in separately. It could also be something like a Cannon, where the same melody is repeated, but with a measure of offset, as seen in the song “Will I” from the musical RENT. In architecture this is seen when the same structural element repeats over and over again in view, creating a tunnel of layered experiences. Or it could be the simple layering of voices in a clear composition of harmonic chords, like in the piece “I Thank You, God” by contemporary choral composer Gwyneth Walker.

Harmony with the Project

This building is designed from the inside out. Each view is designed with the lens of layering and harmony. Each perspective within the building, and especially along the main promenade, is composed with layering of objects, of textures, and of different rhythmic experiences. The metric frame of the steel structure is a constant within each view, and layered on top of that are surfaces made of limestone, a material that address the vernacular of the area, as well as lyrical elements made of wood. Wood within the project is directional or object like. It pulls your eye through the space and relates to the given song.

Abstraction

Abstraction is a conceptual process by which using a general set of rules to interpret a specific example to then derive an interpretation of that example. The design strategy used in this project was to take the aural experience of music, make intuitive paintings from that listening and then use those paintings to design an experience. Although the music is taken through this conceptual process, the design is, by no means, a direct translation of the music. Once taken into painted form, the music becomes something

visual. The way that that visual interpretation of that music then resonates, although very subjective, then creates the designed space.

This process of abstraction started with a series of explorative drawings, paintings and studies of precedent. There were certain precedent that resonate with me because of the lighting, the geometric forms, the simple tectonics. The precedent study started with a three dimensional exploration of each of the precedent and what their main drivers in form and threshold were, as seen previously in the precedent chapter. Then from a perspective from each precedent, there were a series of sketches made, narrowing that image down to its simplest gestalt.

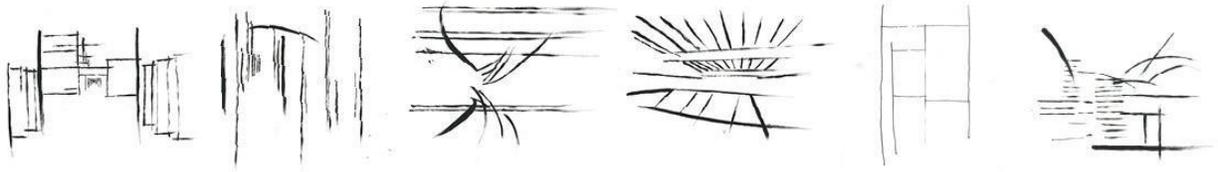


Figure 73| Precedent Gestalt (source: Erin Barkman)

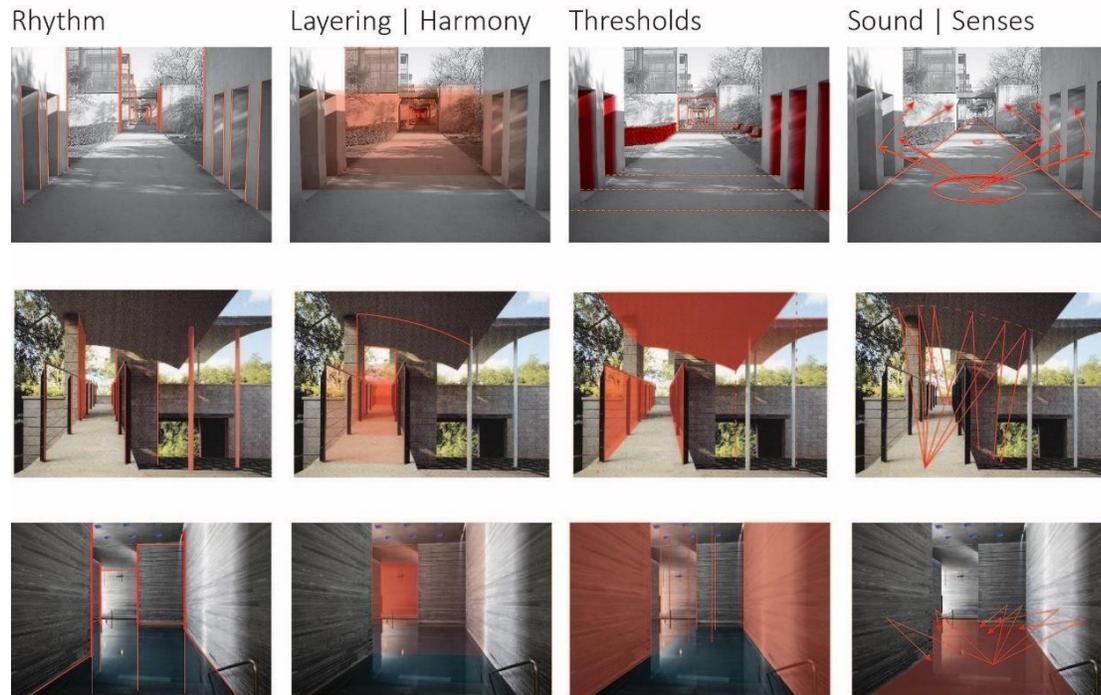
There are different ways to show how the same precedent image could read differently depending on how it is painted. One with more attention to texture, one to light, one to reflection, one to color. The example provided below is four paintings of the same perspective from Peter Zumthor's thermal bathhouse.



