LISTEN

A Sensory Experience

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A Design Thesis Submitted to the Department of
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By

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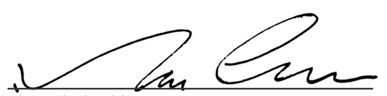

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ABSTRACT

This thesis project uses interpretive and evaluative research methods to examine how best to bring two social circles together through intentional design, education, and immersion. The project is a design proposal for a sensory museum for the hearing population located in San Francisco, California. This project is a combination of an immersive experience facility combined with a community theatre space to promote the exchange of information, culture, and education for all. Though architects follow guidelines for ADA requirement, in those codes there is nothing said about designing for the deaf. This museum is a place for the deaf and hearing communities to come together in an environment built to raise an awareness into a world without sound. The different spaces incorporated highlight innovative technologies, materials, and architectural design. With the help of the National Theatre for the Deaf and Gallaudet University, this project attempts to use history, experience, and architecture to bridge the gap between two social communities creating a better understanding and more opportunities for both. This project aims to create an immersive experience into a world without sound in order to bring to the forefront an awareness for the everyday challenges it brings. By focusing on spatial arrangement, materiality and the implementation of technology, I create spaces that promote the exchange of education, culture, and community between the Deaf and hearing populations.

"In a world without sound, everything still speaks; you simply have to change how you listen to it."

THESIS NARRATIVE

The National Theatre for the Deaf, Gallaudet University, and a wealthy benefactor have come together with an idea for a new type of building; a school that focuses on education for the deaf and community integration. The National Theatre for the Deaf has been looking to build a place for deaf theatre to come and educate and perform. This is a national movement to expand deaf theatre and bring it to schools, communities, and universities throughout the country educating and preforming both deaf individuals and members of the hearing community. The National Theatre for the Deaf's goal is to unite communities through art and performances.

In conjunction with Gallaudet University, this building would be the new model for schools with a strong focus on innovation and intentional design within the deaf community. Gallaudet is the largest deaf college in the United States and they want to collaborate on an outreach that focuses on the deaf youth of America. They want to provide a strong foundation for deaf students at the primary school level. One major benefit to having Gallaudet University as part of the project, is the name. Everyone in the deaf community knows what this university is and how it has thrived as one of the few places for deaf students to go for higher education. The University's reputation adds to the project because many of the desires for the design have been implemented within Gallaudet's campus already.

Even though the National Theatre for the Deaf and Gallaudet University are privately funded, a private third party with personal interest in the project agreed to put up some funds for the construction. This family has a son who is deaf and has had a very difficult time thriving in a mainstream school. The design of a school like this would allow his son, and many others like him, to thrive in a place built with their future in mind. In addition, he also wants to promote sustainability and if possible highlight it in the design; his major desire is for the building to be a net zero building. By accomplishing this, the design would be on par with the green building movement and can be used as a model for future schools. The benefactor wants to promote the use of new and innovative technologies that allow the building to function at an extremely high efficiency and highlight the architectural design of the building.

Omaha used to have a school for the deaf. Unfortunately, it was shut down due to poor money management and controversial teaching practices. This project will allow a deaf school to be reintroduced into the city under new circumstances. Instead of deafness being looked at as a disability that must be overcome, the project provides a place for the deaf community

to thrive and grow. The project looks at the issue and addresses it backwards; not forcing deaf individuals to assimilate into a hearing world, but educating the hearing world about the potential and the capabilities of the deaf community.

This project proposes the design for a school for the deaf because universal design does not create an environment that is geared toward the optimal learning needs of deaf students. Designing with intention while maintaining a mind for sustainability, can contribute to positive Deaf Space creating community and a building that promotes education among thriving deaf students. Additionally, incorporating a public community element that strives to bring together the deaf and hearing communities, bridges the social gap between the two. By using interpretive and evaluative research techniques, in combination with space modeling, the project redefines the standard for universal design.

This project attempts to bridge the gap between the deaf and hearing cultures by means of education through intentional design. By highlighting how architecture can exemplify a world without sound, advancements can be made in educating both the hearing and deaf populations. The main idea is that everyone will be educated. The students will have a place that promotes learning in a world that they are comfortable in without trying to change how they go about their day to day life. Then, the public will be provided with a space that will include an educational outlet for Deaf Culture. The two worlds exist simultaneously, however they rarely interact on more than a superficial level. This project looks to remedy this divide.

The building will be designed as a school to educate deaf students; combined with elements to facilitate in the education of the hearing population about the challenges, capabilities, and day to day life of a person immersed in Deaf Culture. Education and assembly; that is the method to bring two different social groups together into a single typology to better educate the future populations. The school will be designed with intentional elements to facilitate in the learning experience of the students enrolled. The public spaces that will be used as educational spaces for the hearing public, such as the theatre and sensory museum, will be used by both social groups, allowing them to come together and collaborate. The project's main emphasis is intentional design as it applies to Deaf Space. Universal design is a wonderful and extremely useful tool when designing for the world most people live in; a world with sound. But, not all people have the luxury of being able to hear, like the demographic targeted. That being stated, small design decisions can make a huge difference in how the

space is experienced. With this design emphasis, deaf individuals will be able to thrive in the built environment. Through the project's design and emphasis, one will reconsider the definition of universal design and adapt it to include more than the hearing population.

The primary goals of this project are to unite, educate, and thrive. Through the combination of typologies, I hope to propose a way to bring together two social circles that only interact on a superficial level. While bringing people together within and intentionally built environment, the goal is to educate. Educate both the hearing population and allow them to experience Deaf Space as well as Deaf Culture; and to educate the student enrolled at the school. Through exceptional education, both social circles and individuals will be able to thrive with more knowledge. Students will learn in a space designed for their world without feeling forced to have to assimilate into a world that knows little about how they experience the built environment. The public will be able to learn and participate in the experiences of a deaf individual, expanding their understanding and uniting the communities.

The research design plan includes a few design methodologies. Evaluative research techniques will be used to look back at historical projects similar in design an function. Take the experiences from those projects and use the information to bring forward the positive aspects, and eliminate what architects have done poorly in the past. This research method will look specifically at case studies where architecture was used to enhance deaf space. I believe looking at both international and domestic projects will be beneficial. Then, I will evaluate how well the architecture accomplished its goals and implement the elements into a conclusive design. Using this type of research I will also explore buildings that were designed to integrate and educate more than one demographic; community spaces that resulted in positive interaction between its targeted audience.

In addition I plan to use modeling as a way to study the development of space using light and section studies to evaluate the quality of space being created. Modeling will help to visualize the interior and exterior spaces. Being able to highlight the architectural connections between spaces will help bridge the gap between the two social communities.

All documentation will occur at the time the research is completed as to not leave out and credit or information gathered by another person. Sources will be saved and annotated to provide clarity and assign significance, then provided for reference where appropriate.

Project Schedule

Conceptual and spatial research will be completed first. This will provide a basis for which the project will be built upon as the progress continues. As the spaces develop, modeling will be completed to evaluate the quality of the spaces being designed. Next, research will be done pertaining to passive and active technologies and how to successfully implement them to create a net zero design. This research will include case studies and code analysis. In the following weeks the structure of the building will developed to ensure the safety and stability of the design.

Once there is a basis for ideas, collaboration efforts will be made and there will be time for redevelopment of problem areas. After the issues are resolved, floor plan development and deliverables will be started. Following that, material choices will be made based on research into sustainable design solutions. After this phase of the design is complete, midterm reviews will again bring collaboration and reveal and issues that need to be resolved.

After midterm reviews, the main elements of the design should be set and time allowed to readdress any issues in the structural system. Modeling will be completed in Revit and energy modeling simulations will hopefully be started to evaluate the energy efficiency.

Then, using that finished model renderings will be started and final presentation boards will begin to come together. Once the final renderings have been completed and the deliverable have been finished, all of the design information is burned to a CD and submitted to the thesis advisor. Final preparations are made for presentations. Boards, models, and the book are installed and displayed on the 5th floor of Renaissance Hall.

Lastly, the formal presentation is completed in front of a panel of critiques. Then, the final deliverables and boards are submitted to the online architectural repository. And finally, we graduate with a Masters of Architecture from North Dakota State University.

RESEARCH PAPER

So much of how we experience a place is based on our senses. What would happen if one of those senses went away? What would the world look like without sound? The majority of our society has no idea how that would change the way we perceive the world around us. This thought will allow us to look away from the ideas of universal design and toward a more intentional investigation. Specific considerations need to be made in regards to materiality and spatial design in order to encourage students in deaf schools. Materials that are visually engaging, in tandem with attention to spatial details that aid in communication and the implementation of special technology, will contribute to a strong community and an environment that is contusive to a positive learning experience.

Deaf students have been placed in mainstream hearing schools due to the absence of a place to learn that provides an environment designed specifically for their world without sound. A study published in The Journal of Deaf Studies & Deaf Education explored the performance of deaf students, ages 6-14, in different learning environments. They found that deaf students in a mainstream hearing school with and interpreter performed significantly lower in lexical comprehension and Theory of Mind (ToM) tasks than those who were placed in a bilingual school where the teachers incorporated both sign language and spoken language (Tomasuolo, Valeri, Di Renzo, Pasqualetti, & Volterra, 2013). Providing a school designed specifically for deaf students increases their learning potential significantly.

In addition to improving learning, the school would provide a place for young deaf students to interact and be a part of Deaf Culture. Dan Hoffman and Jean Andrews, social psychologists at Gallaudet University, state, "Deaf culture matters because it represents a strong support mechanism within a hearing society, which is more often not attuned to Deaf persons' best interests. It's a network of people who share their experiences." Language and culture are intertwined and are both needed for the development of a strong Deaf identity (Hoffman & Andrews, 2016).

Color and Texture

One of the most mentally motivating aspects of a material is the color. Our brains are hardwired to notice differences in color. The colors we perceive have a neurological effect on us; they actually stimulate a distinct part of our brain that can be measured by functional magnetic resonance imaging (fMRI) (Meacham, 2015). Each color elicits its own specific response and can be both positive and negative. When implementing these colors in a school, intentional placement has an effect on the learning environment.

Meacham's study revealed that blue stimulates creativity. Adding it to the color palette within an art room can have beneficial effects. Red is a high intensity color that promotes energy and, in detail oriented situations, focus. The best use for this color could be in the gym or tactile learning areas for younger students. The findings uncovered that in small amounts yellow promotes happiness. However, if overdone, it can create feelings of stress therefore isn't a practical color to use in a school. Green was found to be the most relaxing of the colors and is best implemented in places designated for healing and rest. Orange was the best color for a classroom setting because it stimulates critical thinking and memory retention (Meacham, 2015).

In terms of materiality this information is very valuable. Instead of coating the walls in a certain color of paint, specific material choices can be made as substitutes. For example implementing a warm colored wood into the classrooms could be a beneficial design decision. Because deaf students lack the sense of sound, colors are more stimulating. By implementing them with intention, a productive learning environment is created.

Derrick Behm the head of the Office of Campus Design and Planning at Gallaudet University, brings attention to two specific colors that aid in visibility. Behm states, "Muted blues and greens contrast with most skin colors and reduce eye strain making communication easier among students" (Vox, 2016) Effective communication is essential to creating a productive learning environment, therefore these considerations potentially outweigh those of the color studies addressed earlier. However, color isn't the only factor that needs to be considered when addressing materiality within a deaf school. All materials have texture. These texture have an influence on the space in which they are used. For instance, brink can make a space feel rustic and harsh. This could be counterproductive when creating a space conducive to learning. Steel and other metals can have a modern or high tech influence on a space. There isn't as much depth to this material as it often is used in flat, smooth applications. In juxtaposition, wood can make a space feel old and country; possibly a little more warm and comfortable. Creating a comfortable environment where people feel safe will contribute to a great learning space.

In addition to color, texture is also something that can be visually encouraging. Rough textures, or textures with many visible layers, elicit more energy from the space; creates a more dynamic area. These textures would be best incorporated into a common space. By doing this, the space brings people together and creates a sense of energy mimicked by the activities happening within. Smoother textures create a calm space. These would be implemented into the spaces dedicated for studying or intentional learning such as a classroom or library. The lack of texture will allow for more focus on the learning material in presented to them.

Lighting and Transparency

Derrick Behm stresses the need for ample diffused lighting. Open space is wonderful, but glares from the sun can strain or inhibit visual communication. Bouncing the light off of nearby surfaces or designing with specific types of glass can achieve this need for diffused light. Thomas Schielke, of Arch Daily, explored many ways to bring an abundance of diffused light into a space. The orientation and urban surroundings have a large role in the potential for diffused light. The surrounding buildings and thier shadows and reflected light will need to be taken into consideration as well. Schielke suggests, "Enlarge as much as possible the perimeter footprint in order to maximize the daylight for interior spaces. Long and narrow building forms work better; atriums offer additional possibilities." Due to our location in the northern hemisphere, southern windows let in the most direct light; however, should not be oversized. In turn, northern widows should be as large as possible. Additionally, applying a daylight reflector system on the ceiling in combination with light colors with a matte finish help bounce the light throughout the space, improving visual comfort (Schielke, 2014).

Glass is a material with a great deal of potential as it has many implications, both on the exterior and interior of a building. Great advancements have been made in smart glass, including photochromic and electrochromic devices. Photochromic glass has the ability to regulate the transparency based on the amount of direct sunlight striking it. Implementing this type of material within an atrium space will allow for ample diffused light during the day, and still preserve the view of the night sky after the sun sets. Derrick Behm addresses the issue of translucency within deaf space in his case study at Gallaudet University. Small details such as using large translucent windows in doors allows for the recognition of someone's presence (Vox, 2016).

