
architectural
sign language

signatures

Architectural Sign Language

A Design Thesis Submitted to the Department of Architecture and Landscape Architecture of North Dakota State University.

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thesis abstract

American Sign Language is not transparent, one cannot understand it until ones learn is. It takes many years of study and interaction with people who use it to be able to properly learn a language. As a student who studies architecture, I have found the same to be true about the communication of our built environment.

This thesis project titled, "Architectural Sign Language" explores the ideas of communication through the built environment. The goal will be to integrate the notion of sign language and architecture into a building that non-verbally communicates to tell a story and can be appreciated by both the deaf and hearing communities.

thesis narrative

Communication comes in a variety of forms, both verbal and non-verbal. American Sign Language is an example of a non-verbal form of communication. However, the challenge that becomes apparent with this language it is not universal, it must be learned in order to be understood. Just as it says in its name, American Sign Language is composed of a variety of signs. These signs together create a language and that language is utilized primarily by those that are deaf or hard of hearing to communicate.

During my undergraduate degree I decided to expand know current knowledge and deepen my appreciation of American Sign Language and Deaf Culture. At a young age I learned ASL to communicate within my best friend and as I began to learn the language, I recognized its beauty and importance within the deaf and hearing communities and the potential for unification through architecture.

"Architects are advocates in the community for better design solutions that are universally inclusive. We are responsible in creating design standards that enhance the quality of life for the Deaf community through architectural solutions that are conscious of their needs, culture, language, way of communications and way finding requirements" (Specht, 2017).

How is this relevant to architecture? As architects it should be our goal to design and create architecture for everyone. A question that needs to be asked and thought about is how we as architects can effectively create that architecture for everyone by being inclusive? Similarly, how does American Sign Language offer the same level of inclusivity when talking about communication?

Through the design of a community center and multi-use facility, I will be offering the city of Rochester, NY a space to unify these different cultures and communications. I plan to integrate elements of DeafSpace into my design. DeafSpace is the design standard developed through research and practice at Gallaudet University in Washington D.C. My design strives to recognize and design for the needs of those that are deaf or hard of hearing in a way that communicates the building accommodations to satisfy the needs of the users.

project typology

A mixed-use **community center** provides the opportunity to combine a variety of spaces within one building. Through personal interviews, I gained insight from professionals and potential users of the building as to what the city of Rochester needs and what they would benefit in having in a building. To summarize the interviews, they are always looking for more room to display the arts, via a theater, large gathering spaces, and classrooms for small instructional use.

The goal for this community center is to help draw the community back to the downtown area and eventually lead to the increased density in the industrial downtown area of Rochester, New York.

precedent research


figure 1

figure 2


figure 3


figure 4

LLRH6

albert schweitzer community center

sephardic community center

gleneagles community center

figure 5

LLRH6

Summary | LTL was hired by Gallaudet to design a residential and educational center for the campus. "Gallaudet is the only liberal arts university dedicated to the education of deaf and hard-of-hearing individuals". The goal for the project was to create a specialized building using the guidelines for DeafSpace tailored to deaf, cognitive, linguistic and cultural ways-of-being (Gallaudet).

Project Elements | major project elements can be observed in the figures on the following pages. DeafSpace focuses on elements of visibility, widened corridors, and visual cues noted in places such as the tread of the stair.

Findings | unlike the following case studies, LLRH6 strictly focuses on the analysis of DeafSpace as displayed in the built environment.

figure 6

figure 7

Architects | LTL Architects
Location | Washington, DC
Size | 60,000 sq. ft.
Typology | Higher Education, Residence Hall

Eye Contact | a section perspective diagram outlining the many paths of vision sight-line. It's important to keep a clear, unobstructed path for visual communication. These instances are most commonly found between multiple levels, across rooms, and within corridors.

Visual Cues | figure 11 highlights the differing corridor colors associated with each level. This helps aid in conversation when describing an interaction with someone or a meeting location. "It's easier to remember a color than the detail of a room number" (Johnson, K. 2019)