Figure 74| Acrylic Interpretation of Thermal Baths (source: Erin Barkman)

Precedent perspectives can also be examined through a technical lens using the comparative elements. In this study, the perspectives are analyzed for the experience within that moment, questioning what is making that moment so awestruck,

such an experience. These diagrams analyze rhythm, layering, threshold and sound within that one moment.



Music has many examples of these comparative elements as well. Four genres specifically stood out as something to be studied for their different characteristics and also their similarities. No matter what genre of music, there is always meter guiding the music forward and structuring it and all the instruments playing within it. The four genres selected were Classical, Romantic, Jazz and Pop. These genres held a wide variety of qualities but also were strung together with similarities like structure, time and movement, and variation on a theme.

Classical music embodies strong, clear chords and rhythmic structure. When watching the conductor, there is always a clear down beat, representing the clear rhythmic structure. Then, there is a strict notation in this music, leaving little up to interpretation. Each orchestra that plays a piece will sound almost the same because the musicians and the conductor do not have much to interpret within the piece. Finally, there is a high contrast between key moments, considering different qualities in the instruments,

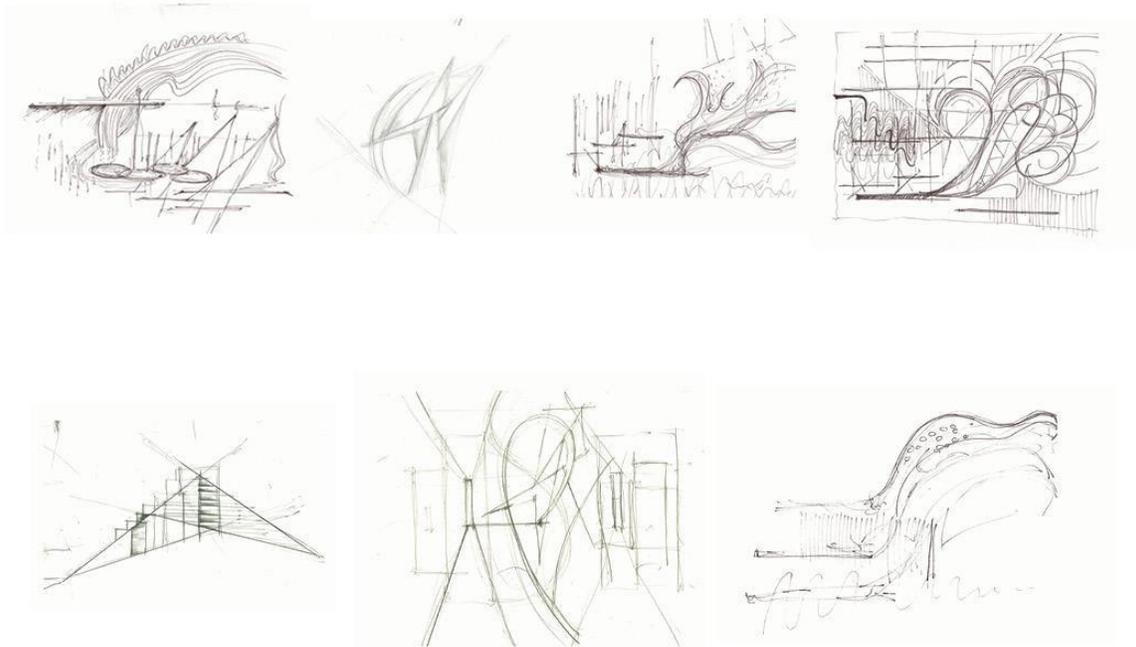
as well as dynamics. The piece used as a specific example is the Overture from the opera “Cosi fan Tutte” by Mozart. Mozart is a classic example of classical music, finding these embodied descriptions in most of his music. This song specifically narrates these qualities between a four part movement that repeats itself, starting with a slow andante movement played by the lyrical oboe and then separated from the next lively adagio movement with a loud interruption from the bass instruments including the drums. The adagio movement is a rhythmic, fluttering duet between the flute and the oboe as well as the strings in the next movement. The fluttering affect from the instruments easily imagines the bustling nature of the market place, for which it describes in the project.

Romantic music can be described as having a rich harmonic language, a series of chords with dissonance and resolve, as well as unprepared modulations. The romantic period emerged from the classical period, but began to break some of the boundaries that existed within the previous period. So although some characteristics still remain within the romantic pieces derived from the classical, they still have their own unique form and texture. “Os Justi” by Anton Bruckner was specifically picked as a sacred piece within the romantic period because of its high contrast of quiet and crescendo moments. As we know, Classical music also has these moments, but within romantic pieces, there is a more poetic lead up to the crescendo, it is not just given to you all at once. The harmonies are crafted to be filled with moments of tension and release, and when the conductor’s hands lead the orchestra, it seems as if she is sculpting sound.