Electrochromic glass is a great solution to this issue. These

devices allow for the material to convert from a transparent state to a translucent or even opaque state when an electrical current is applied. Once the current is sent through the material no additional energy is needed to keep the glass translucent ("Smart glass," 2016). This technology has already been implemented into architectural design and is as easy as flipping a switch. Applying this technology to meeting rooms, faculty offices, and even study spaces will give visual confirmation to whether the space is occupied or vacant. When exploring design for the Deaf Community, glass and transparent materials are more important. They preserve and individual's line of sight and allow for improved communication.

Spatial Development

Communication is a key factor when investigating any type of design; but many people don't consider communicating through only visual means. Communication occurs through more than just face to face interactions. We communicate with our environment through the way we move around a space. There are many sounds that hearing people take for granted. For example, footsteps from behind, voices around a corner, or someone calling your name across a room. With that being said, small details have large benefits when designing a space without sound.

Derrick Behm's case study at Gallaudet University explored more than just materials; he also investigated the development of space. Behm defines Deaf Space as, "An approach to architecture and design that is primarily informed by the unique ways in which Deaf people perceive and inhabit space" (Vox, 2016) In terms of group spaces within a deaf school, the classrooms are biggest exception to universal design. The spaces are smaller, and the desks are aligned in a U-shape or semi-circular fashion. This allows each student to have a front row seat in the class, maintaining a constant sight line between them and the teacher. The spatial layout also allows each student to continually connect with other classmates resulting in group discussion and clear communication.

Walkways are another place of consideration. When walking in a hallway and signing to another person, there needs to be an amount of space between the two people. That distance parameter is known as the visual communication range. It's the extra space that is needed to observe the whole body and it's signing in order to communicate effectively (Vox, 2016). Hearing people may disregard this space because they have no need for that visual field of communication. An extended visual field is required when interacting with the space its self. Something as simple as rounding the corners in a hallway allows for that enlarged range of vision and easier interactions within the space. Because of the absence of sound, this small gesture is extremely beneficial.

Continuing to address circulation, stairs are another aspect of design that can be altered to benefit Deaf Space. Stairs require a surprising amount of visual attention to your footing. That attention makes it much more difficult to communicate with those around you as a deaf individual. In response to that, Behm suggests designing with ramps and sloped walkways (Vox, 2016). These walkways reduce the amount of visual attention needed, in turn allowing for easier navigation of the space while communicating with others.

Because deaf individuals aren't getting information auditorily, the visual range within a space becomes very important. Standing at the top of an atrium on a terrace, someone must be able to see down to the bottom of the space without interference. Maneuvering between the different levels in a space with many levels is enhanced by using something as simple as transparent elevators. Within large spaces like this, breaking them up with partitions allows the space to transform while continuing to keep communication available.

Community

Within a school there is an inherent sense of community. Places such as auditoriums help express that community through art, music, and theatre. The National Theatre of the Deaf is the oldest theatre company in the United States. They have been touring and uniting the deaf community since they were founded by Dr. Edna Simon Levine in 1967 ("National Theatre of the Deaf," 2016). As the National Theatre for the Deaf tour the entire country, they empower young deaf student s to get involved within their local community. Providing a space for young students to express themselves is a key aspect in a complete school design.

Even with the absence of sound, there are still incredible ways in which deaf students can experience music. Sound is emitted as a wave within a 3-dimensional space. That wave creates vibrations that are small disturbances of the particles in a given body (Zureick, 2010). These vibrations are the key to experiencing sound or music. By amplifying the vibrations, deaf individuals can actually feel the music that is being played. Martin Garrix, in combination with 7up, put on a concert for the deaf that did this exact thing.

The students involved in the concert were all completely deaf. Marie Celine Merret, the producer of this experience says, "Music is so much more than sound!" In response to her statement, she and the creators of the concert developed customized cone speaker walls that encircled the dance floor, surrounding the audience with vibrations. They also custom fabricated vibrating platforms for the students to dance on that responded to the music. If that wasn't enough, the room was filled with visual vibrations using light and water experiments. In addition to creating a unique, cohesive space, each student was equipped with a small yet powerful wearable speaker that also vibrated along with the music. All of this was done to create a once in a life time concert experience for deaf students who loved music. Layne Braunstein says, "Music transcends the ears; it's life changing." Every member in attendance that night claimed that it was one of the best experiences of their life (Goldman, 2016).

In order to create a place for concerts like this to happen, there are some acoustical considerations that need to be made in regards to materials and building shape. This space is extremely loud, however must be made so that it doesn't disrupt everything around it; especially when attaching it to another building. There are many ways in which to soundproof a space like this. An extremely effective way is to create two shells with an air space between them. The exterior of the space is made from a dense material such as concrete, while the inside of each wall within the air space is lined with an acoustically absorbent material. Though the technology is doing most of the work amplifying the vibrations of the music, the shape of the building can help too. A dome is a natural shape that continually directs sound back to the center. That shape paired with an interior material that reflects sound will add to the experience being created (Cox & Dickey, 2014).

Universal design isn't always the best route to take when designing a building for the deaf community. Designing for a world without sound takes more attention to details that would be lost in a hearing world. With the creative use of technology, and by making intentional design decisions in regards to materials, lighting, and spatial development, an architect can create a positive learning environment and develop a strong community for deaf students.

Annotated Bibliography

Absorption (acoustics). (2016, August 17). In Wikipedia, the free encyclopedia. Retrieved from https://en.wikipedia.org/w/index.php?title=Absorption_(acoustics)&oldid=734883715

Acoustic absorption refers to the process by which a material, structure, or object takes in sound energy when sound waves are encountered, as opposed to reflecting the energy. Part of the absorbed energy is transformed into heat and the rest is transmitted through the absorbing body. The energy transformed into heat is said to have been 'lost'. When sound collides with a material, part is reflected, transmitted, and absorbed. The absorption is a factor in soundproofing, which aims to absorb as much energy as possible. Soft porous materials are good insulators. Dense, hard materials reflect the most sound.

Baker, S., & Baker, K. (1997). ERIC ED414671: Educating Children Who Are Deaf or Hard of Hearing: Bilingual-Bicultural Education. ERIC Digest #E553. Retrieved from http://archive.org/details/ERIC_ED414671

Deaf children have fallen behind on the learning curve due to total communication and oral approaches. The Deaf community advocates for the right to pass on their language and culture to future generations. From studied done in Sweden, children who are deaf benefit from a bilingual-bicultural educational system. Deaf children benefit from learning information through visual language (ASL). Creating a strong community promotes a health self-image and confidence in the ability to interact in a wide array of situations.

Cox, T., & Dickey, C. (2014, June 6). The Acoustics of Eavesdropping. Slate. Retrieved from http://www.slate.com/articles/arts/culturebox/2014/06/the_acoustics_of_eavesdropping_how_curved_ceilings_and_walls_redirect_and.html

There is scientific diagrams that illustrate how sound deflects on a shaped surface. Elliptial ceilings can enhance communication between two people. The rays will hit the ceiling going upward then hit the surface and focus on the listener. The elliptical ceiling distorts the sound and causes disastrous echoes. A spherical dome reflects sound back to the center, and from one side you can hear someone on the other.

Goldman, L. (2016, March 30). This Concert Gave Its Deaf Audience Good Vibrations | Care2 Causes. Retrieved October 4, 2016, from http://www.care2.com/causes/this-concert-gave-its-deaf-audience-good-vibrations.html

All of the students involved in the experience were completely deaf. They claimed it was the best night of their lives because they could experience music in their own way. They were immersed in an experience that was made specifically for them. The students could see and feel the music being played, being able to enjoy it on a completely new level.

Hoffman, D., & Andrews, J. F. (2016). Why Deaf Culture Matters in Deaf Education. Journal of Deaf Studies and Deaf Education, 21(4), 426–427. https://doi.org/10.1093/deafed/enw044

Bilingual-bicultural systems benefit young deaf students. Deaf students can and should be exposed to both world, deaf and hearing. There are things teachers can do in a hearing classroom to benefit deaf students, however encouraging the use of ASL lends to a stronger self-image. A strong deaf culture intertwines both language and atmosphere. They have become one thing within a school.

Meacham, M. (2015, April 28). How Color Can Affect Learning. Retrieved October 5, 2016, from https://www.td.org/Publications/Blogs/Science-of-Learning-Blog/2015/04/How-Color-Can-Affect-Learning

Color is processed in multiple parts of the brain. Recognizing color has specific neurological patterns. Color also aids in pattern recognition. Research has shown that subjects performed five to ten percent higher on pattern recognition texts given in color rather than black and white. Color stimulates specific brain functions. This study showed how the brain reacts when exposed to different color stimuli.

Music Lifts You Up | 7up.com. (2016). Retrieved October 4, 2016, from http://www.7up.com/en/music/the-creators

This concert took music and made it something people could feel and see rather than something just listened to. They built an entire concert experiment for a deaf audience. From custom speaker walls to vibrating platforms and wearable speakers, the creators did it all. All of the students involved in the experience were completely deaf. They claimed it was the best night of their lives because they could experience music in their own way.

National Theatre of the Deaf. (2016, April 15). In Wikipedia, the free encyclopedia. Retrieved from https://en.wikipedia.org/w/index.php?title=National_Theatre_of_the_Deaf&oldid=715462016

The National Theatre of the Deaf was established in the 1960s and has been the longest standing theatre company in the United States. They go on tours producing original shows for their deaf audiences. Founded by Dr. Edna Simon Levine. All of the shows incorporated American Sign Language with vocal interpreters. They encourage young deaf individuals to peruse their dreams in a big way.

Schielke, T. (2014, January 27). Light Matters: 7 Ways Daylight Can Make Design More Sustainable. Retrieved October 7, 2016, from http://www.archdaily.com/471249/light-matters-7-ways-daylight-can-make-design-more-sustainable/

Daylighting and incorporating diffused light within a space take into account several key elements. Exposure and orientation of the building. The openings presented on the southern, and northern faces make a large difference in the type of lighting allowed into the space. Interior materials and colors play a role in how the light will bounce around the space. Different spaces may be dedicated to tasks that would benefit from direct light. Daylight reflector systems can be used to diffuse unwanted light in certain areas.

Smart glass. (2016, September 4). In Wikipedia, the free encyclopedia. Retrieved from https://en.wikipedia.org/w/index.php?title=Smart_glass&oldid=737633587

Electrochromaic devices change light transmission properties in response to voltage and allow control over the amount of light and heat passing through. Electrochromic windows change the material opacity from a transparent to a translucent or opaque color. Once a current is applied to it the glass will remain translucent or opaque without any remaining current running through it. These windows have been implemented within architecture to create privacy, eliminate blinds and shades, minimize glare, and reduce heating and cooling requirements.

Tomasuolo, E., Elena. Valeri, G., Di Renzo, A., Pasqualetti, P., & Volterra, V. (2013). Deaf Children Attending Different School Environments: Sign Language Abilities and Theory of Mind. Journal of Deaf Studies & Deaf Education, 18(1), 12–29. https://doi.org/10.1093/deafed/ens035

The study examined whether full access to ASL as a medium for instruction could influence performance. Three groups of children ages 6-14 were placed in different learning environments. Two groups of deaf children participated. One group was placed in a mainstream school with a single interpreter, the other in a bilingual-bicultural school. The bilingual-bicultural group performed significantly better on lexical comprehension and theory of mind tasks.

Vox. (2016, March). How architecture changes for the Deaf. Retrieved from https://www.youtube.com/watch?v=FNGp1aviGvE&feature=youtu.be

The study of the redesigning of building on Gallaudet University's campus brings up a lot of point about designing for a world without sound. The study looks into visual considerations and how the small details or intentional design changes can benefit a deaf population. The study covers color, lighting, walkways, accessibility, and spatial development. Small considerations make a large difference when designing for the deaf community.

Zureick, A. (2010, December 1). Vibrations Surround Us: The Science of Music. Retrieved from http://dujs.dartmouth.edu/2010/12/vibrations-surround-us-the-science-of-music/

Vibrations are small oscillation disturbances of the particles in a given body. Regular vibrations have a defined period, the amount of time it takes to complete a cycle. Vibrations are really 3-dimensional waves that expand in all directions from the point of origin. The difference in period is what defines the pitch, and a combination of these are how we create and perceive music.

PRECEDENT ANALYSIS

These case studies look into different aspects of Deaf Space. Each project sheds light on a slightly different typology and analyzes the space created through intentional design. The following projects emphasize that intentional design for a community without sound can create a beneficial architectural experience that can enhance their world. Using specific materials and innovative technologies, paying attention to lighting and spatial development, and making small yet intentional adjustment, can result in spaces that contribute to the well-bing and functionality of deaf students and individuals within their built environment. All of these lead to a positive learning space for students to create a community and grow with all of the potential possible.


figure 1


figure 2

Living and Learning Residence Hall

The Living and Learning Residence Hall at Gallaudet University takes a new look at the development of "deaf space." LTL and Quinn Evans Architects paired with Gallaudet's ASL and Deaf Studies Department to create and exemplary building tailored to deaf, cognitive, linguistic, and cultural ways-of-being. The program was expanded to include public gathering spaces, student residence, classrooms, offices, and collaboration studios. Gallaudet wanted to challenge the way in which residential and academic components of campus interact by changing the current separation between them and reactivating the mall as the center of university life.

The designers were extremely careful to make sure that communication between the spaces was possible. This was accomplished by using transparent materials, open spaces separated by partitions, and vertical voids in space. Movement through the spaces was addressed by using sloped walkways and by extending the tread in the stairs.