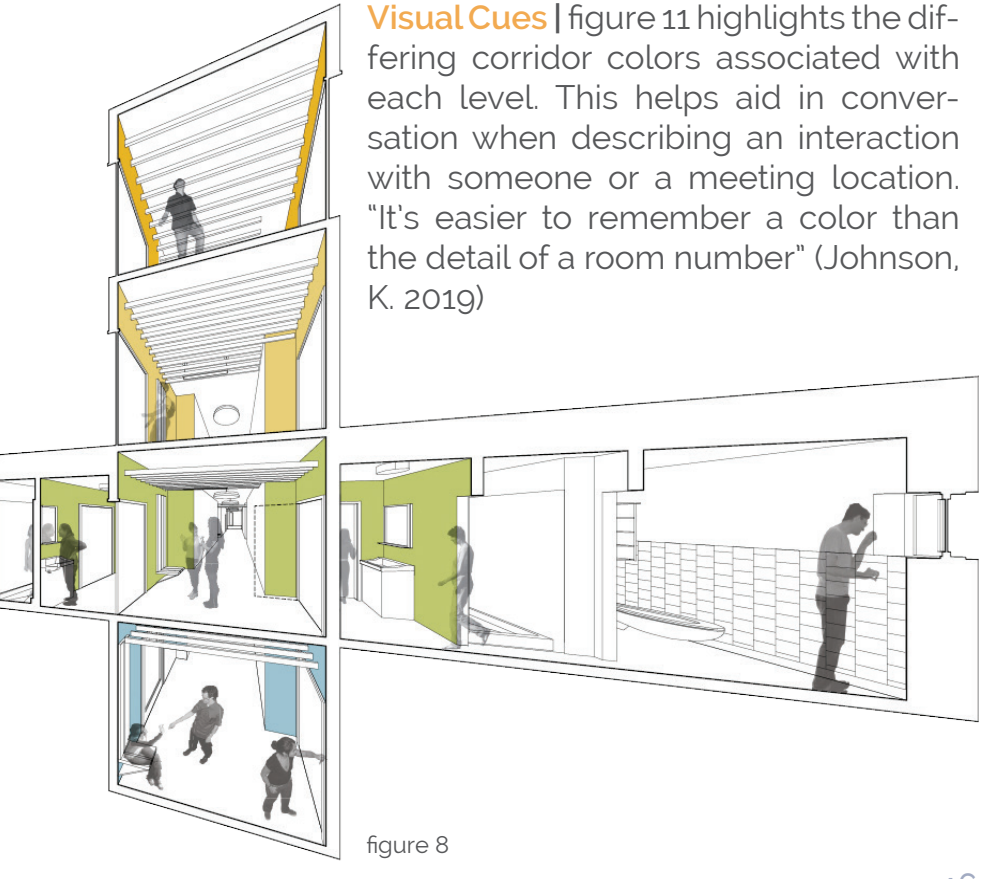


figure 8

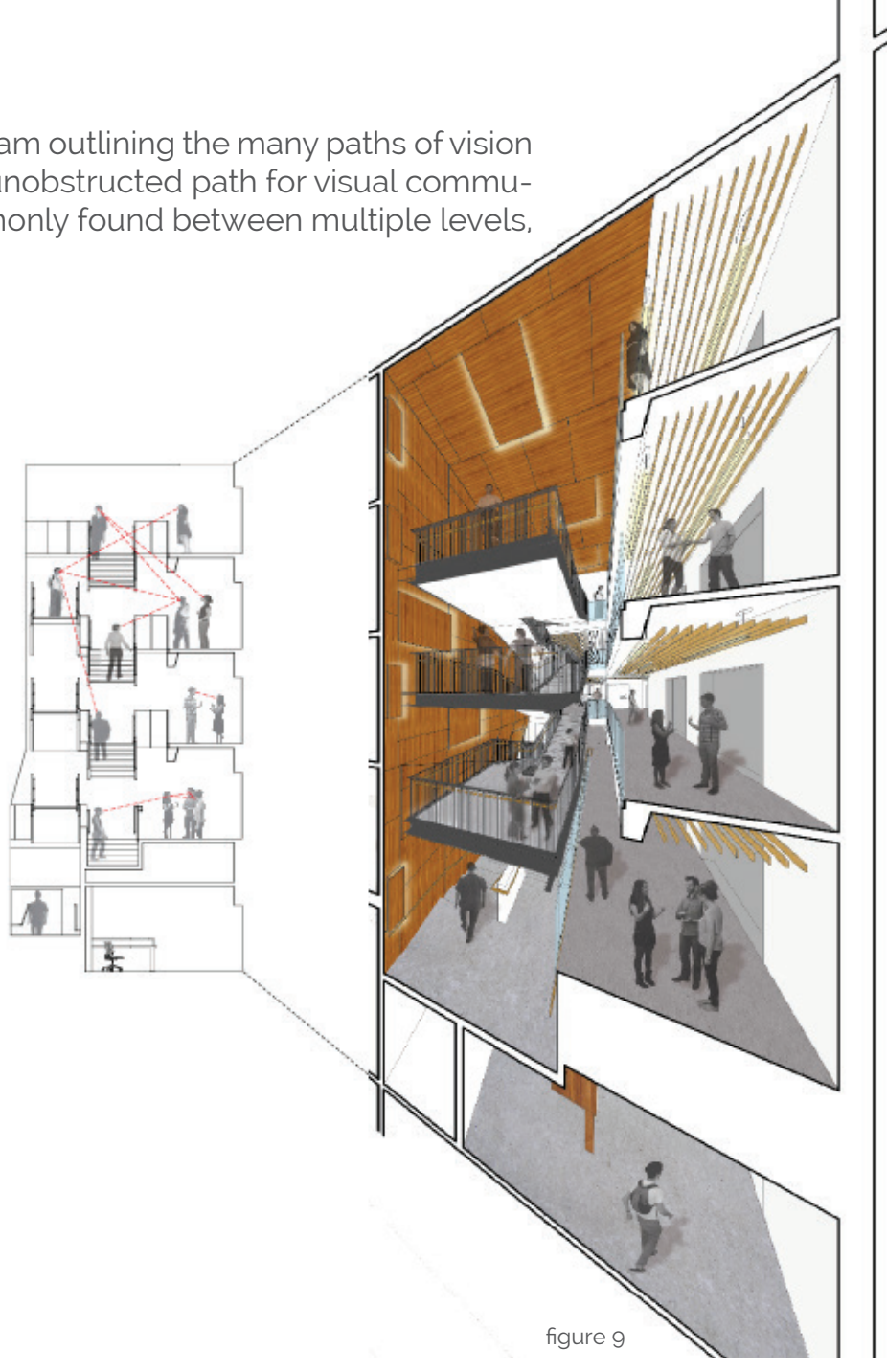


figure 9

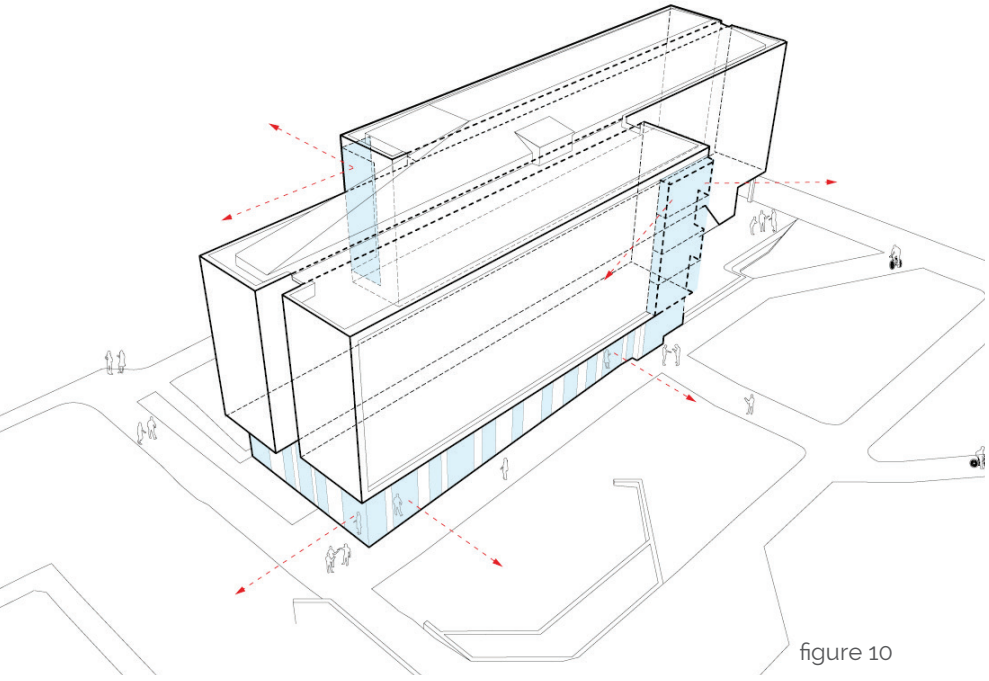


figure 10

Natural Light | is an important design element in DeafSpace because the impact of eyestrain is significantly less than an artificially lit space. Natural light is typically diffused through the use of clerestory, tinted, or partial height walls within a space. In the case that artificial lights are needed in a space, it is best if they are not providing direct spotlights, but reflected upward at the ceiling to provide an even distribution of lighting.

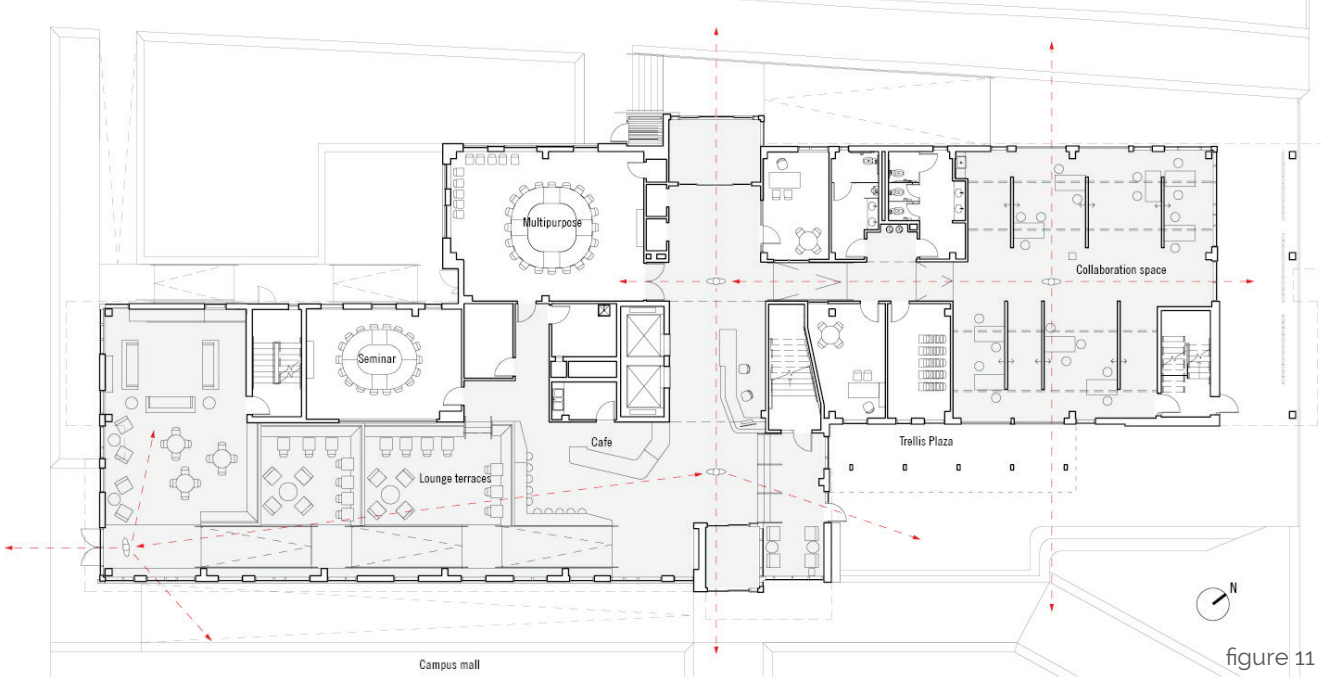


figure 11

Circulation | this floor plan is an example of clearly defined travel paths. This ties back into having a clear line for eye contact across several spaces. This diagram also shows the minimal use for walls. Most of the larger spaces have partial height walls which provide visibility to the users through the entire space. Being able to see the entire space and where you want to go makes navigation significantly more user friendly.