Jazz music is spontaneous. It can be sung or played differently every time it is performed. In one song, there will be multiple variations on a theme, playing it soft and slow, to playing it lively and up beat and then a certain instrument solo bee-bopping on top of that. Different types of rhythm also guide jazz comparatively to the normal rhythm. Syncopation on the beat can be used within a jazz piece or simply swinging the beat. “Summertime” from Porgy & Bess, performed by Ella Fitzgerald has a simple melody that Ella Fitzgerald embellishes on a little more each verse. Starting with a slow blues jazz piano under the first verse then speeding up to a short staccato verse, then leading in to the improvisation that happens on top of the last verse with then a grand finale.

Pop music almost always follows a verse, chorus, verse, chorus, bridge, verse, chorus layout. The song chosen is “Say it” by Flume, a British DJ artist. The song is characterized by a strong bass at the down beat creating a dramatic rhythm. This build up in the bass leads to a strong anticipation ending in the breath or silence, and then the drop, where the instruments or bass come back in, usually in a dramatic way because of the silence before it.

After selection of this music and these specific songs, the process of intuitive abstraction began. The first step in this process was a series of sketches derived from the aural experience of the music, as seen below.



The next step in this process was to move to paint. Painting allowed for fluidity in the interpretation of light and color in the composition, as well as the placement of brush strokes.

Figure 75| *Os Justi* Acrylic Paint (source: Erin Barkman)



Figure 76| *"Say It" Interpretation in Acrylic* (source: Erin Barkman)

Finally watercolor paint gives a quicker, more fluid interpretation of the sound because of the quick nature of the brush strokes along with the wet and dry characteristics of the paint and brush. Watercolor was used in this next series of images to interpret the previous genres stated.

Classical | Così Fan Tutte Overture | Mozart

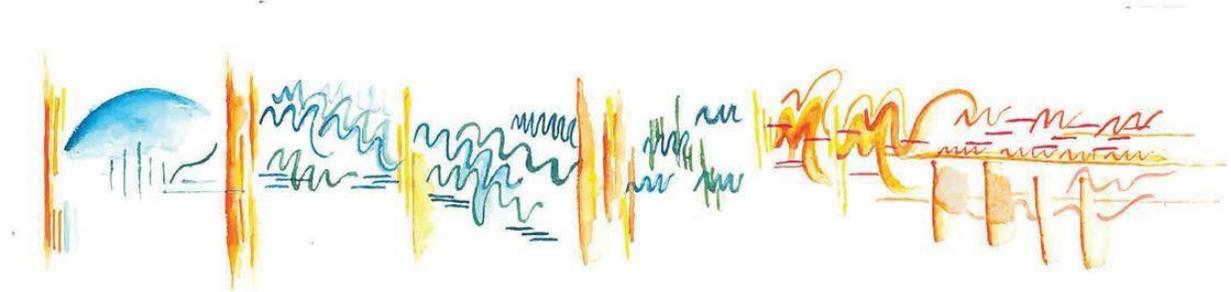


Figure 77 | Classical Watercolor Sequence (source: Erin Barkman)

1. Strong rhythmic structure
2. Strict notation
3. High contrast between key moments, including contrast in types of instruments, type of note articulation and type of dynamics.

Romantic | Os Justi | Anton Bruckner



Figure 78 | Romantic Watercolor Sequence (source: Erin Barkman)

1. Rich Harmonic Language
2. Sculpted music, shaped with dissonance and resolve
3. Build up to crescendo key moments



Figure 79 | Romantic Watercolor Gesalt Moments (source: Erin Barkman)

Jazz | Summertime | Gershwin & Heyward | Performed by Ella Fitzgerald

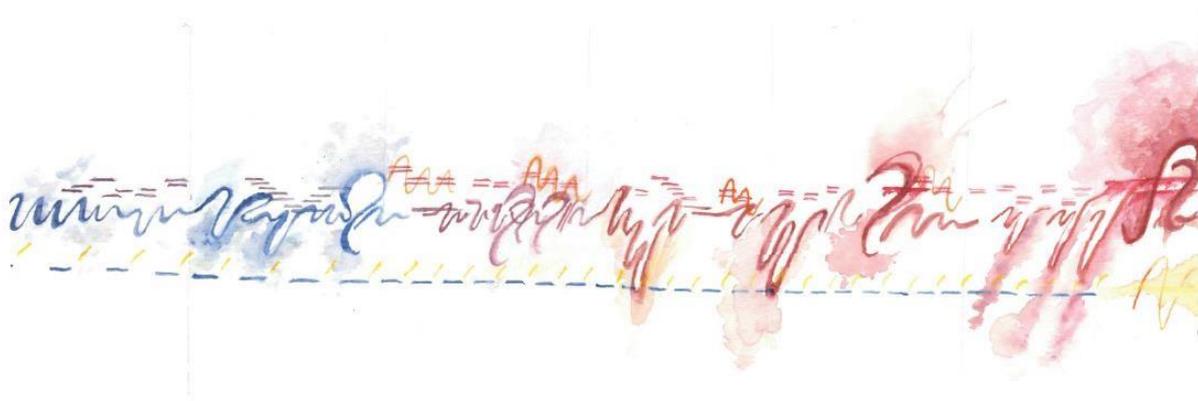


Figure 80 | Jazz Watercolor Sequence (source: Erin Barkman)