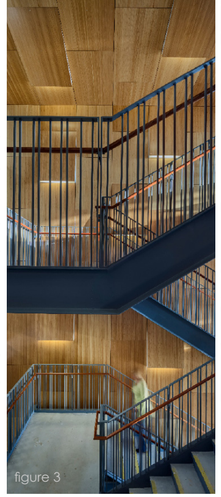


figure 3

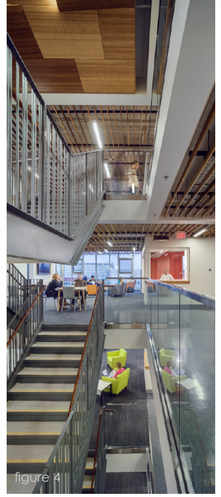


figure 4


figure 5


figure 6

Communication was also facilitated by the use of specific colors; muted blues and greens that contrast with most skin tones. The classrooms were integrated near group spaces encouraging collaboration among the students. This also brought life back to the main mall, revitalizing it and creating a center for community and activity. The spaces move vertically from public to private; multi-purpose and larger class rooms on the main floor, then dorms on the upper floors.

figure 7

Drawing Conclusions

Spatial development can revitalize and create community among deaf students. By combining residential and public learning spaces within the same building, Gallaudet University was able to bring new life back to this part of campus. Communication is key throughout this process and can be aided by the use of specific colors and materials, as well as the way in which the students move about a space. The designers did a great deal of consulting with the users of the space which benefited in the development of a space that people wanted to be in. Though pairing my project with residential wasn't in the initial plan, it may be something to consider moving forward.

figure 8

Skådalen Skole

Skådalen Skole by Sverre Fehn is a school for the deaf built in the early 70s on the Holmenkollenåsen on the outskirts of Oslo, Norway. The school is a small campus surrounded by nature. Located on the hillside, the campus incorporates several dormitories, a sports and swimming hall, pre-school, cafeteria, and kitchen. The intention was to create an appropriate surrounding for the deaf children. Fehn designed the buildings carefully as he considered the visual connections among windows and light-flooded rooms. The main material used in the design was concrete. This was an intentional design decision to prevent distraction within the learning environment.

figure 9

The design was an experimental exploration into materials. Concrete was used to prevent distractions. The concrete was paired with simple red brick to create some variation among the textures and large windows to let in ample diffused lighting. A few years later the school staff painted all of the exposed concrete white and installed false ceilings to improve the acoustics and cover the concrete. Many years later the concrete was re-evaluated and found to be an effective warming material.

Fehn designed the spaces to grow as the age of the students increased. He even designed specific furniture that varied in height to accommodate all ages. The campus was initially designed as a boarding school and was envisioned to be a home away from home for these young students. However the entire project was rejected by many of the parents as the initial plans were released to the public. The press called it "Concrete hell for deaf children."

figure 10

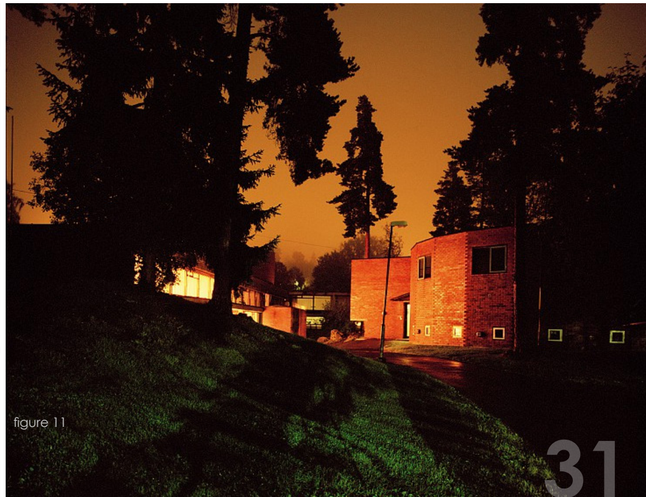


figure 11

figure 12

Drawing Conclusions

Even though this project was rejected at the time, the material exploration adds to the campus. The large atrium and windows allow for plenty of diffused light. However, lowering the ceilings in the hallways creates a cave like feel that isn't as conducive to a beneficial learning environment. Concrete can still be used in the construction, especially in a climate that changes with the seasons as it's a wonderful thermal barrier. The pairing of simple textures is a good way to prevent over stimulation for deaf students, however pure white or concrete walls create a potentially oppressive environment. Again pairing the school with residential wasn't something initially considered, but will be something to consider.

figure 13

Roomroom

Roomroom is a single family residence designed by Takeshi Hosaka built in Tokyo, Japan. The home was designed for a family with two deaf parents and their unimpaired young children. The house is a simple box comprised of two stories and an accessible roof. The unique aspect of the dwelling is that there are a multitude of small windows, openings, and well holes placed throughout the house. The openings in the facades function as the bridge between the first and second floor to enhance communication. Some of the punctures function as conduits for plants and the incorporation of a rooftop garden.

The design features small openings that really bring the space to life. The openings allow for light, air, and life to circulate through interior and exterior spaces. Plants are also allowed to bridge the floors and flourish from the lower floor into the open upper space. The rooftop cut outs also flood the space with natural, diffused light and ventilation.

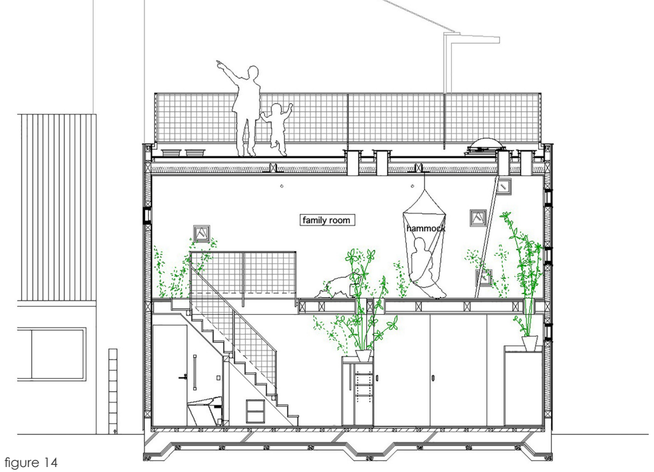


figure 14

Section S:1/75

figure 15

figure 16

Communication is a key aspect to any family dynamic and this design embraces the unique way in which this family communicates. Sometimes, the children drop small toys to alert their parents. The small well holes also facilitate the communication between floors, they allow the parents to sign to each other through sign language.

figure 17

Drawing Conclusions

Communication between people and the environment is a key aspect in the development of space. The innovative way to embrace the bridge between the upper floor and lower floor was a strong design decision on the part of the architect. The small spaces used in the house translate to larger atrium spaces within public buildings where the same line of sight for communication is still needed. Aside from the communication aspect, the space is simple and free of visual distraction, a common theme found throughout my research.

figure 18

Dialog Im Dunkeln

Dialog Im Dunkeln or "Dialog in the Dark" is an immersive experience into a world of a blind individual. This experience is lead by blind guides that bring small groups of people though a day in the life of a blind person. Through this experience they hope to "open your eyes" to a new world and the different challenges it brings with it. Each group is taken through the exhibition and their view of daily life tasks are met with a new perception. Blind guides lead the group providing a sense of security, while the participants experience the world through only sound, smell, and touch.

figure 19

Blind guides lead tours of no more than eight people through the exhibition. During which participants are brought through a grocery store, crossing a street, a short boat ride, and into a coffee bar. The idea is that each of these tasks is simple but gives the sighted person a new perspective on daily life activities. The tours lasts about 90 minutes and goes through a course that is approximately 500 sq meters.

figure 20

In 2014 this company successfully transferred this idea into a deaf experience. Deaf guides will lead groups of no more than twelve participants through soundproof rooms where they learn about the challenges of non-verbal communication. Participants are shown how to communicate with their expressions and gestures as well as listen with their eyes instead of their ears. Some of the challenges include: The Dance of the Hands, Gallery of Faces, Forms and Flgures, and The Game of Signs.

figure 21

figure 22

Drawing Conclusions

An immersive experience like these are really interesting for those who are not hindered by an absence of a single sense. In both the blind and deaf exhibitions, participants have an opportunity to broaden their horizons and change their perception of the world and how to interact with it. I believe this knowledge is imperative because it allows for understanding and eliminates fear of the unknown interactions. I want to implement some of these aspects as I draw people into a world without sound. My goal is to bring to light the day to day challenges as well as open eyes to new ways of communication and a better understanding of deaf culture.

DESIGN PROGRAM

The primary function of this building is to create a place where the deaf and hearing communities can come together to share information, culture, and experiences. The spaces within the building accommodate the deaf community while creating and immersive experience for hearing individuals. As you progress through the building, you encounter different aspects of deaf life. The spaces progress and lead a hearing individual through a day in the life of a deaf individual, bringing to attention the differences in everyday challenges the deaf community faces.

The architecture, materials, and technology aim to exemplify deaf space and create spaces that highlight the non-auditory senses in hearing individuals. The main goal is to bring to a forefront an awareness of deaf culture and change give a new perspective on spatial navigation and communication. Additionally, the program includes spaces that bring together both communities to facilitate interaction and the exchange of information, experience, and culture.

Name	# of Units	Capacity	Area/Unit	Net Area	Net:Gross	Gross Bldg. Area	Floors	Building Footprint	GAC	Land Area
Learning										
class room	25		1000	25000	0.6	41667				
study room	12		100	1200	0.5	2400				
library	1		2000	2000	0.75	2667				
computer lab	2		500	1000	0.5	2000				
art studio	2		500	1000	0.75	1333				
Subtotal						50067				
Community/Recreation										
auditorium/theatre	1		2000	2000	0.5	4000				
lunch area	1		5000	5000	0.5	10000				
atrium/community space	1		5000	5000	0.5	10000				
waiting area	1		100	100	0.5	200				
locker room	4		500	2000	0.6	3333				
gym	1		6000	6000	0.5	12000				
Subtotal						39533				
Admin/Misc.										
food prep	1		5000	5000	0.6	8333				
storage	8		100	800	0.5	1600				
bathroom	8		600	4800	0.6	8000				
admin offices	5		100	500	0.62	806				
nurses station	1		200	200	0.5	400				
dressing room	6		200	1200	0.5	2400				
stage storage	2		200	400	0.5	800				
mechanical	4		200	800	0.5	1600				
Subtotal						23940				
Building Total						113540	3	47667	11%	420000
Parking/Site Elements										
Staff		35		7000						
Visitor		10	200	2000						
Student		200		40000						
Service		5		1000						
Track/Field	1		240000	240000						
Subtotal						290000		290000	69%	420000
Total				64000		340619		337667	80%	840000

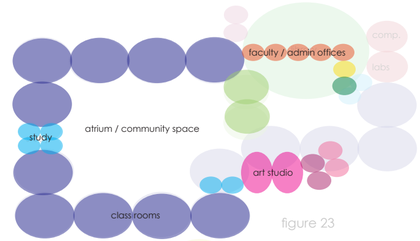
chart 1

Qualitative Comments

The foot print of the building takes up only a small portion of the site. This allows for less disruption of the land and more access to outdoor elements for activities. The track and field do take up a chunk of the land area, however potentially partnering with the middle school across the street would be an option to promote collaboration.

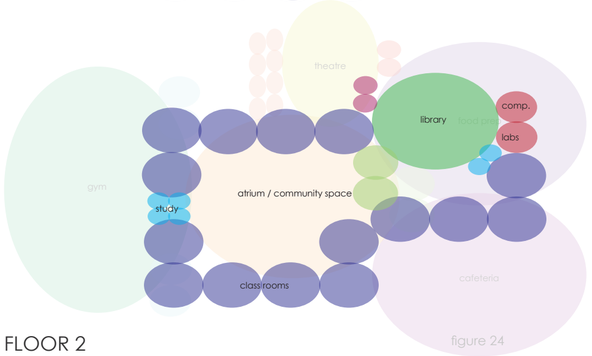
The classroom set up is divided so that the upper floor's primary use is for the younger students. The older students who have to move between classes are on the middle floor allowing them more convenient access to the community spaces such as the library, computer labs, gym, and theatre.

Floor one houses many of the community spaces. The spaces become more private as you ascend in elevation. The second floor is comprised of mainly class rooms, however the community library and computer labs are also housed on the floor. Lastly, the third floor is made up of more classrooms and faculty offices. If I were to incorporate housing into the project, that would be the upper most floors ensuring the most amount of privacy.



FLOOR 3

figure 23



FLOOR 2

figure 24

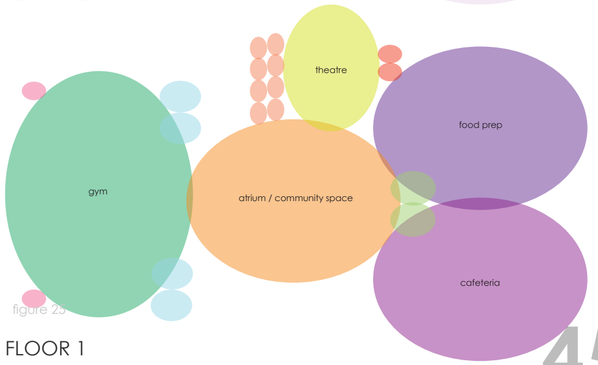


figure 25

FLOOR 1

Name	# of Units	Capacity	Area/Unit	Net Area	Net:Gross	Gross Bldg. Area	Floors	Building Footprint	GAC	Land Area
Museum										
entrance	1		450	450	0.6	750				
lobby	1		750	750	0.5	1500				
prep/transition	1		120	120	0.75	160				
kitchen	1		500	500	0.5	1000				
inside out	1		800	800	0.5	1600				
dance studio	1		550	550	0.75	733				
emergency	1		300	300	0.65	462				
bubble	6		500	1000	0.75	1333				
Subtotal						7538				
Misc.										
office	2		300	600	0.5	1200				
reception	1		200	200	0.5	400				
bathrooms	2		1000	2000	0.5	4000				
tunnel	1		800	800	0.5	1600				
Subtotal						7200				
Theatre										
stage storage	2		5000	5000	0.6	8333				
seating	1		3000	3000	0.85	3529				
stage	1		1500	1500	0.5	3000				
bathroom	2		1500	3000	0.6	5000				
ticketing	1		100	100	0.62	161				
sound booth	1		200	200	0.5	400				
dressing room	2		500	1000	0.5	2000				
prop shop	1		500	500	0.5	1000				
green room	1		400	400	0.75	533				
lobby	1		2000	2000	0.65	3077				
mechanical	4		200	800	0.5	1600				
Subtotal						28634				
Building Total						43372	1	43372	22%	195000
Parking/Site Elements										
Staff		15		3000						
Visitor		10	200	2000						
Service		5		1000						
Subtotal						6000		43372	22%	195000
Total				25570		49372		86745	44%	390000

chart 2

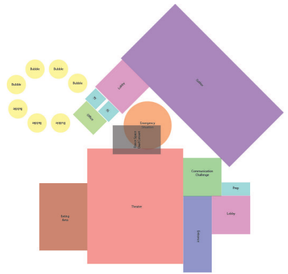
Qualitative Comments

Through further research, the program of the building shifted from an educational facility to a sensory museum.