Conclusion | LLRH6 provides additional insight into the unifying idea that through intentional design for the user, architecture can then communicate signs to the user. Some of the signs displayed in LLRH6 include safety (using ramps to encourage the continuation of a signed conversation) and physical wellbeing (providing ample amount of natural light to public gathering spaces in the effort to decrease eye strain). My unifying idea remains unchanged, good architecture can communicate to the user.

figure 12

figure 13

albert schweitzer community centre

Summary | the Albert Schweitzer Community Center is designed around three (3) connected spaces, the Lys plain, the historic town center and the surrounding park Abbey. This community center has become an icon in the center of the neighborhood.

Project Elements | contains multimedia library, associations' hub, administration hub, medical and psychological health centre, and early childhood space.

Pre-Renovation | described as uninviting, closed off, dark. The vegetation surrounding the building that was overgrown, making the building physically invisible to the public.

Post Renovation | major spaces are not connected via courtyards that parallel the front facade of the building. Additionally there are large outdoor gathering space that include seating areas and urban gardening spaces. Theses elements combined present a more welcoming atmosphere to the surrounding neighborhood and community.

Architects | mobile architectural office
Location | France
Size | 11,483 sq. ft.
Typology | Renovation, community center

figure 14

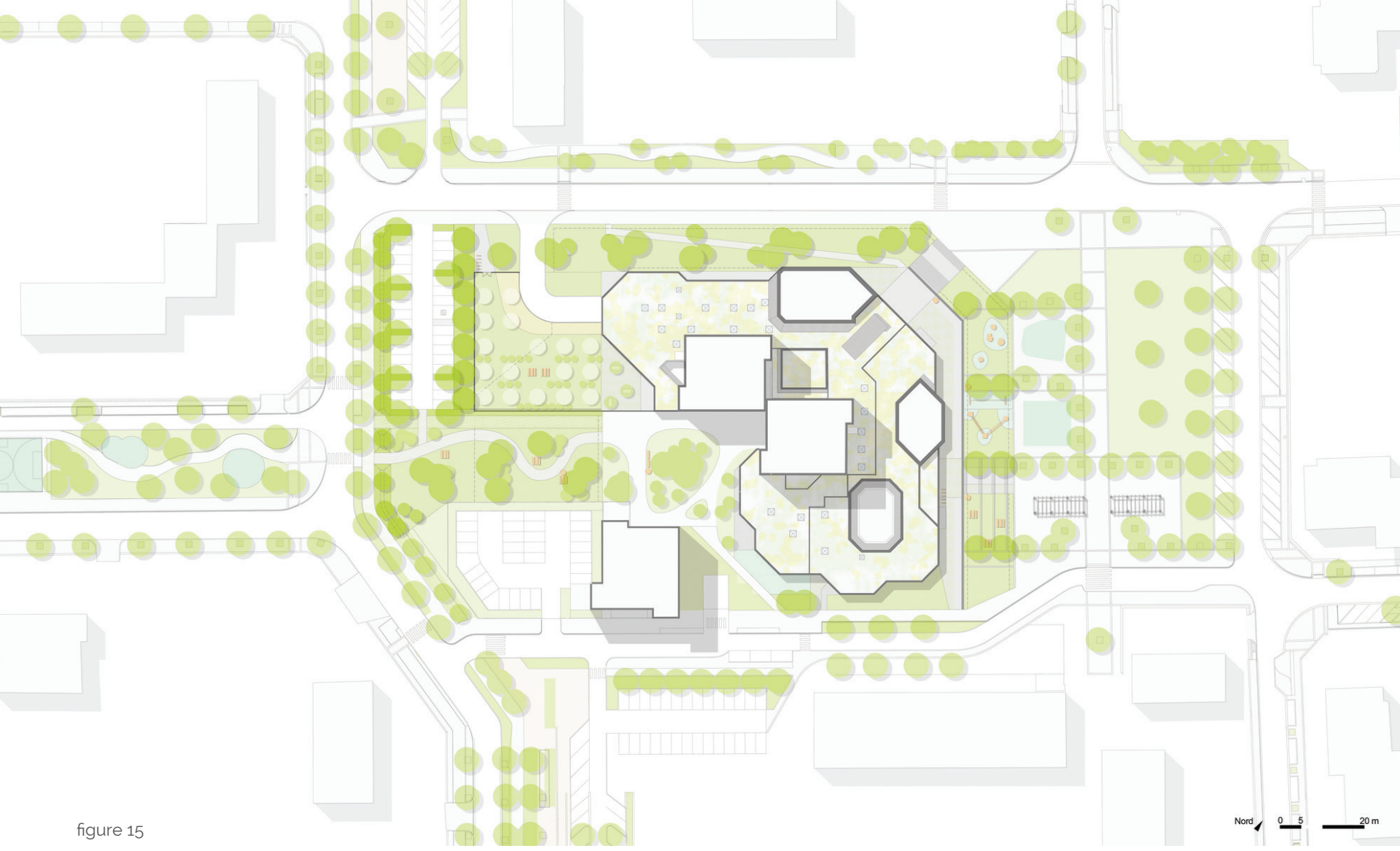


figure 15

Vegetation | the environmental and cultural response to the surrounding neighborhood to design a landscape that is inviting and welcoming to those passing by or searching for their final destination. A good landscape communicates context with the surrounding elements. It also has the effect of foreshadowing what spaces could be found within the building, i.e. large plazas and walk ways that are easy to navigate could let the user know that the building contains large atrium or gathering spaces and that the circulation paths can be navigated easily.

Circulation | figure 20 shows the ground level of the Albert Schweitzer Community Centre, the main approach bring you to the center of the building which opens up into a large 'open concept' multimedia library. Unintentionally, this space works well for the design elements associated with DeafSpace. A large naturally lit space with shoulder height movable furniture, this is conducive for signing across the room over the furniture or moving the furniture to widen the aisled when necessary.

Massing | the overall form of the building is geometric in nature. Based on the information gathered from figure 18, the building entrance is positioned N on the 45 degree angle of the site. My knowledge would leave me to believe that the pedestrian traffic is most significant on that corner of the site and the building wants to communicate visibility and accessibility to those passing by.