Figure 81 | Jazz watercolor gestalt paintings (Source: Erin Barkman)

1. Variations on a theme, from slow to fast to improvisation
2. Unique variations in rhythm
3. Spontaneity

Pop | Say It | Flume



Figure 82 | Pop Watercolor Gestalt Paintings (source: Erin Barkman)

1. Strong Bass, creating dramatic rhythm
2. Anticipation from the build up with a quicker tempo
3. Build up ends in a breath, or silence, then a drop.

Chapter 6 | Design Implementation

Note: All Figures in this chapter are original images from the author, Erin Barkman.

The design of this project was driven from two different ends of the spectrum. On one end was a need to design the building from inside out using a connection to music and the strong sequence of iterations in different mediums to bring a special character and resonance to each space, and each moment within the

building. Each painting started to give a character to the moments or perspectives along the sequence within the building. There are certain compositional themes, certain strokes that represent rhythm vs light, color vs attitude within the paintings. These characteristics also came out within the perspectives of the building. On the other end of the spectrum was the need to address the site and the surrounding context of the building, adding to the place that existed, while also creating a new place for musicians to collaborate.

First, it is important to define the title of this thesis.

Perceptual: relating to the ability to interpret or become aware of something through the sense.¹⁶

Resonance: the ability to evoke or suggest images, memories & emotion.¹⁷

The intention of this thesis is to design space using abstraction as a conceptual process to bring an aural experience as an interpretation of space. These spaces were designed through perspectives and iterations on those perspectives.

The project is anchored by four main spaces to pair with the four different types of music, the market (classical), the music atrium (romantic), the amphitheater (jazz) and the Sky Chamber (pop). These spaces were derived from the user and programmatic needs, as seen in the below diagram.

¹⁶ "Perceptual", Dictionary.com

¹⁷ Musecke, Mikesch.2007. *Resonance: Essays on the Intersection of Music and Architecture*. Culicidae Architectural Press

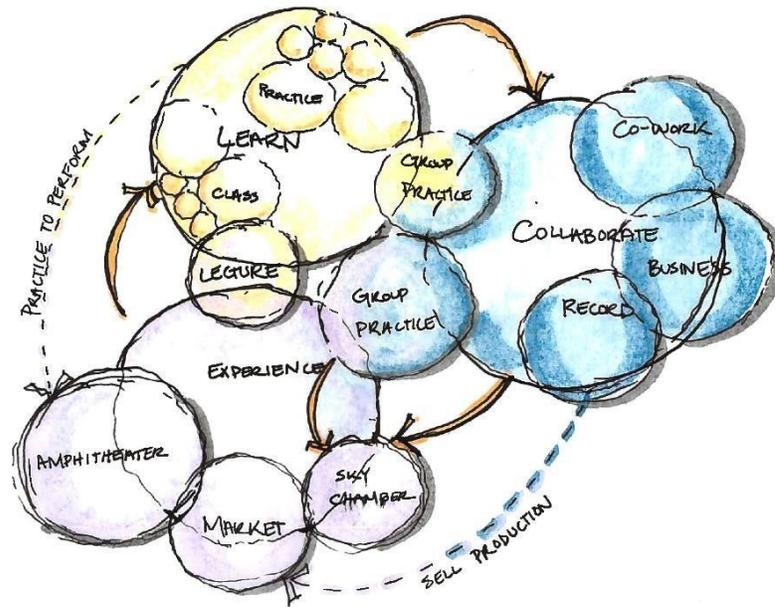


Figure 83 | Program & User Diagram (source: Erin Barkman)

The users are Learners, Collaborators and experiencers, and the main spaces serve all of those users, where other spaces cluster around those main spaces. The market and amphitheater sit on the urban edge of the building and proceed to add to the sense of place that already exists on Chestnut street. The market can open up depending on the season and be fully porous towards the city around it. The amphitheater towards the north of the site, opens up onto a park space. This activates not only the park as a space, but pulls people down into the building and activates the interior space almost as a part of the exterior space, blending the edge between them. The music atrium is hidden from sight when approaching the building, or even when you come into the two very public spaces. One must ascend upwards to get into the space, and transcend to another place that did not previously exist. It is a place for the purity of music, where you can see musicians all around you playing music, people walking, activity happening, and then very high above you, you can see a floating form. The metaphor that exists here is that as you circulating up in the practice rooms and learning spaces you get closer and closer to this form, almost bringing you close

enough to touch it, yet it is just out of reach. It is not until you have mastered your art, that you can then perform within this form that is completely focused on sound isolation and resonance of that sound within the space.