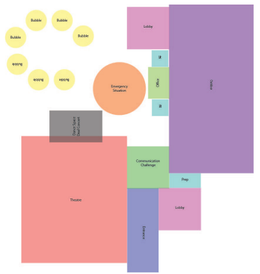
The foot print of the building takes up only a small portion of the site. This allows for less disruption of the land and more access to outdoor elements for activities. The theatre does take up a chunk of the land area, however it still leaves enough room for parking to be implemented or for additional use of the site by a separate contractor.

The layout is set up so that most of the elements are on the first floor. The few elements that are underground are also connected through skylights to the plaza above, utilizing the space in multiple ways. The theatre entrance is elevated slightly to create a grander approach.

The spaces are mainly organized along a linear path. This alignment provides a clear walk through of each space. The spaces progress from open to isolated then back to full integration within the theatre. There is external access to only one of the spaces from the exterior and that is the dance studio because it has a dual purpose and needs to be accessible from both the experience space and the general public.



LAYOUT 1 figure 26



LAYOUT 2 figure 27

LAYOUT 3 figure 28

FINAL LAYOUT

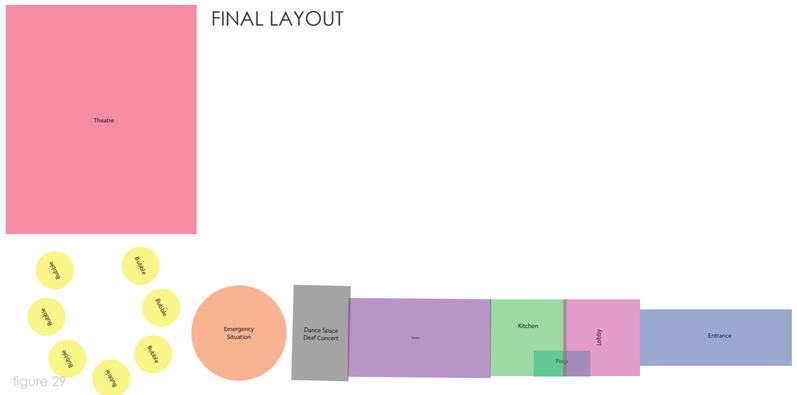


figure 29

Function

Since the state of California has the second highest deaf population and tourism, **the introduction of a building of this nature will be located in a place where it can act as a link between the deaf and hearing communities.**

Since sustainability is an important aspect to good architecture, **this building will aim to be at least LEED Platinum with goals during design to be a Net Zero facility while promoting sustainability to the community that will occupy this building.**

Form

Since line of sight is important among deaf individuals for communication, **this building will have an "open" feel throughout in order to facilitate productive communication between students and faculty.**

Since acoustical properties will be important in creating a "world without sound", **the building will incorporate innovative ways to use form, materials, and technology to insulate the building from unwanted noise.**

Since a prominent aspect of this building is to connect two communities, **the building will be designed to accommodate both.**

Economy

Since the design has a high emphasis on sustainability, **there will be a higher initial cost to develop and incorporate innovative technology and design.**

Time

Since the area is rapidly growing, **the time line for the completion of this building should follow suit.**

SITE ANALYSIS

San Francisco is a growing metropolitan area that has a large deaf population and high tourism traffic. These aspects of the place are ideal when attempting to connect the deaf and hearing communities within a single space. The city is not too busy as to have too many attractions, however it does have an appeal that brings people in and lets them explore.

This site brings the project to a growing part of the city. There are connection to many different elements such as medical facilities, parks, restaurants, bars, educational establishments, and community gathering spaces. Introducing a building of this typology so close to downtown and the embarcadero, expands the tourism area and draws people into a wider range of the city. Currently the site is the temporary home of the trans-bay terminal, however after the new hub is built this site will maintain its close connection and be easily accessibly from anywhere in the city.

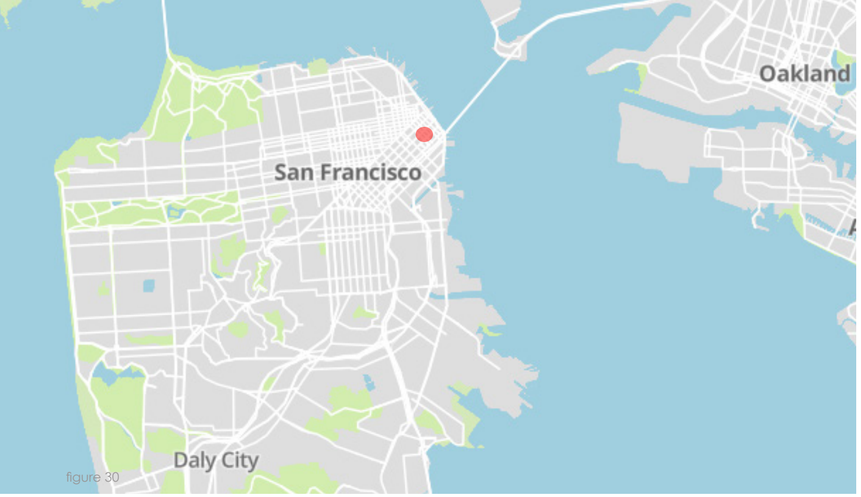


figure 30

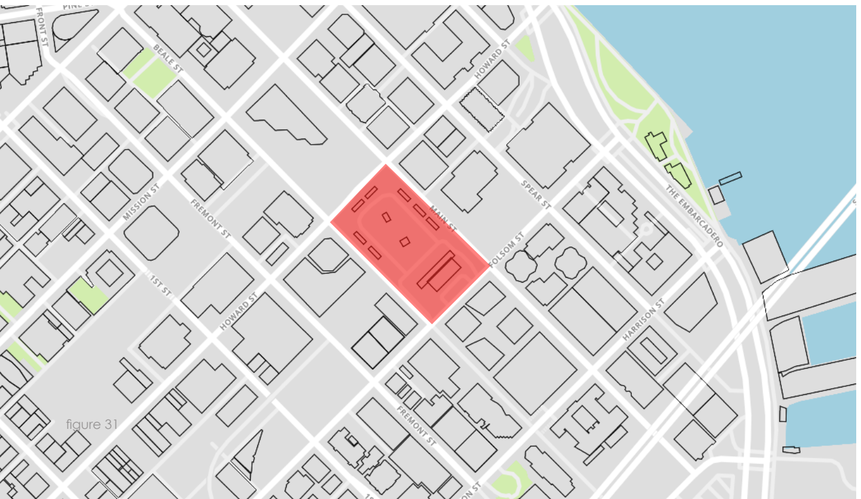


figure 31

San Francisco, California is the location picked for the site of the project. California has the second largest deaf population and an immense tourism industry making it a wonderful location for a sensory museum and theatre. The specific site is located in the SOMA district which is an up and coming part of the city with fast growing population and development.

figure 32

- Green spaces
- Medical facilities
- Educational facilities
- Restaurants and bars

The site has connection to many different amenities such as green spaces, medical facilities, educational institutions, and plenty of restaurants and bars. It is also located near the embarcadero, a major through way for the coast. There are plenty of public transit access points that connect to the rest of the city.


figure 33


figure 34

As seen in these site pictures, this part of town is growing quickly. It is connected to downtown and the financial district. There is quite a bit of new construction surrounding the site. The lot at this time is the temporary home to the trans-bay terminal. This provides connections to most places in the city as well as brings lots of traffic to the site. The Northern corner of the site is the most populated while the Southern corner is surrounded by mostly residential highrise apartments.


figure 35


figure 36


figure 37


figure 38

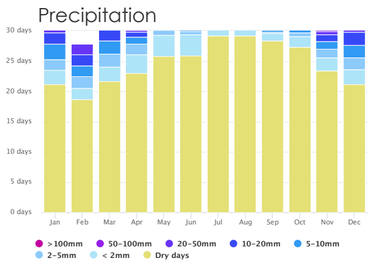


chart 3

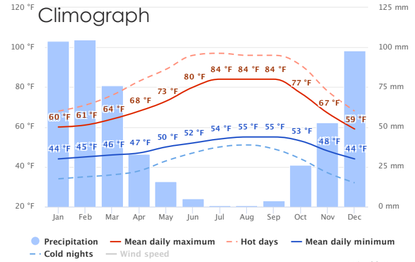


chart 4

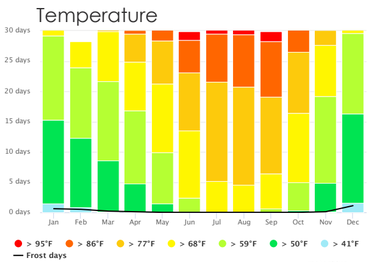


chart 5

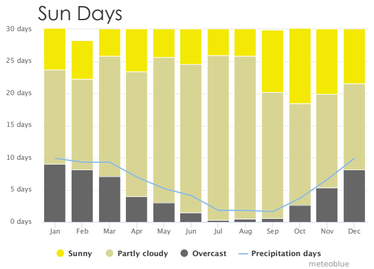


chart 6

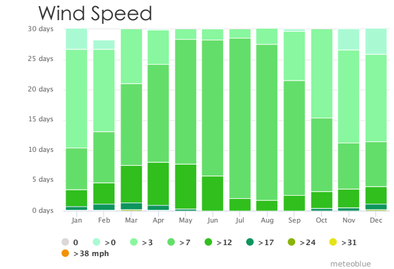


chart 7

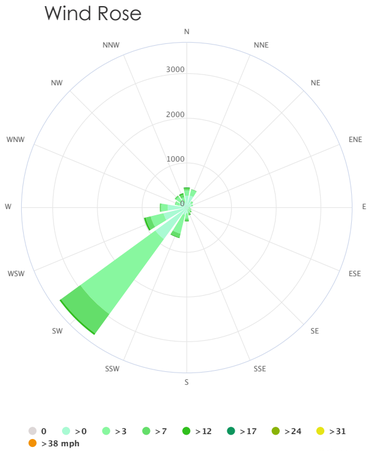


chart 8

Through climate analysis these charts show that San Francisco is a relatively dry environment with moderately high temperatures that don't have a large swing due to the proximity to the ocean. The rainy season spans most of the winter, resulting in hot and dry summers. There are more sunny days providing ample natural lighting opportunities. The wind comes mainly out of the southwest between 3 and 20 miles an hour, with the windy season being the beginning of the year.

This site map shows the amout of city noise, measured in decebels, that influence the site. The sound within a city, taking into account buildings, traffic, and human interaction, extends about 1/4 of a mile from a single point. Any sound emitted beyond this distance doesn't have much influence on the area. Measurements are shown based on activity within the building, traffic, and density of people.

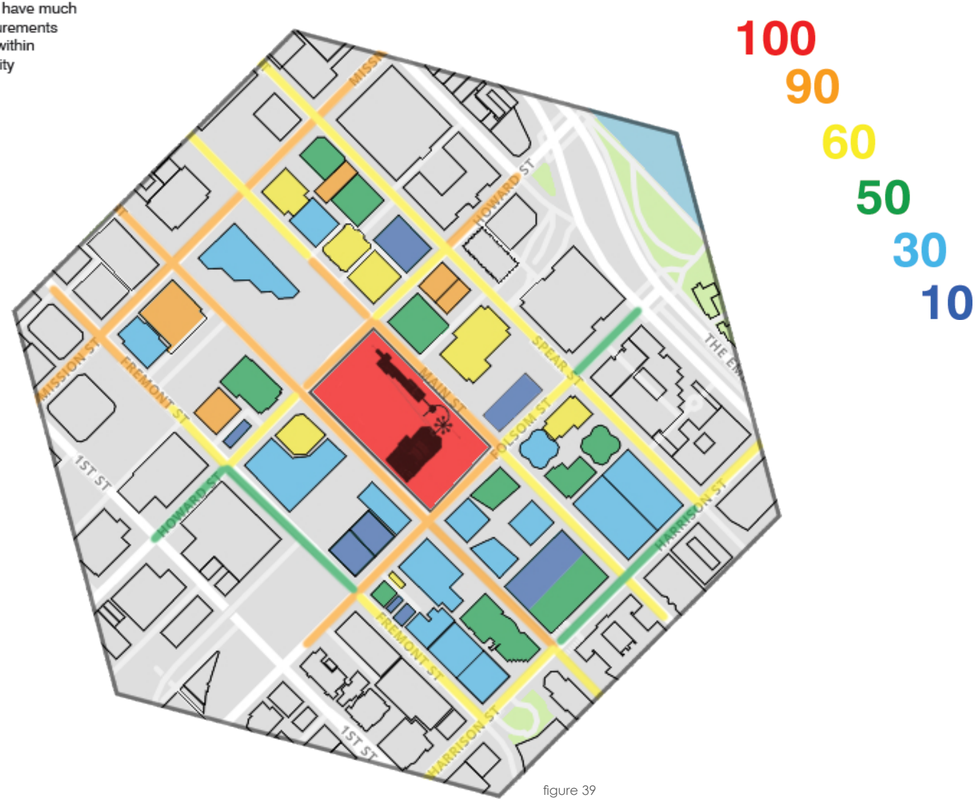
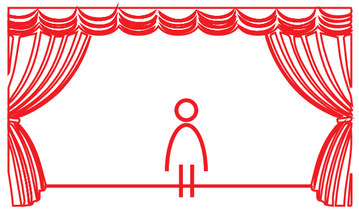


figure 39

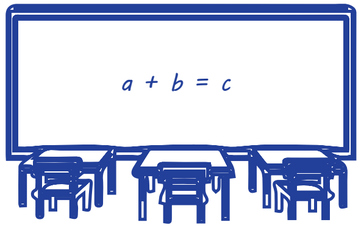
CODE ANALYSIS

This project combines two main building types. This represents both aspects of the project; education and community. With primarily steel construction, both portions of the project have the capabilities to be much larger than needed. This is beneficial because it allows for expansion as the school, community, and city grows. With such a large occupancy load, egress is always the main issue. The site has access on all four sides to facilitate in any emergency.