figure 16

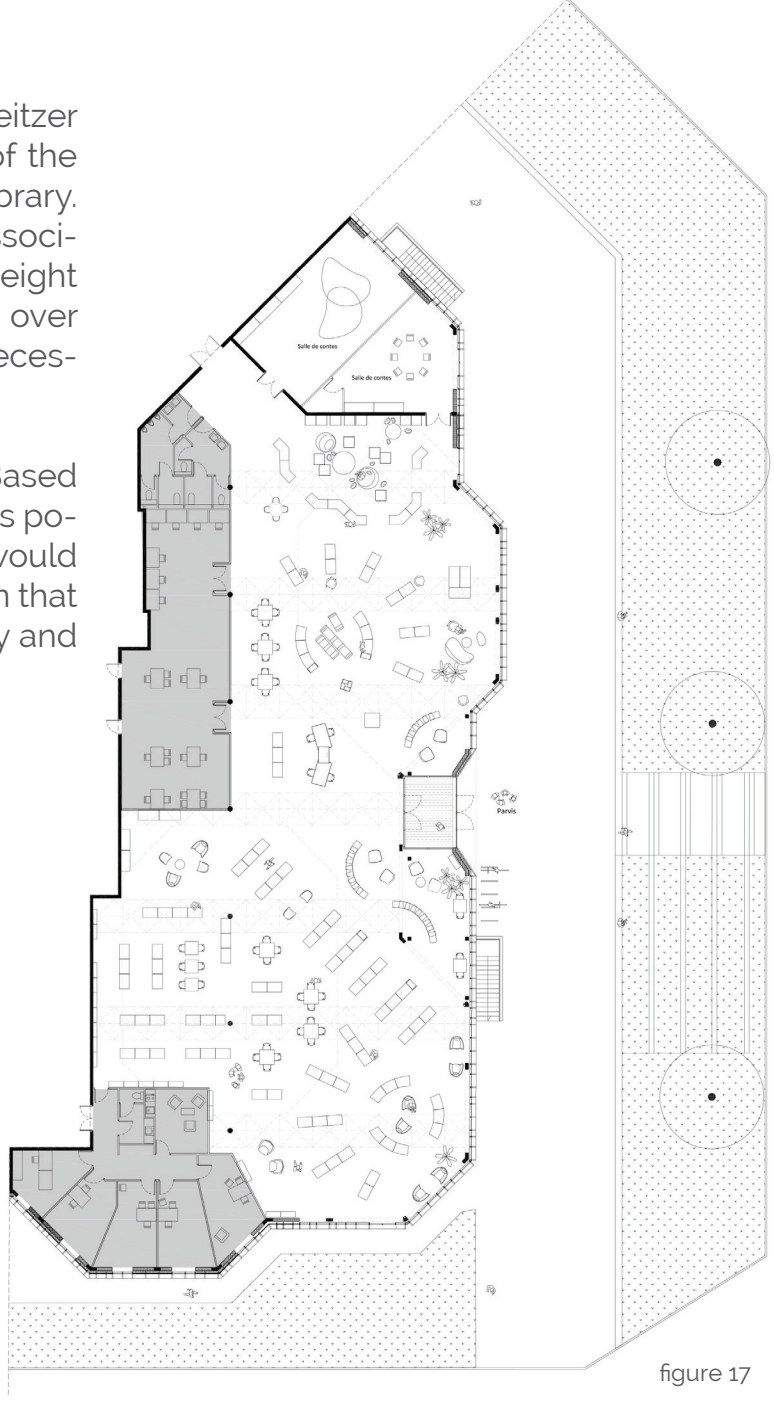


figure 17


figure 18

Structure | large steel trusses line the ceiling of the multimedia space. This creates a space with less obstructions from columns, allows for flexibility of the furniture within the space. The taller ceiling height and exposed trusses make the space feel larger and more welcoming when you enter the building.

Natural Lighting | both figure 21 and 22 showcase areas of the building that utilize natural light to illuminate the space. Figure 22 is the best example of overhead natural lighting through clerestory's. Utilizing this element is preferred in many instances, in DeafSpace it illuminates the room without the need for direct light which fatigues the eyes faster. Natural lighting in a space also helps fight seasonal depression, especially during the dark winter months up north.


figure 19

Conclusion | the Albert Schweitzer Community Centre is an example of a variety of amenities coming together and connecting as one. Looking into each space individually, it's apparent that each space communicates different architectural elements and provides different experiences for the user. Figure 21 shows two yellow chairs, a small bookcase, and rug in their own area. However, it is noticeable that this small intimate gathering space is sitting within a much larger entity. This is architecture communicating through arrangement and scale to the user.

figure 20

figure 21

sephardic community center

Summary | Sephardic Community Center is a large restorative addition that nearly doubles the size of the original building. The simple nature of the exterior façades have been developed to provide more insight to the complex nature of the building's interior

Project Elements | contains original 50,000 sq. ft. community center. The original Center was very closed off and used cold materials that didn't offer much visibility to the interior of the building. Joining elements in the project include a large continuous canopy to join the old and new façades. The newer façades were designed with the residential street in mind and not to have the large institutional like building invade their privacy.

Symbolism | "The Sephardic Community Center plays a symbolic central role in the surrounding neighborhood, an intergenerational facility. The Facility's mission is to preserve and nurture the rich history and culture of the community" (Sephardic, 2010).

Architects | BKSK
Location | New York
Size | 100,000 sq. ft.
Typology | Restorative, community center

figure 22

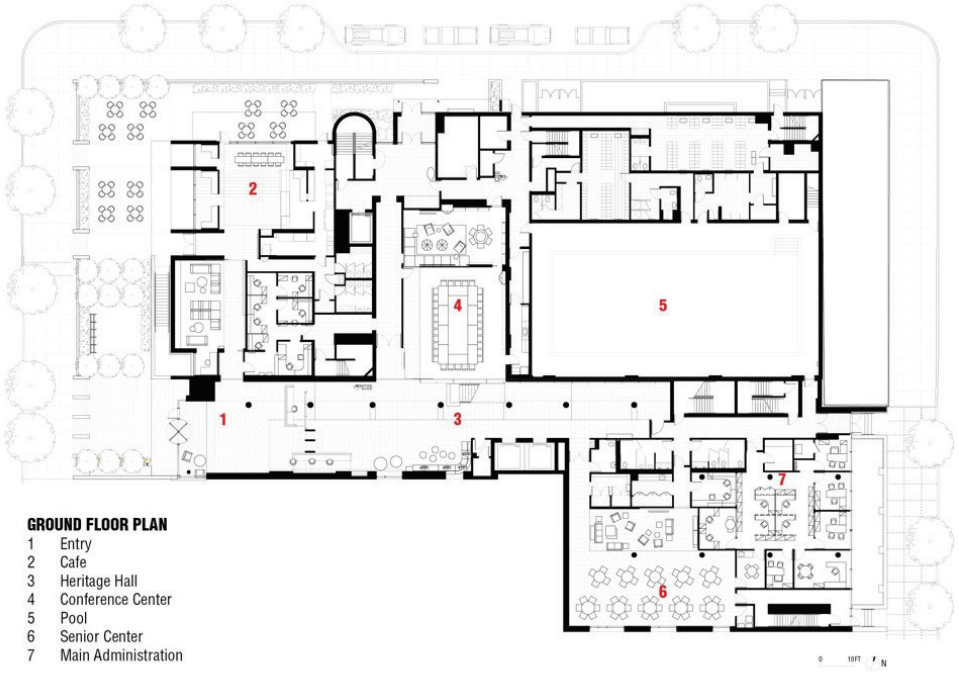


figure 23

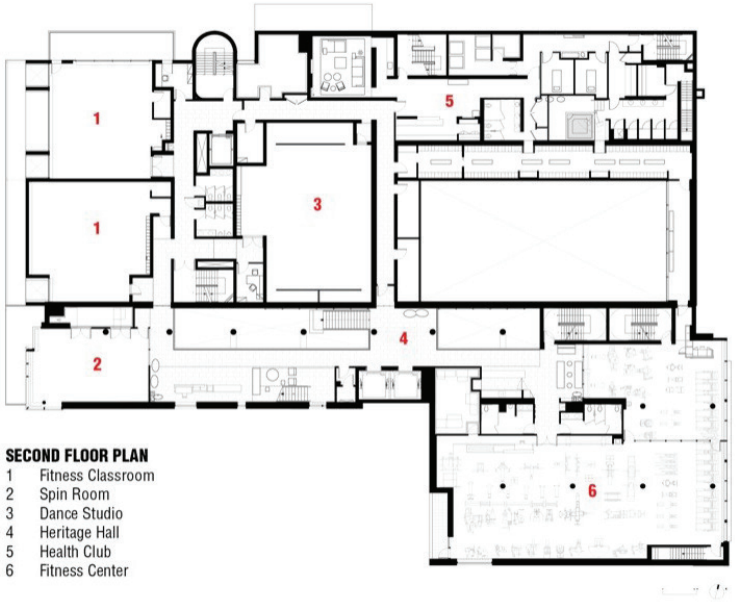


figure 24

Pedestrian Approach | is one of the most important exterior elements for drawing users into the building. The landscaping on this community center is geometric and provides clear direct paths to the building entry points. Illustrated in the ground floor plan, only the West and North elevations have 'active' landscaping. This encourages engagement on the public facades while respecting the residential neighborhood that boarder the South and East elevations.