The diagram below focuses on the public flows being accepted into the building, along with the soundscape of the site, where as the music atrium is separating allowing it to stay sacred.

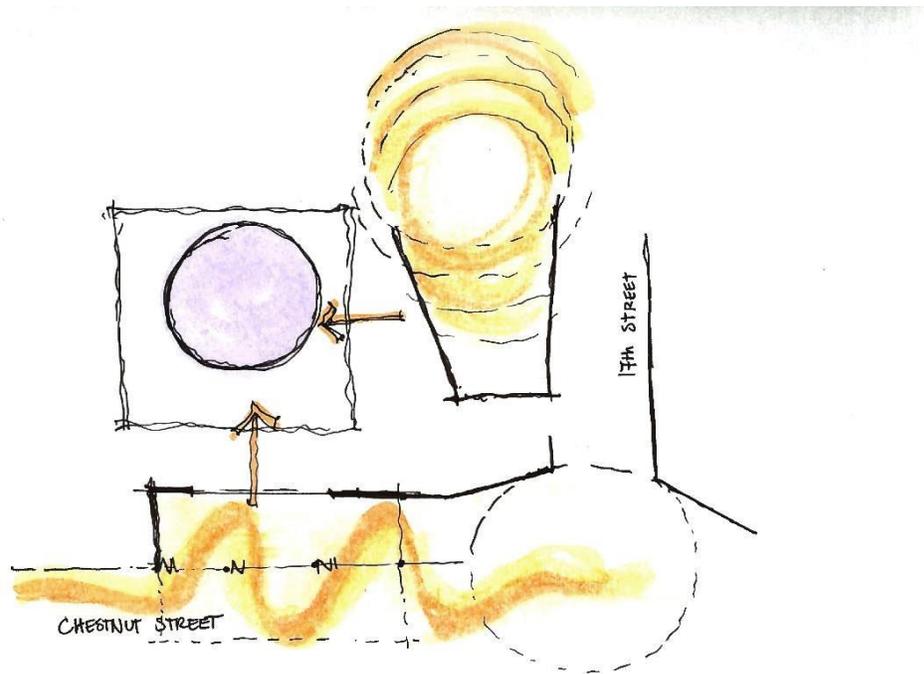


Figure 84 | Places Diagram (source: Erin Barkman)

The main parti diagram guiding the design of this project forward was derived from the structure acting as a meter creating a datum that the other forms could adhere to. The main public forms then break past that datum to accept the ground or the sky. The amphitheater reaches down past the datum to accept the ground, built of stereotomic materials natural to the area. The Sky Chamber reaches up past the datum to accept the sky, built of an athermal material on the inside, making an audacious attempt to transcend away from the visual realm and into an ephemeral liminal space between reality and the sky.

The diagrams below show how the project developed in simple diagram form.

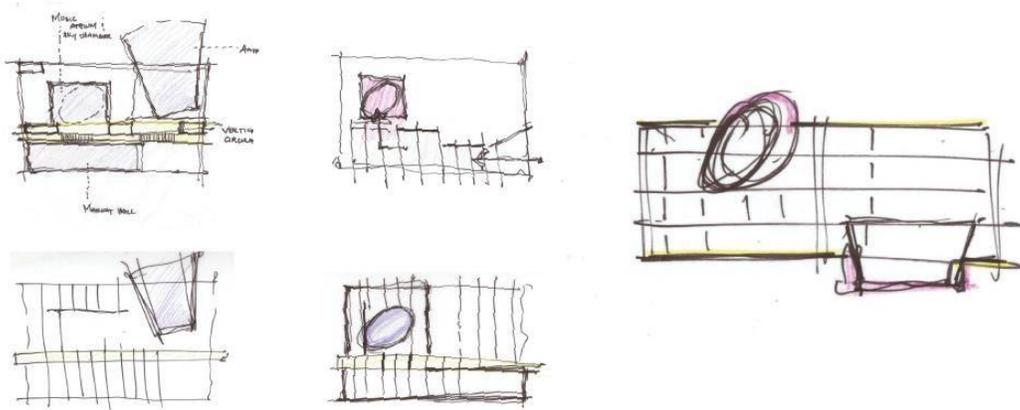


Figure 85 | Parti & Schematic Diagrams (source: Erin Barkman)

Included below are a series of perspectives that describe the main promenade at the ground floor of the building.

1. Corner perspective

This image shows a layering of materials and replicates the adjacent rhythm of the street. Although given a more contemporary, industrial gestalt, it takes the material of the neighborhood and the scale of the local arts buildings into consideration. The building uses the technique of layering to draw people into the building.



Figure 86 | Approach Corner Perspective (Source: Erin Barkman)

2. Approach to Building

The limestone wall to the right pulls you into the building and along a series of threshold (depicted in the diagram) through the main market space. Included are a series of façade and massing studies.