A - 1 (Assembly)



Occupancy Type



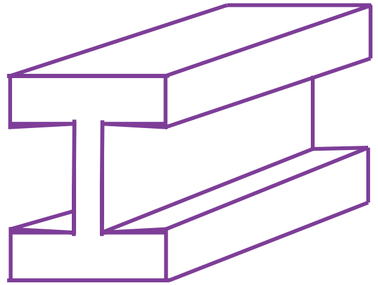
E (Education)

6,000 people

Occupancy Load = 1,000 people

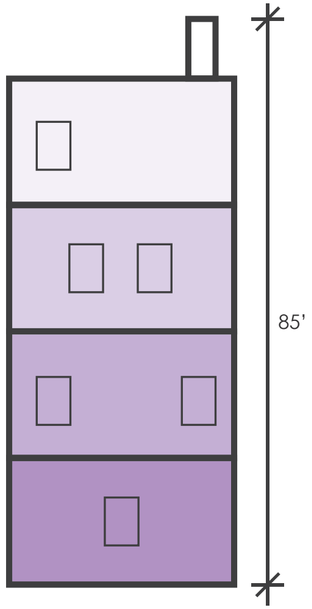
3,525 people

Construction Type
III A

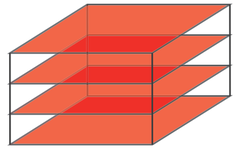


Steel Construction

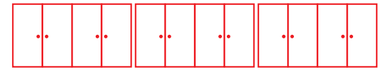
Maximum Height



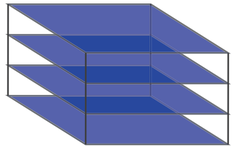
42,000 Total
10,500 per Floor



(6,000 x 0.3) / 12 = 150 Ft. Total
150 / 3 = 50 Doors
50 Doors / 4 Floors = 12 Doors per Floor
(3 means of egress with 2 double doors)

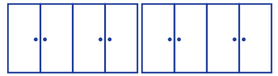


Maximum Square Footage



70,500 Total
17,625 per Floor

Maximum Exit Width = 36"



(3,525 x 0.3) / 12 = 88 Ft. Total
88 / 3 = 30 Doors
30 Doors / 4 Floors = 8 Doors per Floor
(2 means of egress with 2 double doors)

PLAN FOR PROCEEDING

Research Direction

Research will be completed by reviewing and analyzing articles and case studies pertaining to the deaf community. Research will be completed on the topics of light, sound, materials, schools, theaters, housing, and any other pertinent topic relating to the unifying premise.

All research completed on light and sound will pertain to the theoretical premise/unifying idea. Analysis will be completed on the effects that light and sound have on space as it pertains to deaf individuals. Conclusions will be made as to the most beneficial ways in which to implement and enhance the built environment.

Historical documentation will be analyzed to determine best how architecture has adapted to the needs of deaf individuals. Conclusions will be made in terms of programmatic requirements within the selected typology based on historical success of existing pertinent projects.

Research completed through the analysis of relevant typologies to determine their success in integrating one or more social groups. These studies will be evaluated and methodologies integrated into the final design.

Plan for Design Methodology

I will use a combination of methodologies to ensure a successful design solution. These methodologies include but are not limited to modeling, evaluative research, and logical systems research.

Modeling will be used to evaluate the quality of space being created. This will be achieved through both digital and physical models. Light, sound, material, and energy modeling will be the main aspects this type of research will help to address.

I will used evaluative research to analyze completed projects and evaluate their success with regards to the unifying idea. This will allow me to continually analyze my own design decisions as guided by the unifying theoretical premise.

Logical systems research will provide new insights as I attempt to combine typologies and create new interactions between uncommon aspects. This allows me to continually transform the relationships between design practices and social values as it pertains to the collaboration of the deaf and hearing cultures.

Plan for Documenting the Design Process

All physical deliverables related to this thesis project will be collected and compiled into a digital document. That document will then be submitted to the thesis advior.

All images will be takes hat 16 megapixles or higher to ensure good printing and viewing quality as to highlight the work as well as possible.

All digital files will be saved on an external hard drive to ensure safe keeping. They will then be uploaded to the North Dakota State University Architectural Repository and available online for future students, accreditation, and research.

All non-digital documents will be scanned in on a weekly basis then saved to the same external drive. Then they will be compiled into a digital file and submitted as process work.

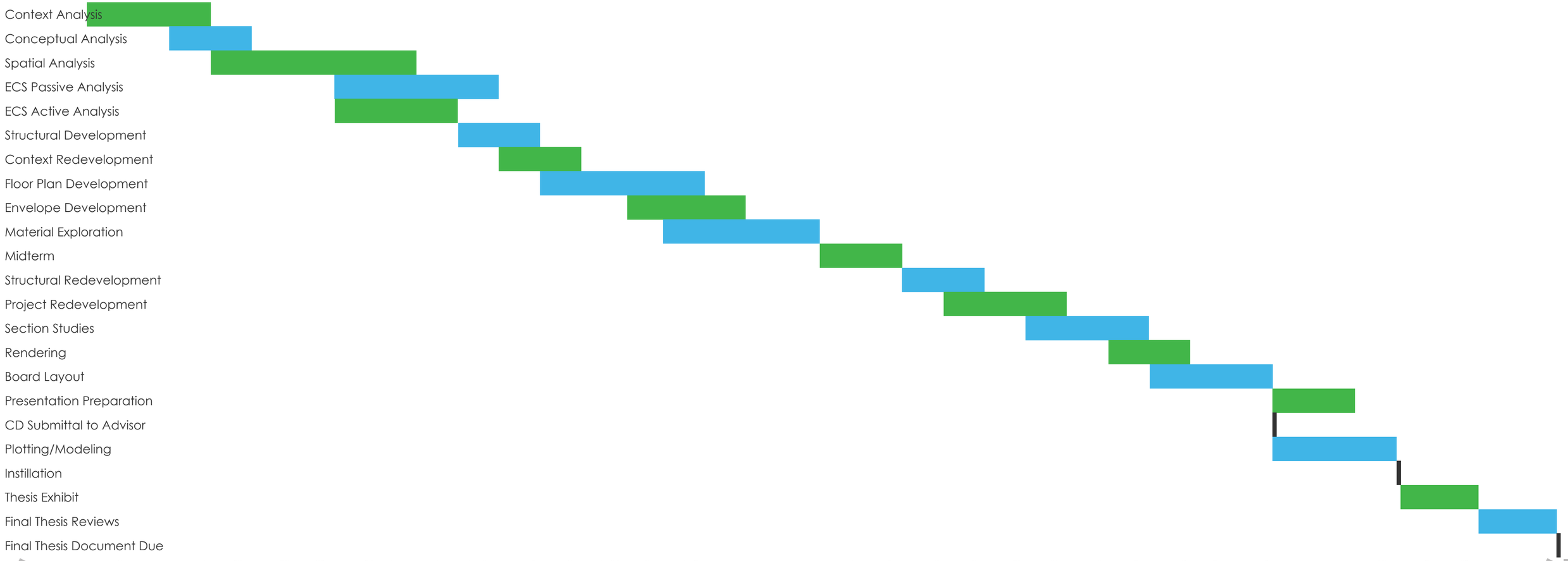

Context Analysis
Conceptual Analysis
Spatial Analysis
ECS Passive Analysis
ECS Active Analysis
Structural Development
Context Redevelopment
Floor Plan Development
Envelope Development
Material Exploration
Midterm
Structural Redevelopment
Project Redevelopment
Section Studies
Rendering
Board Layout
Presentation Preparation
CD Submittal to Advisor
Plotting/Modeling
Instillation
Thesis Exhibit
Final Thesis Reviews
Final Thesis Document Due
Jan. 9 - Jan. 15
Jan. 16 - Jan. 22
Jan. 23 - Jan. 29
Jan. 30 - Feb. 5
Feb. 6 - Feb. 12
Feb. 13 - Feb. 19
Feb. 20 - Feb 26
Feb. 27 - Mar. 5
Mar. 6 - Mar. 12
Mar. 13 - Mar. 19
Mar. 20 - Mar. 26
Mar. 27 - Apr. 2
Apr. 3 - Apr. 9
Apr. 10 - Apr. 16
Apr. 17 - Apr. 23
Apr. 24 - Apr. 30
May 1 - May 7

figure 40

FINAL DESIGN

THE PATH

This project leads the participants along a specific path throughout the building. Within each new space the attention is drawn to a different element or sense to be experienced. The transitions between the spaces are also important as they work to show change, create an experience in themselves, and alert you to the new experience to come.

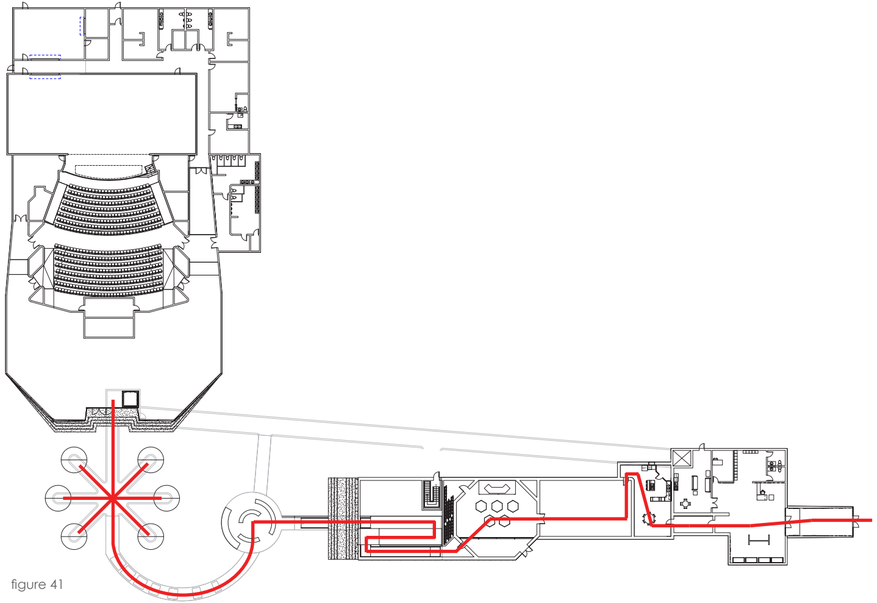


figure 41

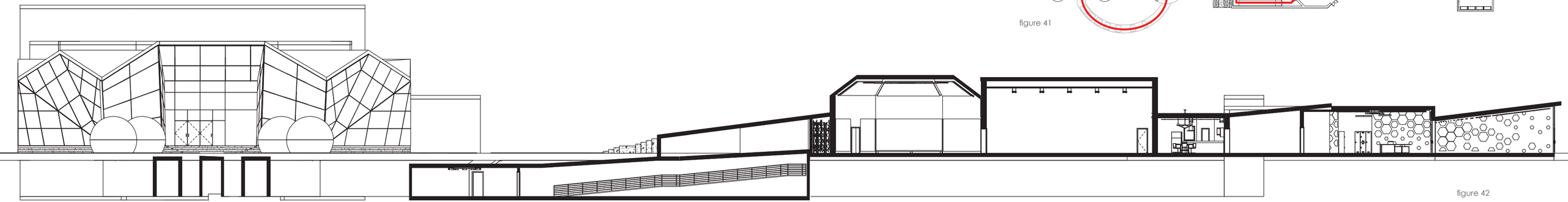


figure 42

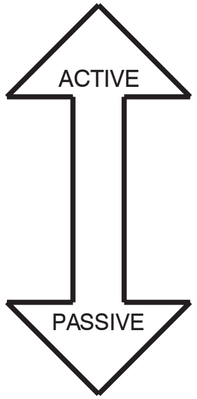
Bright Colors

High Ceilings

Resilient Surfaces

High Light Levels

Acoustically Reflective



Lower Ceilings

Soft Surfaces

Low Light Levels

Acoustically Absorbent

Subdued Colors

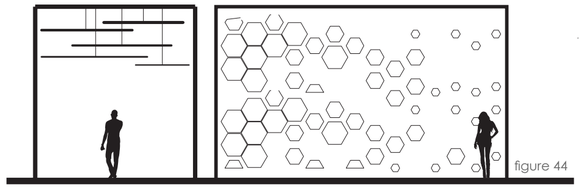


figure 44

The entrance of thesis project aims to draw attention to the noise level within the volume of the space and transition the person from noisy to quiet. The space achieves this goal by using the architectural shape; transitioning from a tall ceiling height to a lower one. Additionally, the walls are lined with acoustical tiles that become thicker and are arranged in a more dense pattern as you progress through the space. To accentuate the transition from the noisy exterior space to the quiet interior, drop ceilings are also used; more reflective materials closer to the entrance, then changing to a more absorbent material as you reach the interior door.