Spatial Program | Sephardic Community Center is a perfect example of a multi-use facility. "The Center hosts activities and programs for all ages. It contains a gym, pool and spa; a 170-student preschool; meeting spaces for a variety of social groups; a performance space; administrative office; and a cultural memorial gallery" (Minner, K., 2001)). A community center with this many spaces encourages the community to utilize the Center for a majority of their events.

figure 25

figure 26

Natural Light | as mentioned in the previous case studies, natural light is an important design element in DeafSpace because the impact of eyestrain is significantly less than an artificially lit space. Natural light is typically diffused through the use of clerestory, tinted, or partial height walls within a space. In the case that artificial lights are needed in a space, it is best if they are not providing direct spotlights, but reflected upward at the ceiling to provide an even distribution of lighting.

Conclusion | the Sephardic Community Center encompasses a significant list of elements that are desired to have in a community center. The largest take away from this 4-story building is the immense focus and attention to the spatial program that it takes to design a building that includes this many spaces.

figure 27

gleneagles community center

Summary | Gleneagles Community Center is 3 story community center located near a small golf course and dealt with the challenge of a sloped site topography during initial design. This multi-use space contains a fitness center, large basketball court that occupies half of the floor plan and the entire 3 story volume of the building,

Project Elements | Focus of site utilization, for a large building. Patkau Architects designed the Gleneagles Community Center with a smaller foot print to fit on the site and for an increased benefit from the heating and cooling systems used in the building. Another notable element on the interior of the building is the significant amount of glazing used. Since the gym occupies half of the building occupancy, the spaces that occupy the other half are all glazed and provide total visibility between the spaces.

Architects | Patkau Architects
Location | West Vancouver, Canada
Size | 24,000 sq. ft.
Typology | Restorative, community center

figure 28

Site Condition | Shown in figure 39, the topography has a slight slope to it. The design of the community center worked with these site conditions by slightly modifying it's cross-section, see figure 40 below. The site challenge provided the design opportunity to have 2 different grade entrances into the building. The lowest level of the building walks out onto a cover terrace and courtyard with views towards the adjacent golf course. The upper side of the site also contains a significant walkout along the street with interior connections to the cafe, meetings rooms, and child care facilities. Having these space close to the entry helps draw users in from the street that may otherwise just pass by.