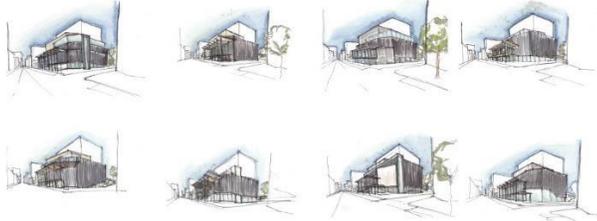


Figure 87 | Approach (source: Erin Barkman)

3. Main Market Space

This space is organized by a rhythmic meter that translates from

the structural beams and columns and carries onto the floor, where it becomes an audible experience when you walk over it. The dark metal makes a series of frames going back in space. This space is derived from the paintings of the abstraction of classical music. There are strong dynamics within the space, strong contrasts between key moments, being very compressed to being very open.



Figure 88 | Market Space (source: Erin Barkman)

4. Practice Rooms

The practice room boxes are used as a layering technique within the space, putting a sharp staccato rhythm into the space, to contrast with the undulating, lyrical ceiling.



Figure 89| Practice Rooms in Market Space (source: Erin Barkman)

5. Threshold to Music Atrium

Passing under the stairs and the cables that hold them up, you then pass under the floor slab, while also coming up a series up steps, creating a very compressed space.



Figure 90| threshold between market and music atrium (source: Erin Barkman)

6. The Music Atrium

This space is an interpretation of the intuitive romantic paintings. This space tries to capture what resonates in the composition from the music. There is a buildup through ascension into a space, which then has an ultimate climax. But as you circulate around the space at all levels there is a slow build up to getting closer and closer to the sky chamber.



Figure 91 | Music Atrium, under Sky Chamber (source: Erin Barkman)

7. Courtyard “Breath”

The courtyard represents a breath within the sequence of spaces. It opens us completely to the sky and brings back the sounds of the city subtly, while also the soft hummer of birds, rustling trees, and water.