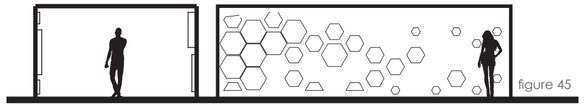


figure 45

Smaller and tighter spaces elicit a sense of comfort and coziness. The confined space prevents excess movement and lowers the amount of ambient noise present within a space. These spaces are easily constructed with wood or softer materials that will absorb more sound waves that some of the harder materials required for larger construction. However, this doesn't mean small spaces can't and aren't constructed out of concrete or similar materials. In spaces made of highly resonant materials, acoustical wall tiles are a solution to reducing the noise within a space. Due to the ceiling restriction, the panels can be mounted to the walls and vary in thickness.

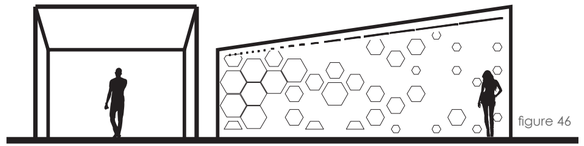


figure 46

Spatial volume plays a large role in the acoustical properties of a space. Larger spaces are generally louder and filled with more energy than that of a smaller space. Large volumes allow for more occupants and movement of both sound waves and people. This movement is a contributes to louder interior spaces. These spaces also require a more substantial structural system, lending to the use of harder materials that reflect sound, bouncing it all throughout the space. This reflection and reverberation of the sound waves causes echoes and more ambient noise. To compensate for the additional noise factor,implementing drop ceilings with acoustical tiles can eliminate some of the noise reflection, thus quieting the space and creating a more comfortable atmosphere.

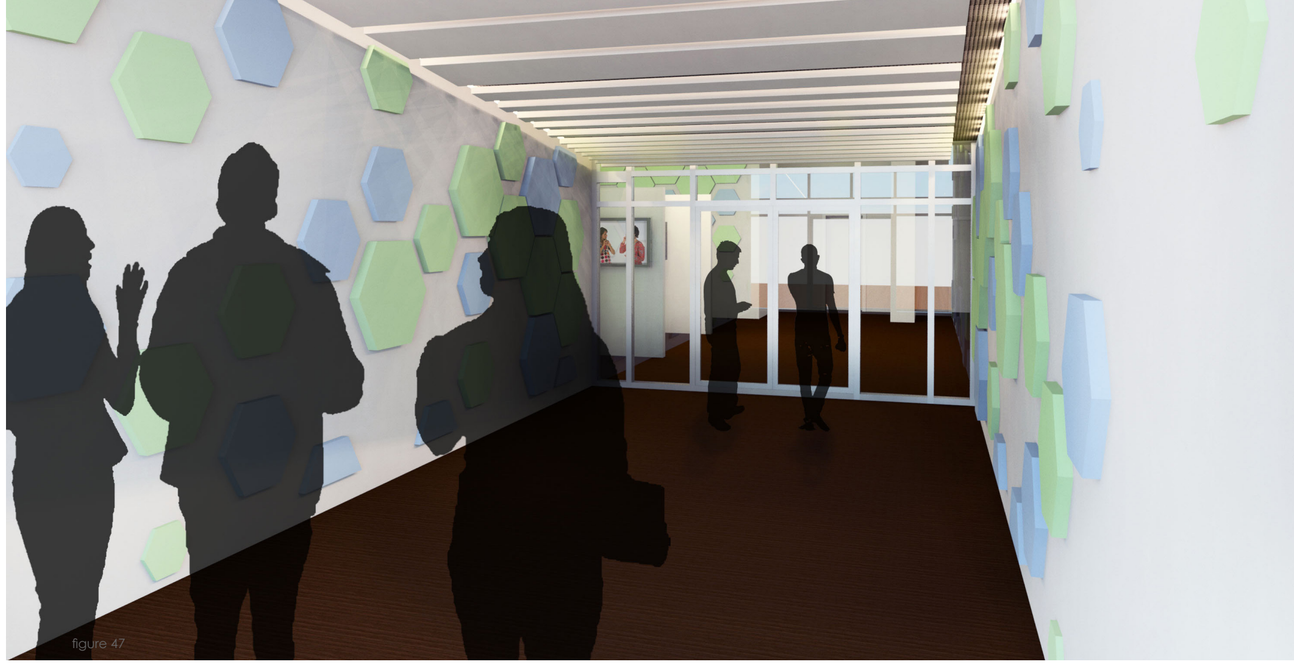
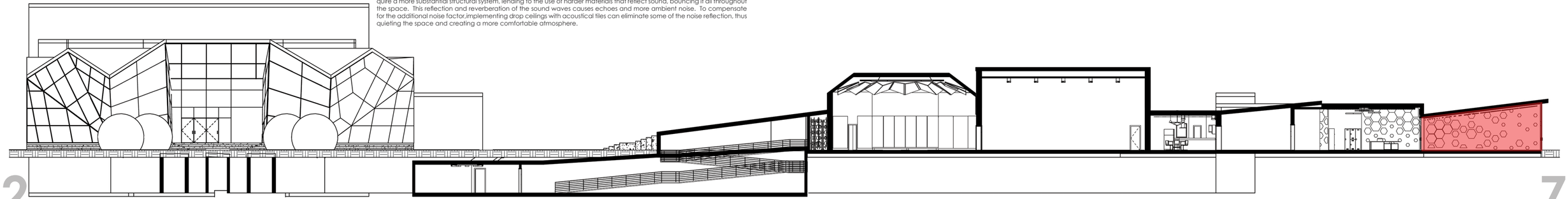


figure 47



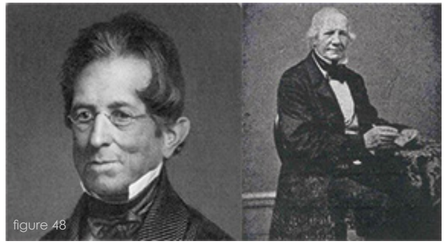


figure 48

In the early 19th century, deaf education was largely inspired by the desire to save deaf people's souls. A form of visual communication was developed to help convey God's word as written and preached from the Bible. In 1817, a deaf teacher from France, named Laurent Clerc (left) partnered with American educational philanthropist Thomas Hopkins Gallaudet (right) to establish the first American School for the Deaf. The school was located in West Hartford, Connecticut. This was first school for the deaf in the western hemisphere. Clerc went on to teach at the school for 41 years, using his knowledge of French Sign Language, to influence the development of what we know today as American Sign Language (ASL).

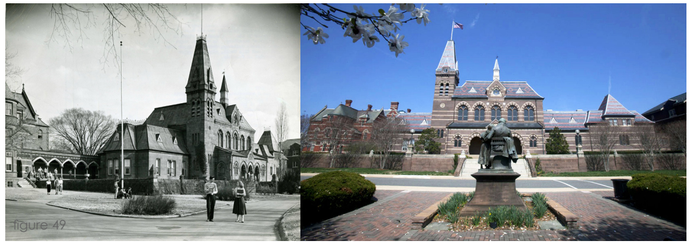


figure 49

In 1857, postmaster general Amos Kendall donated two acres of land in northeast Washington, D.C. to establish a school and housing for 12 deaf and 6 blind students. A year later he appointed Thomas Gallaudet's son Edward Miner Gallaudet's the first superintendent. In 1864 the U.S. Congress authorized the Columbia Institution for the Instruction of the Deaf and Dumb and the Blind to confer college degrees; President Lincoln sign the bill into law himself. Edward Gallaudet became the president of the first deaf college in the world where he presided over the first commencement giving 3 deaf individuals their college diplomas. Each of their diplomas were signed by President Ulysses S. Grant himself, and to this day all of the diplomas of Gallaudet graduates are signed by the presiding U.S president. The school's name was officially changed to Gallaudet College in 1954 as an honor and tribute to Thomas Hopkins Gallaudet.

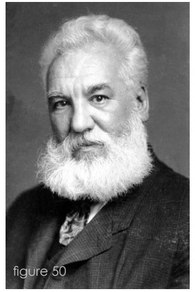


figure 50

In the year 1872, Alexander Graham Bell promoted deaf education by opening a school for the deaf that focused on the idea of Oralism. This is the teaching style that is now regarded as very controversial and focused on teaching deaf students how to speak and communicate audibly instead of using visual means of communication. This lead to the 1880 meeting of The World Congress of the Educators of the Deaf where they passed a resolution to promote Oralism in deaf education all over the world. In turn this dismissed most of the deaf teachers from the schools.

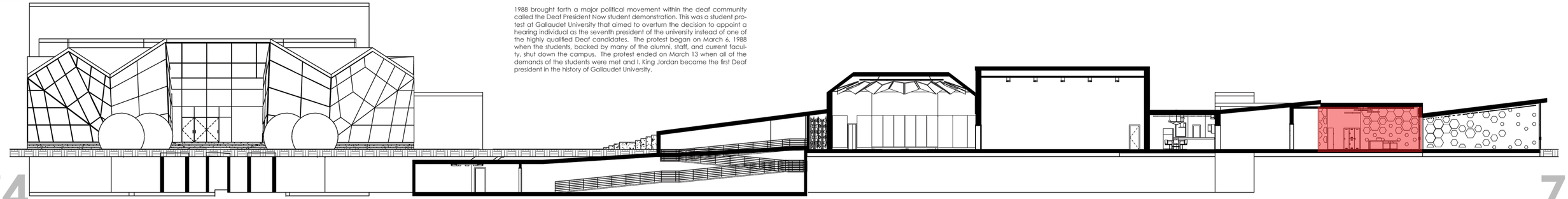
figure 51

In the early 20th century, deaf individuals saw the continual suppression of sign language in schools and the increasing importance and involvement of students in clubs and sports. With the goal of healthy competition and cultural and linguistic interaction, the International Committee of Sports for the Deaf was founded in 1924. That year they established the first World Games of the Deaf, or Deaflympics which took place in Paris, France. The Deaflympics are held every four years and host over 4,000 deaf athletes. In 1949, the Deaflympics added the winter games, also held every four years.

figure 52

1988 brought forth a major political movement within the deaf community called the Deaf President Now student demonstration. This was a student protest at Gallaudet University that aimed to overturn the decision to appoint a hearing individual as the seventh president of the university instead of one of the highly qualified Deaf candidates. The protest began on March 6, 1988 when the students, backed by many of the alumni, staff, and current faculty, shut down the campus. The protest ended on March 13 when all of the demands of the students were met and I. King Jordan became the first Deaf president in the history of Gallaudet University.

figure 53



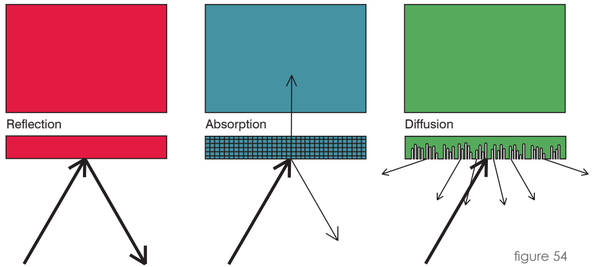


figure 54

Every sound wave will reflect off of a surface,and they can reflect with almost the same amount of intensity as the initial wave. This is how we get echoes and reverberation within space. Harder, more dense materials have a higher reflection coefficient. These materials included metals, concrete, and hard woods. When looking at acoustical design, most spaces strive to diminish the amount of reflected sound as much as possible.

As sound encounters a surface, depending on the specific material, some of that sound will be absorbed. Softer and less dense materials have a higher absorption rating making them ideal for soundproofing and acoustical design. These materials include fabrics, curtains, and foam. As the thickness of the material increases, so do the acoustical properties.

When sound waves strike a flat surface, the wave reflects and/or absorbs at an angle equal to that of the incident angle. However, when sound waves strike a jagged or uneven surface,they diffuse at many angles, decreasing the volume as the sound is dispersed throughout the space. Acoustical tiles are designed with this in mind, as to diffuse the sound as much as possible. Therefore, the shape of the sound-proofing material also plays a factor in its effectiveness.