figure 29

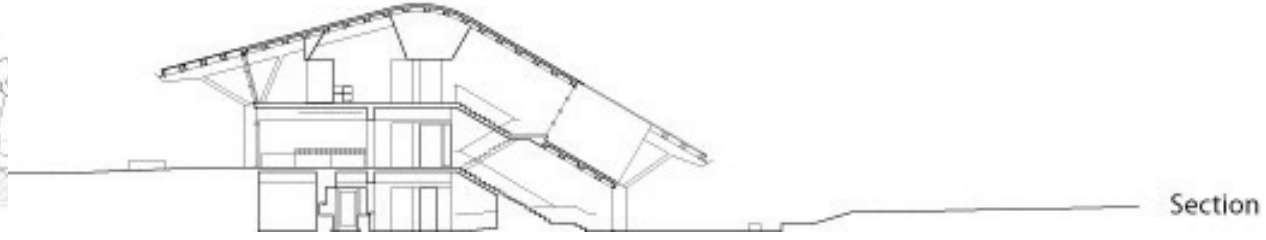


figure 30

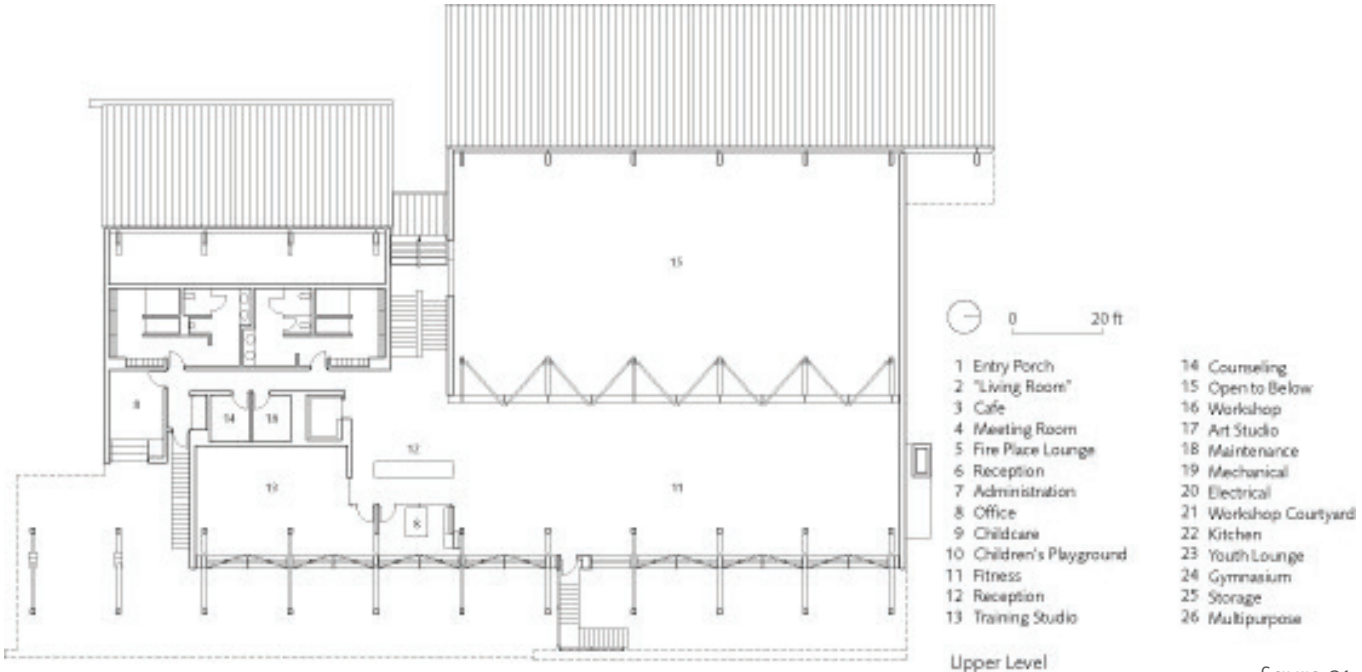


figure 31

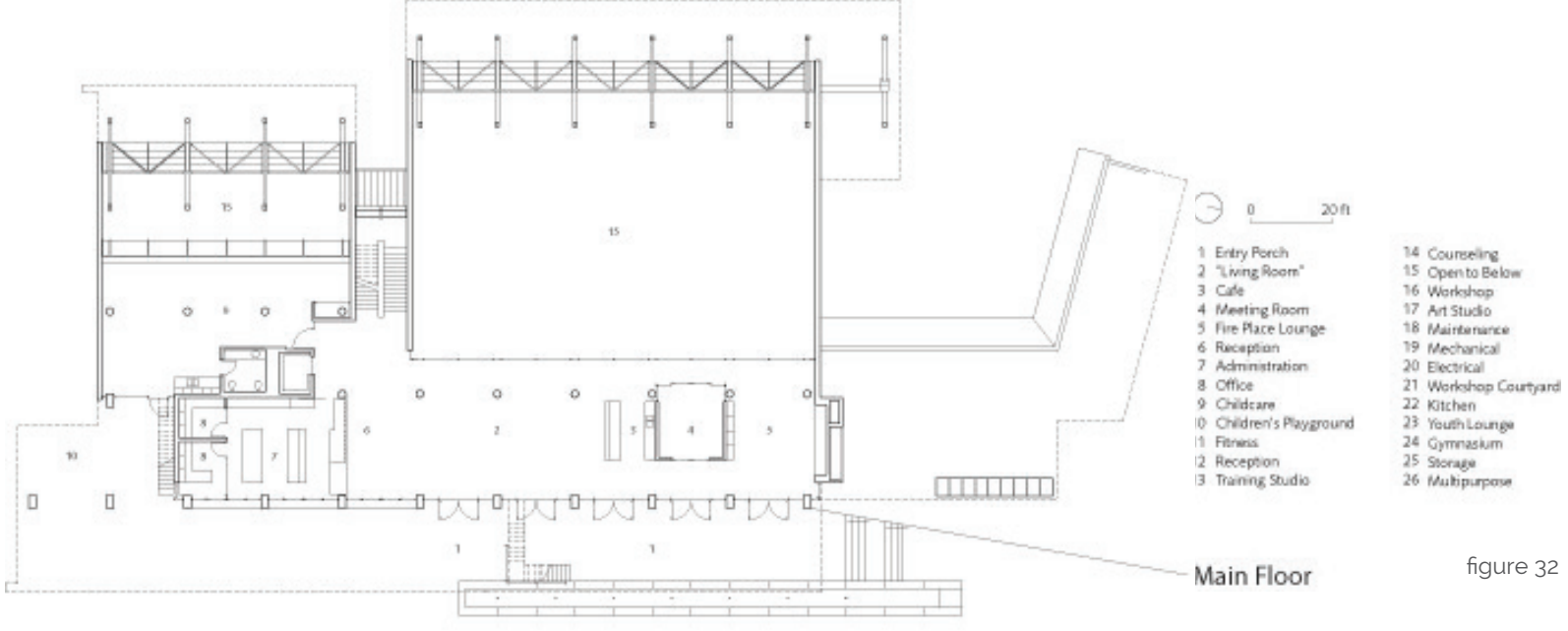


figure 32

figure 33

figure 34

Environmental | the structural and mechanical elements designed for this building work together to sustainability and environmentally heat and cool the building. The concrete floor slabs and walls act as a giant thermal -storage mass. This thermal-storage mass absorbs, stores, and releases energy to create a stable indoor climate. Even with occupied spaces and open doors, the inside temperature will remain constant. This is also a constant fresh air supply moving through the space and exhausting through a heat recovery ventilator, this also allows the temperature to remain constant.

Precedent Summaries Summary | the three precedent studies, Albert Schweitzer Community Center, Sephardic Community Center, and Gleneagles Community Center are all similar building typologies. All three provided similar information to understanding the basics of what it is that a community center needs to communicate. Key take aways from these studies include the importance of unity, visibility, and communication between spaces. Even though the spaces within the Center may not have any relation, it was the job of the architect to communicate to the user that there is a relation. The fourth precedent study, LLRH6, provided excellent insight into designing with elements of DeafSpace. I used this knowledge to uncover similar elements in the community center studies, and find a parallel between the four studies. Each precedent study contained its own unique elements that I will find useful and I dive more into the design of my community center for the city of Rochester.

project elements

Designing a community center offers a large variety of program needs while having the flexibility to incorporate elements that best fit the needs of the community.

Learning Center | equipped with small classrooms for off-campus instructional use by area universities and local school districts.

Event Space | including large conference rooms and flexible multi-media space available for a variety of events to be hosted.

Performance Space | in a community with ties to the arts, there is always a need for additional performance space that is available for public and private performances.

Food Services | and operations for public and private even use. Café for public use and a full service commercial kitchen for the use of large events being held in the event spaces.

Gallery Space | to display the historic information of the site and city to the general public and those that would be occupying the building for other amenities.

General Operations | covers standard program elements such as parking, bathrooms, circulation, administrative staff spaces, maintenance quarters, and gathering spaces.

square footage

user description

Students & Educators | utilizing the education amenities within the facility. Student age ranges from elementary to high school and including higher education courses.

Building Employees | such as administrative staff for the community center and management for food services and maintenance.

Café Patrons | could include (but not limited to) near by business employees in search of lunch or users already occupying the building for another use.

Event Visitors | are those that are attending a conference, performance, or other large function being held in the facility.

Community Visitors | include those that are visiting the city of Rochester and happen to stumble upon the area and meander their way around the building, or of those same visitor that have made the community center a destination stop on their trip.

*The building will assume that each user groups will have an individual with a physical restriction and will therefore have accommodations available to those users.

**With the understanding of the large population of deaf and hard-of-hearing people in Rochester, The facility with be designed with elements of DeafSpace.

parking requirements

site information

According to the New York Times, Rochester, New York has the largest populations of deaf individuals per capita in the United State (York, M., 2006).

Prior to visiting Rochester I had not picked a location for my site. Through conversations with local architects and community members during my visit to Rochester, I was made aware of a site located in the in the industrial district part of downtown, adjacent to the High Falls. What ultimately drew me to the site was its history. An old mall had once occupied this location but has since been torn down and the only thing remaining is the roughly paved parking lot.

This site is located adjacent to the High Falls, across the river from Genesee Brewery, and sits right outside the Inner Loop boundary of Downtown. There is a significant elevation change from the base of the site to the main street level of downtown.

The **reason** for picking this location for my site is to eventually help increase the density in downtown Rochester. The **goal** is to bring beauty back to downtown and re-encourage building occupancy and residency. This community center will **communicate** to the city as being a destination, and a reason to live in the city of Rochester, New York.

figure 35

figure 36

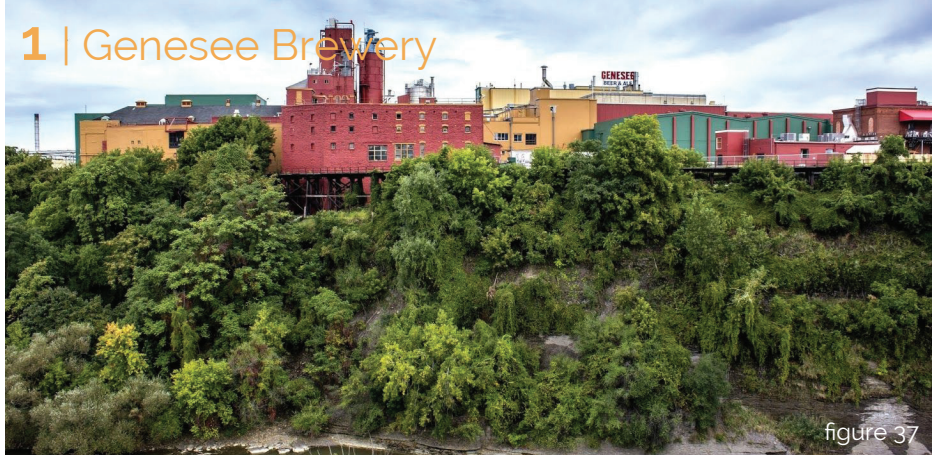


figure 37

figure 38

figure 39

1 | one of the largest and oldest continually operating breweries in the United States.

2 | water from the falls used to be diverted and used to feed various area flour mills.

3 | originally built in 1891 as a road bridge but later converted to a pedestrian bridge and renamed after Rochester's sister city in France, Rennes.

project emphasis

Buildings **communicate** through their own language. Proportion, color, material, and scale are all elements that are being communicated within the building. This communication happens between building systems, the environment and the user.
Goal: effectively design a building that communicates with the site, city environment, and most importantly, the community.

"The City of Rochester has the largest population deaf and hard-of-hearing individuals (per capita) in the United States" (York, M., 2006).
Goal: design a facility with elements of **DeafSpace** design. Utilizing DeafSpace design elements will inform deaf and hard-of-hearing individuals about this inclusive design intention of the space.

Since the economic recession in the early 1990s, the population density of Down town Rochester has decreased and sits at a stand still for growth.
Goal: to develop a **destination** through restoration site development and site context. The first part to creating a destination is initiating the conversation between the site and building typology, only then can a destination be produced and occupancy and density downtown begin to rise again in Rochester.

project goals

Academic Goal | I want this project to help develop my research skills and provide myself with the opportunity to continue my education in American Sign Language and the Deaf Culture.

Professional Goal | Gaining an understanding for the needs of a community and understanding what it means to design a building with impact. Being aware of a city's demographics and needs provide the designer with a certain perspective that would not otherwise be apparent when designing a "normal building".

Personal Goal | Since I was young, I've had an appreciation for Deaf Culture and their common language, American Sign Language (ASL). Through the early stages of research, I have discovered this passion for language and communication. I want to use this passion to better myself as a designer by focusing on the needs of the building context to ultimately design for the health, safety, and welfare of the user.