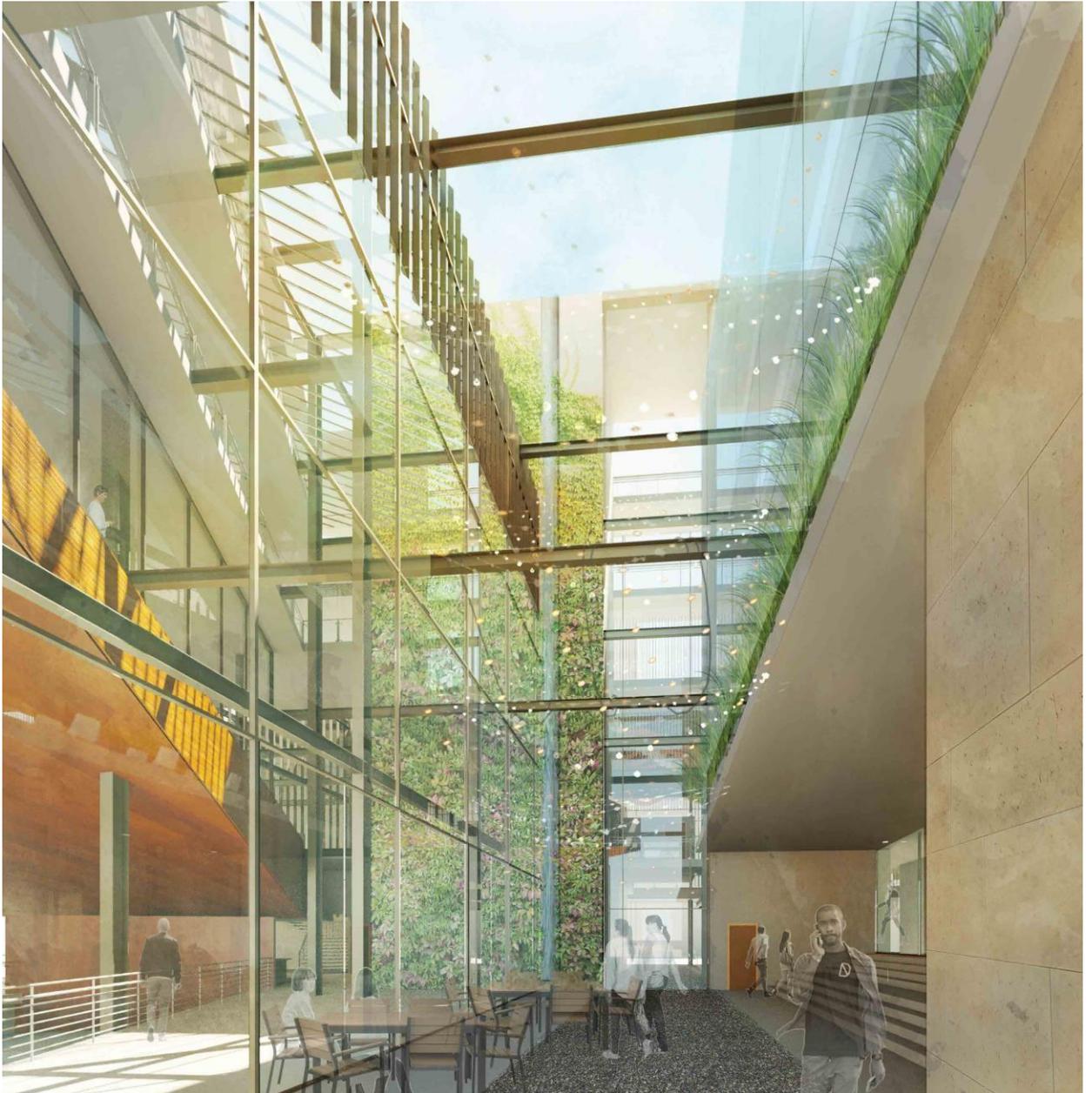


Figure 92 | Courtyard space (source:Erin Barkman)

8. Residual Atrium Space

This atrium space is the left over space in the normal grid from the form of the amphitheater. It travels all the way up this portion of the building, allowing all the co-working, business spaces a view to the green wall and the courtyard.



9. Amphitheater

This space descends down into ground and focus the view to the main performance space. The entire space is flexible, and varies on the theme of performance. It is representational of the jazz



theme because it uses time to gain its flexibility, as well as a flexible floor structure that can create different arrangements. Its flexibility allows for indoor performances of all kinds, as well as a full indoor-outdoor experience as seen in the section variations.

10. Amphitheater from Park

This view depicts the experience from the park looking back at the building and a performance that might be happening there. It is a place to day dream about the musical world beyond.





Included below are the floor plans, to describe where the main promenade is on the first floor and how to ascend upward to the Sky Chamber.



Figure 93 | First Floor plan (Source: Erin Barkman)

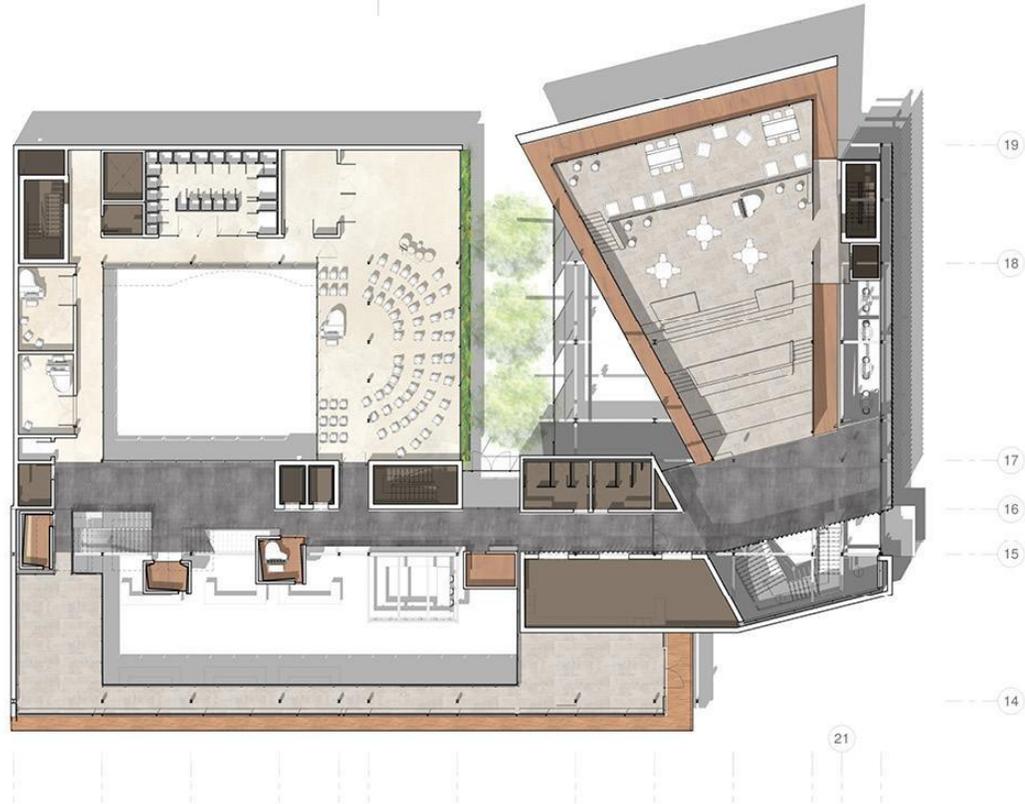


Figure 95 | Second Floor Plan (source: Erin Barkman)