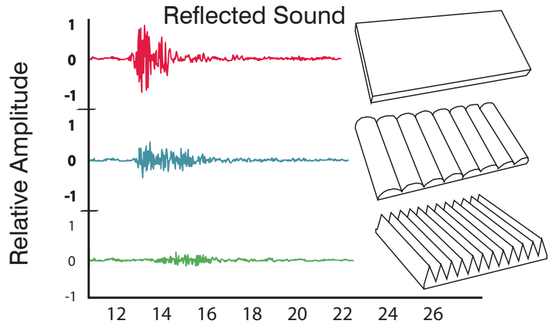


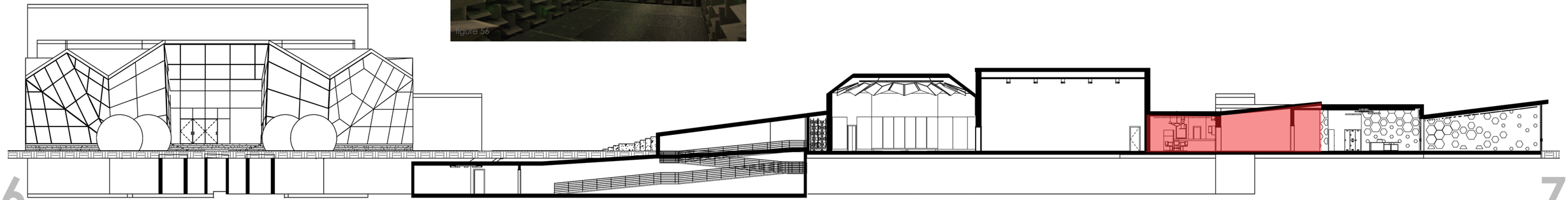
figure 55

As shown in this graph, the shape of a material's surface has an effect on the around of sound that is reflected back into the space. The more surface area a sound wave can interact with, the more diffusion will occur, dampening the sound.

figure 56

figure 57

Anechoic Chamber



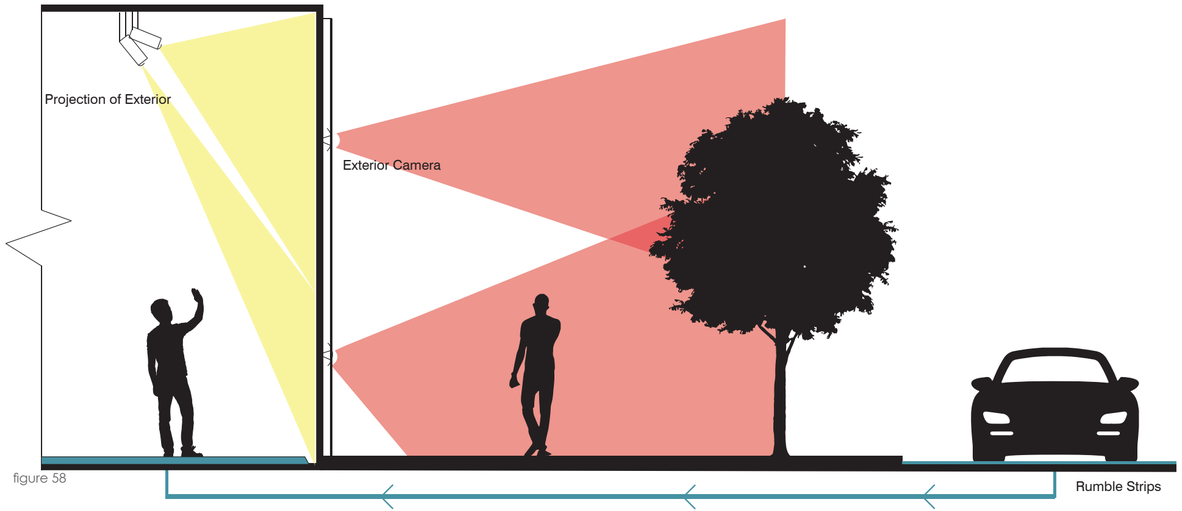
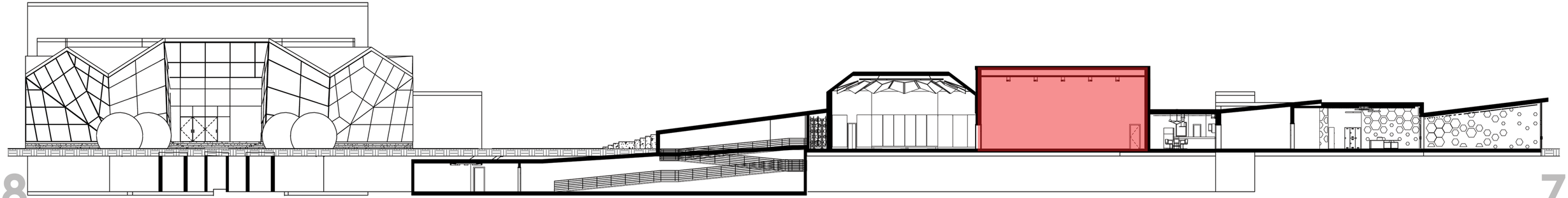


figure 58

This interior "exterior" space aims to create both isolation and interaction. Cameras mounted on the exterior face of the building record the outside world. Then projectors connected to the cameras display that life feed on the interior face of the wall. People on the outside cannot see what's happening on the interior of the building, however they are interacting with the barrier as they become part of the interactive media instillation on the exterior face of the building. The people on the interior of the wall can see this interaction. Still completely silent, the person inside feels a sense of isolation due to the lack of ability to communicate with the interaction before them. Additionally,this space attempts to stimulate the other senses by incorporating vibrating strips on the floor that send as very small vibration when triggered by the cars driving over the sensors on the street. This is to bring into play more than just visual awareness of a space by incorporating other senses.

figure 59



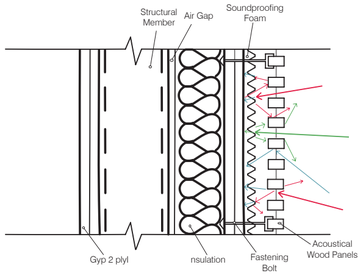


figure 60

The experience of the dance studio is an important one because it incorporates an aspect of life that most people don't consider when thinking about a world without sound. How does one enjoy or experience music without being able to hear the beat, listen to the melody, or sing the lyrics?

During the guided experience, you will be attending a dance class where you must learn a choreographed dance. However you must do so without being about to hear any sound. This poses an interesting challenge and highlights the importance of visual and tactile cues. Dancing without sound challenges us as hearing individuals to rely on our internal beat instead of being influenced by our surroundings.

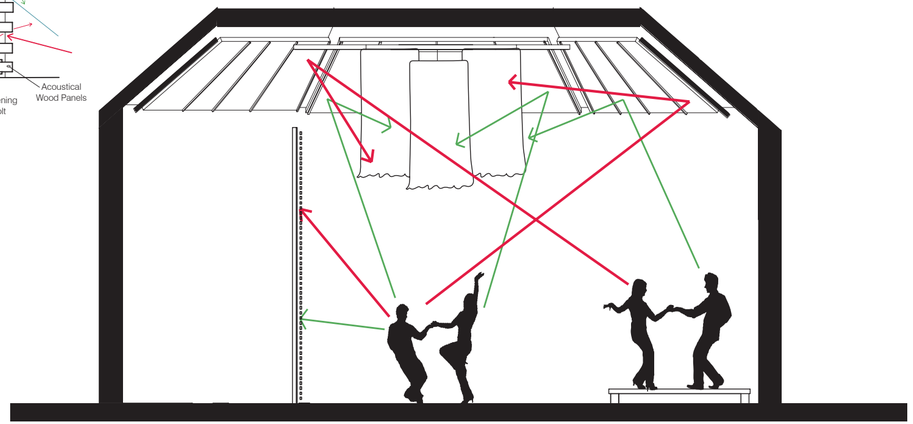
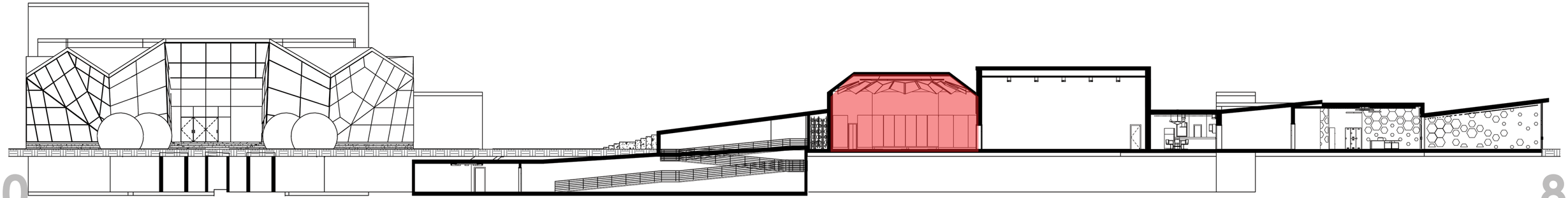


figure 61

figure 62



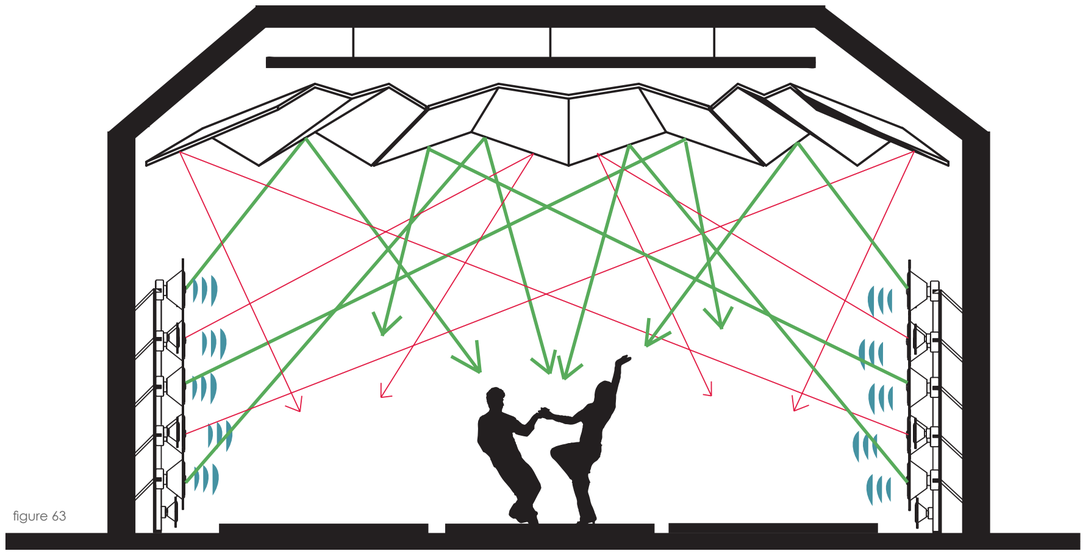


figure 63

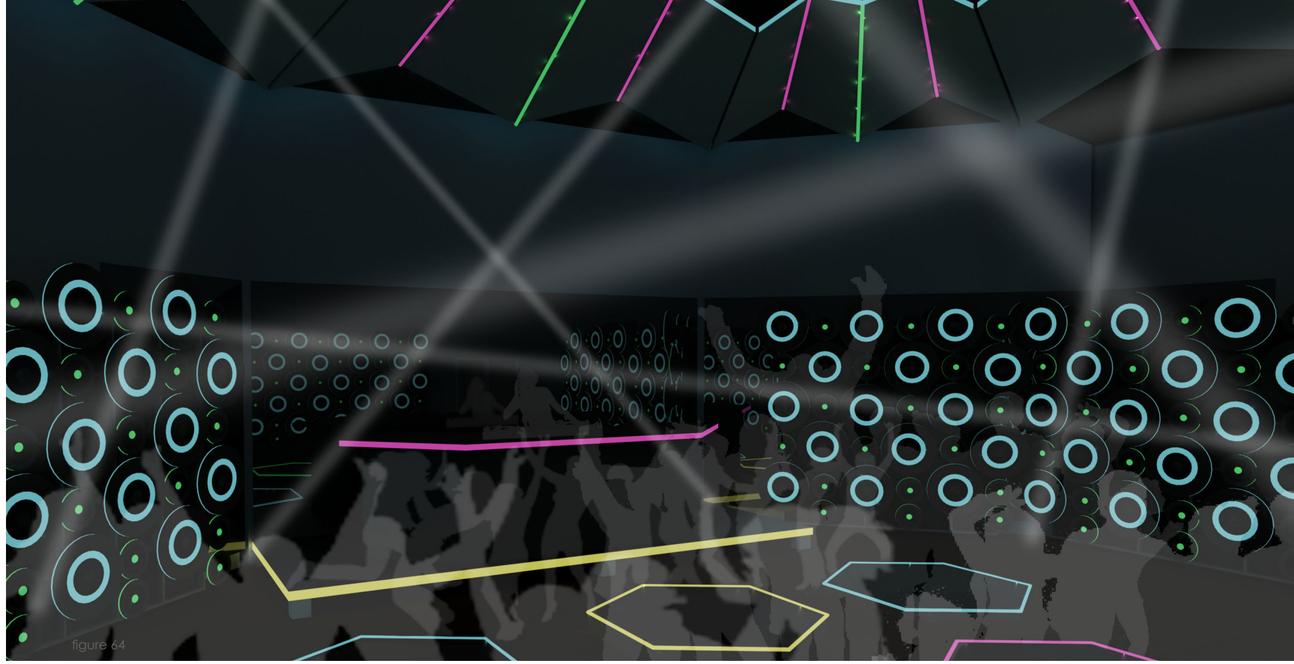
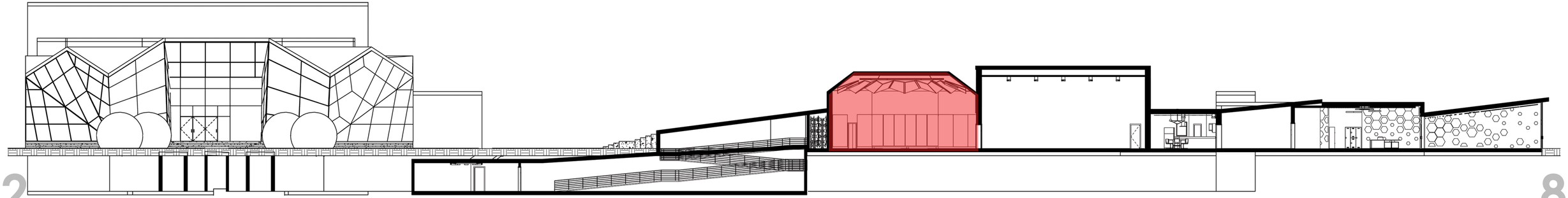


figure 64

Additionally, this space acts as a community concert space focusing on creating a similar musical experience for both hearing and deaf individuals. The space is equipped with speaker cone walls that can amplify the vibrations of the music, vibrating platforms that pulse to the beat so that it's not only heard, but felt, and light and water elements that mimic the appearance of sound converting the three dimensional sound waves into a visual element.