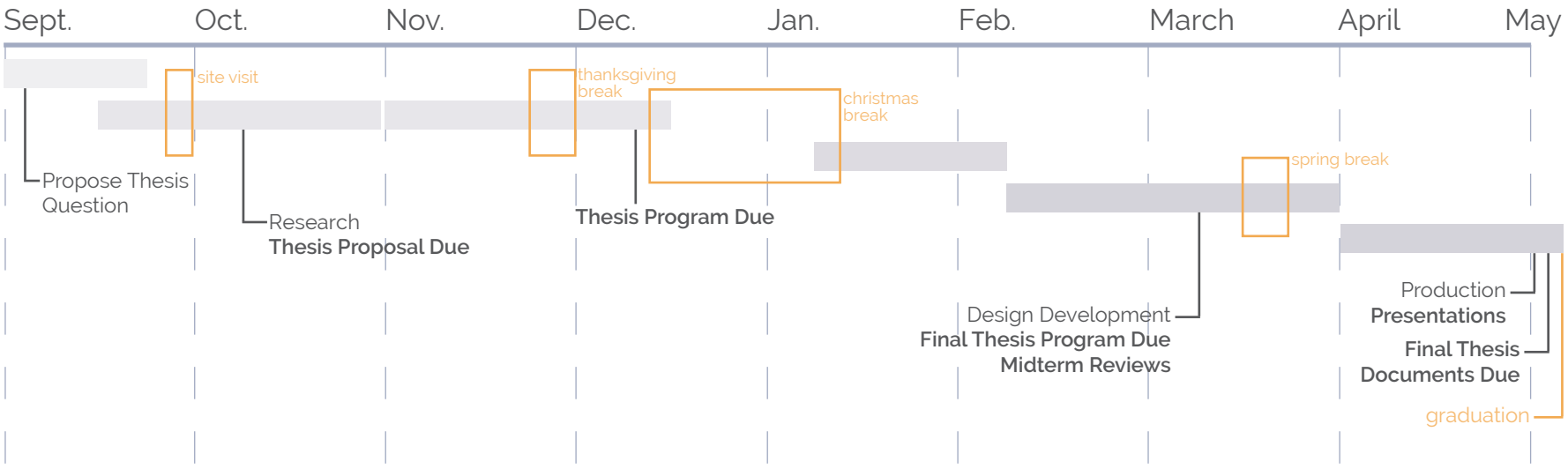
plan for proceeding

Research | Communication is a vital part of design and our everyday lives as we interact with the built environment. What is the architect and architecture trying to tell me? This thesis will attempt to focus on what it means to create an architectural sign language. "Most interpersonal communication is conducted through spoken language" (Stokoe, 2005). Proceeding from this quote, as the researcher and designer, I want to understand what it means to communicate through the **UNSPOKEN** language. This topic is inspired by my connection and appreciation to American Sign Language and Deaf Culture. My research will investigate how architects communicate through buildings, how buildings communicate to the users and the community, and what is the story being communicated as the result. I will be studying the foundation of signs, the history of sign language and how it is used as a tool for communication with the relationship to architecture.

Methodology | The system of inquiry for this research focuses on the development of conclusions through interactions that directly correlate to the subject (Groat & Wang, 2013). I will achieve these conclusions through extensive research via case studies, journal articles, personal interviews, and my existing knowledge of ASL as a communication language. The case studies and journal articles will discuss the fundamentals of what is to be communicated through supporting facts. The goal is to find a common denominator between the development of a sign and architecture. Once this parallel has been established, then I can begin to marry the two into one communication language. Additionally, I will be utilizing statistical analysis (demographic charts) and comparative studies together to understand what signs are and how they are used as a visual communication.

Results | This thesis will be documented in phases. The initial phases involved the understanding of developing a sign, what is a sign. I have made notes and diagrams related to journal articles and additional literature pertaining to my research topic. The final stages of my research and design will be compiled via a research journal, research report, and comprehensive integrated design. These documents will be made public through the North Dakota State University Department of Architecture Repository with previous graduate students of the program.

project schedule


Sept.
Oct.
Nov.
Dec.
Jan.
Feb.
March
April
May
site visit
thanksgiving break
christmas break
spring break
Propose Thesis Question
Research
Thesis Proposal Due
Thesis Program Due
Design Development
Final Thesis Program Due
Midterm Reviews
Production
Presentations
Final Thesis Documents Due
graduation

thesis research

Philosophical Framework | This system of inquiry will display the qualitative research methods associated with the framework of epistemology and methodology. The research will develop conclusions through interactions the directly correlate to the research. The outcomes of this study are based on the direct action and reaction of the subject interpretation of a sign.

In the study sign will be analyzed based on their interactions with people, the users, and how the meaning of the sign is interpreted. Signs could present themselves in a variety of forms, i.e. a street sign, verbal sign, physical element or body language, etc. Studying a subject's reaction to these signs to determine if the meaning was received in a positive or negative manner or was is intended meaning of the sign effectively communicated.

Theoretical Framework | The goal of my research is to highlight that architecture is a language communicated through signs, like American Sign Language, commonly used by those who are hearing impaired. Language is a tool utilized by most people, I want to prove that architecture has a way of communicating to its users. I believe that communication is a vital part of design and our everyday lives. What is architecture trying to tell me? I want to explore the two ideas of American Sign Language and how we can learn about, what is Architectural Sign Language. The primary audience for the presentation of my research will be the graduate students of Ganapathy Mahalingam's Thesis Research Studio.

Strategies | The research strategies used involve the careful selection of journal articles and applicable case studies where elements of the research have been implemented. Understanding the foundational elements of language and the elements and classifications that distinguish what a sign is are crucial the research that must be understood before attempting to prove the parallels in architecture. Furthermore, precedent studies will be used as an example for necessary program elements, spatial relationships, and their communication to one another.

Tactics | Tactics utilized in this research will be conducted through interviews, statistical analysis, and comparative studies. Interviews will be conducted to understand how different people interpret the meaning of signs and their effectiveness to communicate their intended meaning. The use of statistical analysis and comparative studies together will broaden my understanding of what a sign is and how it is used as a tool for communication.

What is Language?

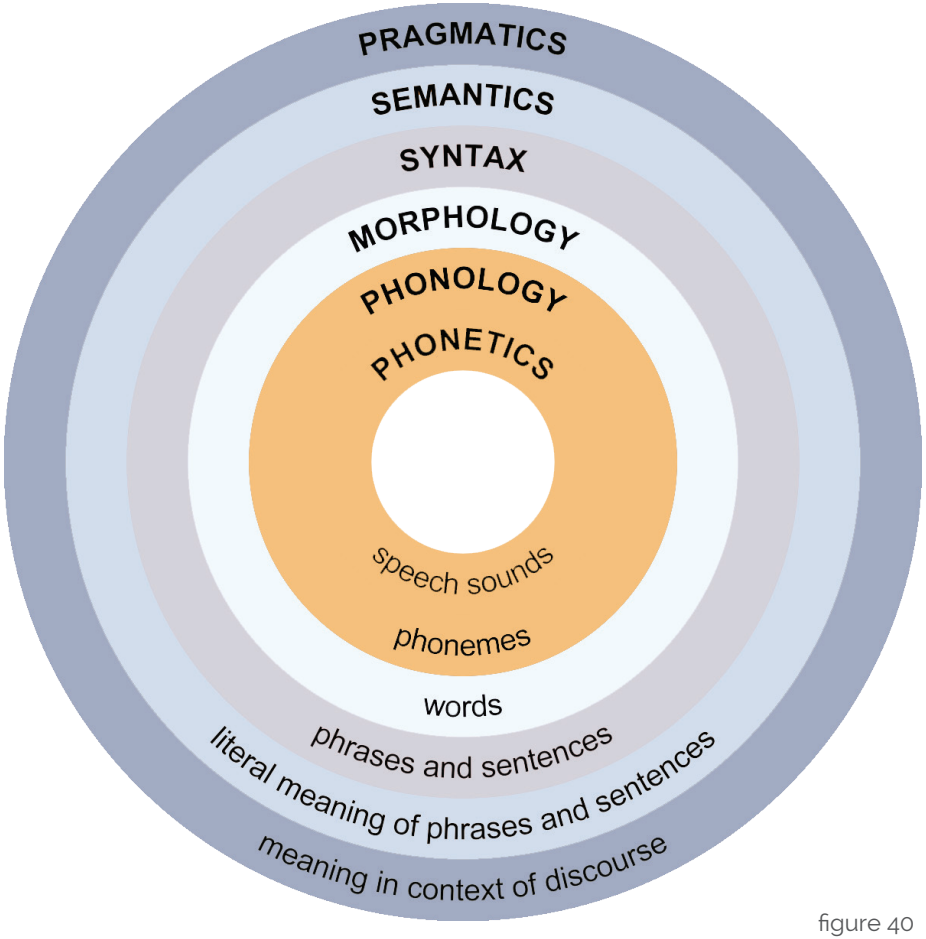


figure 40

Language is the composition of carefully selected components. Components including lexicons, grammar, phonetics, syntax, and semantics. Each element is applied in combination to create a language.