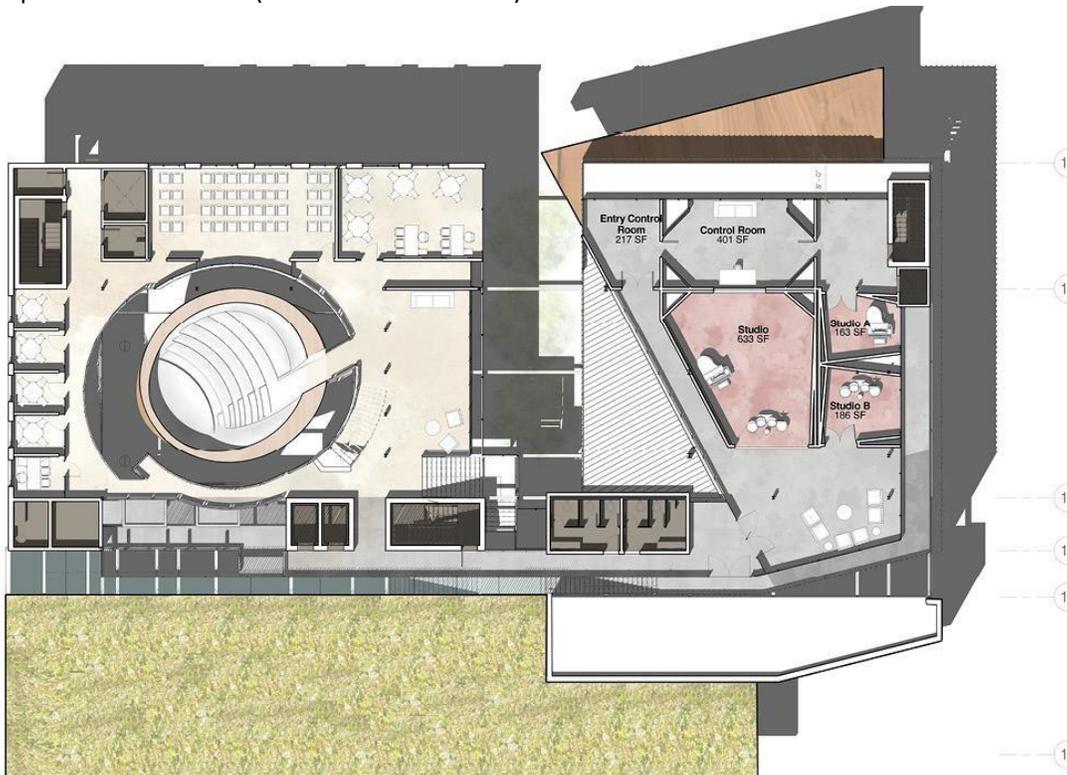
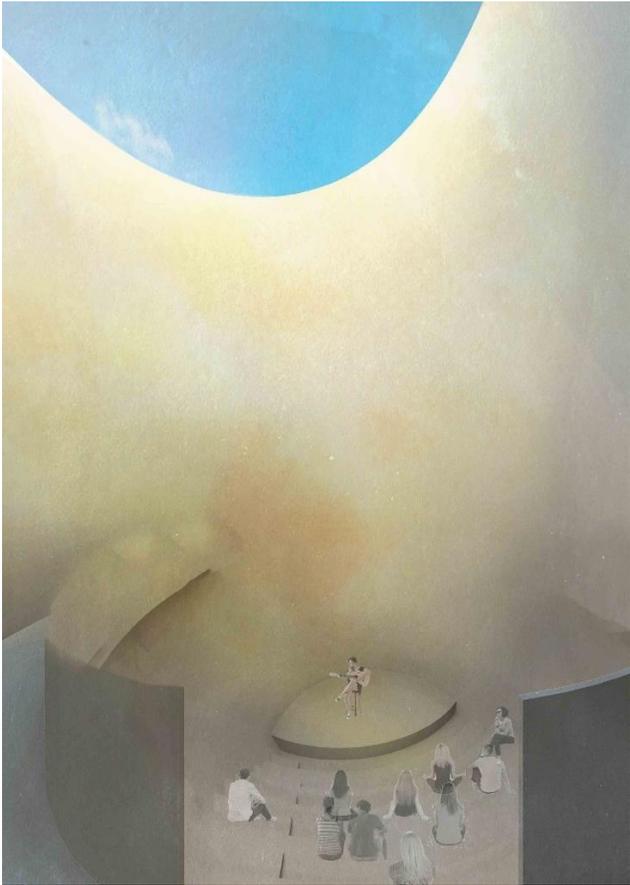


Figure 94 | Fifth Floor Plan (source: Erin Barkman)

The ascension upward to the sky chamber is depicted below through perspective.



Describing the Sky Chamber and the threshold experience to it.



Figure 96| Market & Music Atrium Section (source: Erin Barkman)

Conclusion

The conclusion to this thesis is that this was just the beginning. This exploration was long and hard, but it helped me to learn and understand how one might begin to understand the connection between an audible art and a visual art. At the thesis review, each reviewer connected with the work, taking their own interpretation of the paintings and of the experience all together. All of them liked the work, but had suggestions on how it made them think. This speaks to the title of the piece. The work resonated differently with each review, leaving a different impression and different feeling with each person. I think, because the work resonated with each person differently, that the work was a success. Music will never be interpreted the same by different people, it affects people differently depending on the type of music. In the same way, architecture resonates with people differently, and although everyone had a

different interpretation of the work, the perspective experiences resonated with people and moved them to speak passionately on the subject.

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