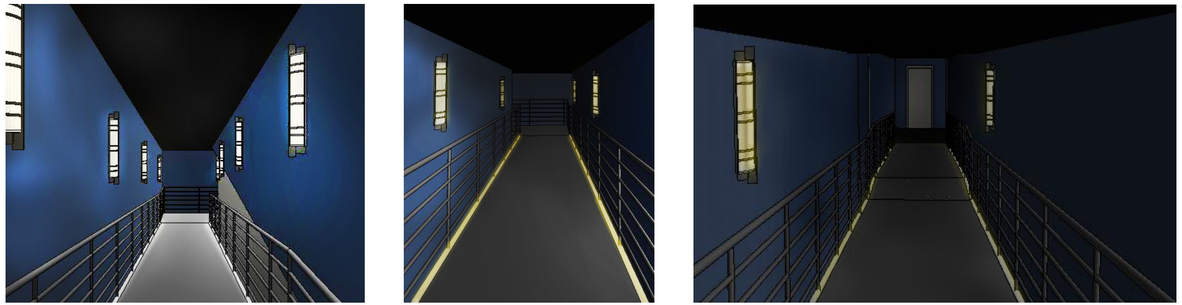


figure 65

The tunnel to that brings you underground from the dance studio to the "emergency situation" is and important transition. The ramp creates and isolation by bringing you underground. Lowering the light levels, compressing the space, and isolating you from the outside world all create a sense of urgency as you progress through the space. The ramp is suspended from the walls. This amplifies the tactile sense in the way that as you walk down the ramp you can feel the other people as they walk behind you. The vibrations can be felt from any place on the ramps surface and vibrates up through the handrails. This way, if you can't see around the corner you can feel if someone is coming before you see or hear them.

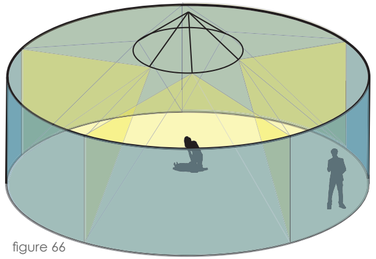


figure 66

The underground "emergency" space provides and experience that isn't a common daily occurrence. By bringing you down and underground, limiting the lighting, and decreasing the volume of the space, a sense of intensity builds. This space plays on that uncertainty by simulating a disastrous situation that you then must navigate without audio communication. The circular room is equipped with a 360 projector which allows a virtual reality simulation to be experienced by a group of people. Navigating this fast paced and stressful experience is the challenge that this element brings to the project.

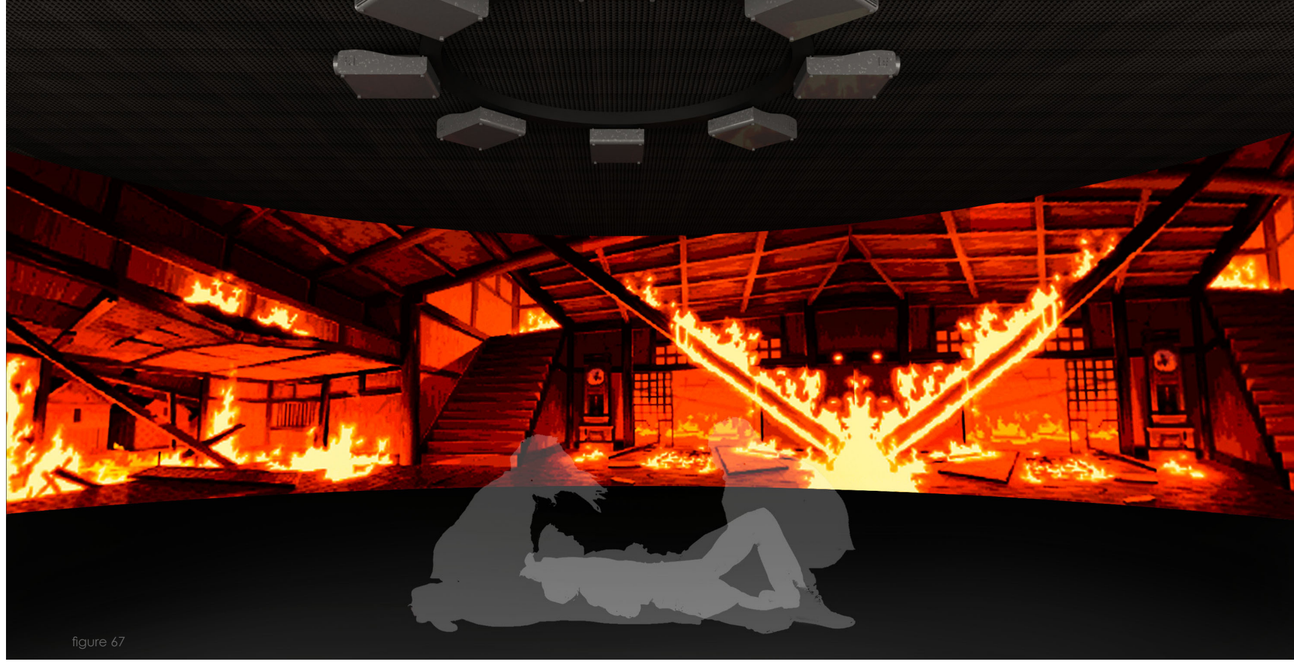
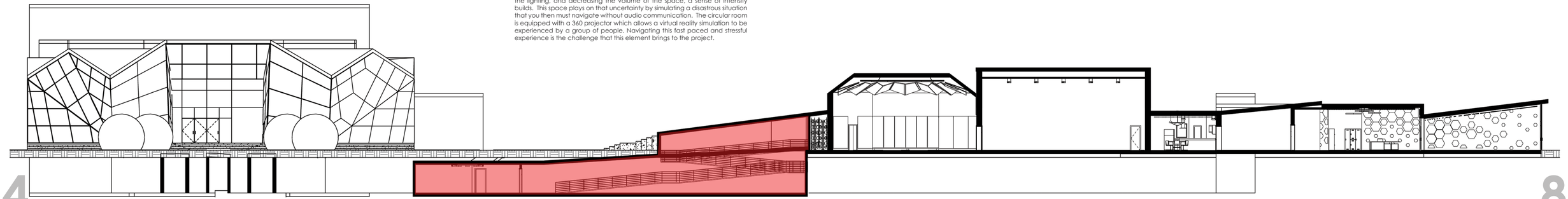


figure 67



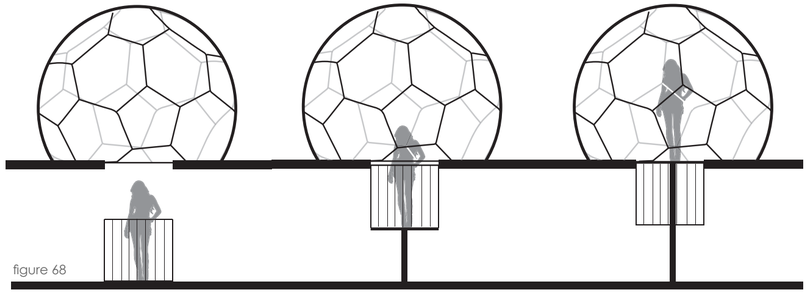


figure 68

The bubble is the last step in the experience before you are introduced back into the world of sound. This element is the reprieve after a stressful and high intensity experience underground. The bubble keeps the sound isolation, however it allows for visual interaction with the world outside of the building. A sense of calm and relaxation is achieved as you are given a space all to yourself to reflect on what you have learned and experienced along the path. The platform slowly lifts you from underground up into the plaza in front of the theatre.

The National Theatre of the Deaf was founded by Dr. Edna Simon Levine, a psychologist working in audiology. She formed the concept of a professional company of deaf performers and presented it to David Hays, Broadway set and lighting designer, who fell in love with the strength and beauty of Sign Language on stage. He persisted in his vision and helped Levine bring the expressive art to the main stage.

In 1965 a grant was give from the U.S. Department of Health, Education and Welfare that provided the funds for planning. Two years later, a national television program was aired exploring the newfangled idea of Deaf Theatre. They then held their first live performance at Wesleyan University in Middletown, Connecticut. The following year, The Little Theatre of the Deaf was founded; they still tour the country today.

In 1994, the National and Worldwide Deaf Theatre Conference came together in session to facilitate communication, develop techniques, and encourage young deaf actors to pursue their acting careers all around the world. The National Theatre of the Deaf has toured in all 50 state and 32 countries around the world.

figure 69

The National Theatre of the Deaf provides an opportunity for the hearing community to come and experience the artistry of Deaf Theatre. The theatre provides a place for the deaf and hearing communities to come together and share culture. This theatre allows for the stereotypes to be broken regarding the "disabilities" of deaf individuals.

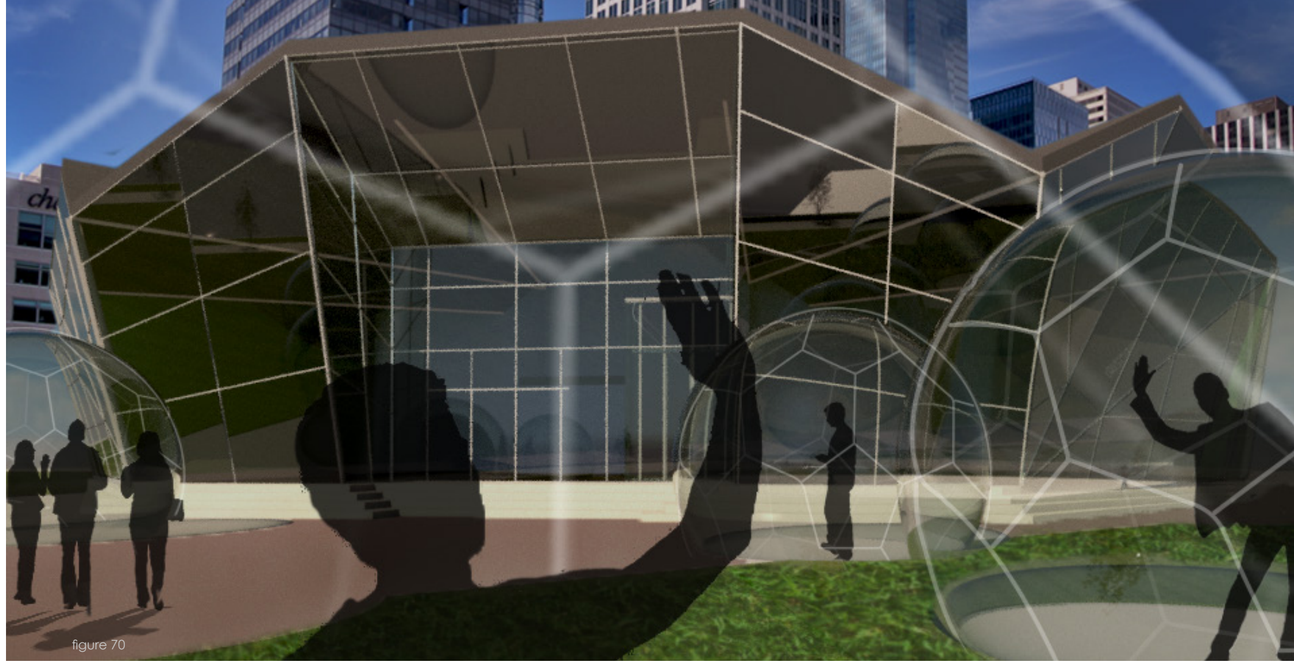
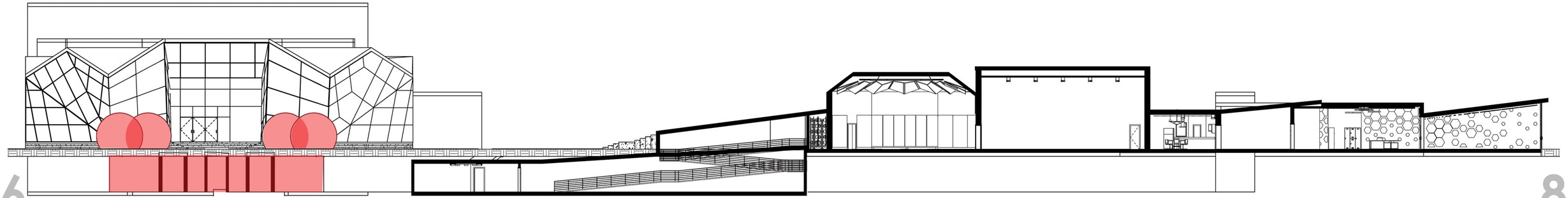


figure 70



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2nd Year

Fall 2013

Daryl Booker

Tea House

Spring 2014

Cindy Urness

Dance Studio

Bird House

Dwelling

3rd Year

Fall 2014

Steve Martins

Community Center

Fire Station

Spring 2015

Mark Barnhouse

NDSU Library

SC Johnson Research Lab

4th Year

Fall 2015

Bakr Al Amad

High Rise

Spring 2016

Paul Gleye

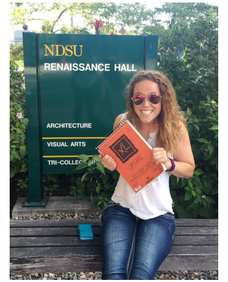
Brussels Urban Design

5th Year

Fall 2016

Malini Stravasta

Speculative Design



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Originally from Sioux Falls, SD

"For some reason no one from South Dakota wants to come up to North Dakota... I truly wonder why."