Linguistic Elements

Definition of *lexicon* (n): the language framework, the sum of words in the language by using grammatical rules to combine words into logical sentences

> Example: run (uninflected word); running, ran, runner, (forms of inflicted word)

Definition of *phonetics* (n): the study of individual speech sounds. Phonemes are the sounds that are made when a word is said. The English language has approximately 45 different phonemes via letters and letter combinations.

> Example: bake | brake; adding one additional letter changes the sounds and meaning of the word

Definition of *morphology* (n): the study of words and the system of word-forming elements. Morphemes are the series of sounds (phonemes) that are used to create a special meaning (word).

> *Bound morphemes*: adding a prefix- or -suffix to a word [ex. Unkind | Kindly]
> *Derivational morphemes*: the process from changing a description to an action [ex. Sad | Sadness]
> *Inflectional morpheme:* modifying the tense of the verb or number value of a noun. [ex. Bottle | Bottles]

Definition of *syntax* (n): the study of sentence and phrases; the construction of words together to form effective models of communication; the combination of morphemes and grammar. The order of words in a sentence is more crucial in the English language versus other languages, such as French or American Sign Language that focus of the emphasis of the word to convey the meaning of the sentence.

> Example 1: Sara picked up the can.
> Example 2: The can picked up Sara.

Definition of *semantics* (n): focuses on the meaning of a sentence; similar to pragmatics, how the context of the sentence contributes to the meaning that is intended to be communicated.

> Example: "Hi Jack!" The *context* of this example changes from a surprised greeting to a friend versus an international plane ride between countries.
> Example: AWESOME! | awesome
>
> The second work is perceived to have a less energetic connotation, more sarcastic tone, and the body language in the delivery of the second word could reveal disapproval or disappointment.

What is a Sign?

figure 41

1st ORDER RELATION	2nd ORDER RELATION	3rd ORDER RELATION	
QUALITIES	VISENTS	SYSTEMS	FIT TO BE SIGNS
ICONIC	INDEXIC	SYMBOLIC	RELATION OF SIGN TO REFERENT
DISPLAY	ASSERTION	CONCLUSION	MOTIVATION

figure 42

Linguistics is part of the general science of semiology. **Semiotics/semiology** is the study of signs, their functions and effects. When understanding the basics of semiotics, it is important to know the difference between a signifier and the signified. The signifier is the sensed image and the signified is the conception one has when seeing the sensed image.

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The first trichotomy is fit to act as visual signs containing: qualities, visents, and systems.

Qualities: physical manifestation or distinct traits of an element

> Example: the color yellow commonly represents caution

Visent: an individual visual element in a performing role, capable of contrast and visually predictable

> Example: graphics, photographs, illustrations (crosswalk sign)

System: involves prior semiotic participation, capable to depicting a sign's meaning

> Example: road laws and procedures

The second trichotomy is the relation of the sign to the referent containing the iconic, indexic, and symbolic signs.

Iconic: relations based on similarity and resemblance (onomatopoeic words)

> Example: the iconic human figure represents the literal human silhouette.

Indexic: relationships connected through physical or environmental contact (influence)

> Example: the two parallel lines indicate the physical crosswalk

Symbolic: consensual agreement that "this" stands for "that"

> Example: the rotated yellow square indicates caution

The third trichotomy is the authority toward action. Categories include display, assertion, and conclusion.

Display: a description of the arrangement, qualities, and subject matter

> Example: the simple display, caution color, and element color of the sign.

Assertion: the propositional claim a display is making about the world

> Example: paying attention to and stopping for the person in the crosswalk

Conclusion: the conclusion is drawn from encounters, devised by the mind and behavior of the receiver to the sign

> Example: the behavior of obeying the sign or not could cause physical harm to the person in the crosswalk

American Sign Language

Definition of **American Sign Language** (n): a complete natural language composed of the same linguistic properties of a spoken language. ASL is expressed through a series of movements of the hands and face.

American Sign Language is an independent language like English and French. In the 1700s, Abbe Charles Michel de L'Eppe (a French man), showed the public that deaf people could communicate through the use of sign language. At this time people who were deaf were called Dumb, meaning they could not respond vocally because they could not hear. (Allen, 2005)

American Sign Language is a **visual language** composed of gestures, signs, finger-spelling, facial expressions, inflections, dialect, register, and accent. Similar to any spoken language, sign language has linguistic structure, including proper grammar rules and variation based on location. (Vicars, 2009) Word order of American Sign Language, when compared to English, has its own unique form. Figure 6 is an example of a simple sentence in both English and ASL. This specific grammar in ASL is stating the bicycle first so that the person reading the sign understands that the sentence topic is going to be related to or about the bicycle.

The general public often does not understand that English is not a deaf person's first language but their second. Similar to any spoken language around the world, Deaf communities around the world have developed accents or dialect over many years. Some signs are regional, unique to a specific place or group of people, while others are common nationwide and worldwide. For instance the ALPHABET sign for cactus in Arizona is not understood in North Dakota to be any sign. Whereas the sign for Korea is understood around the world. The complexity of their language is more than just gestures and random movement of the arms, hand, and fingers. The key to understanding sign language is facial expressions the message sent can be misunderstood.

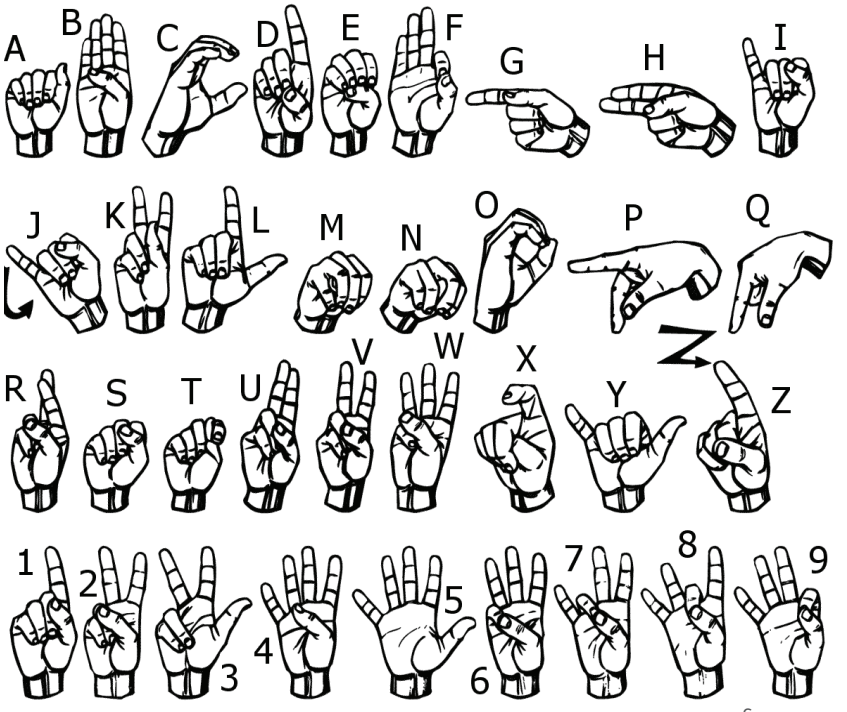


figure 43

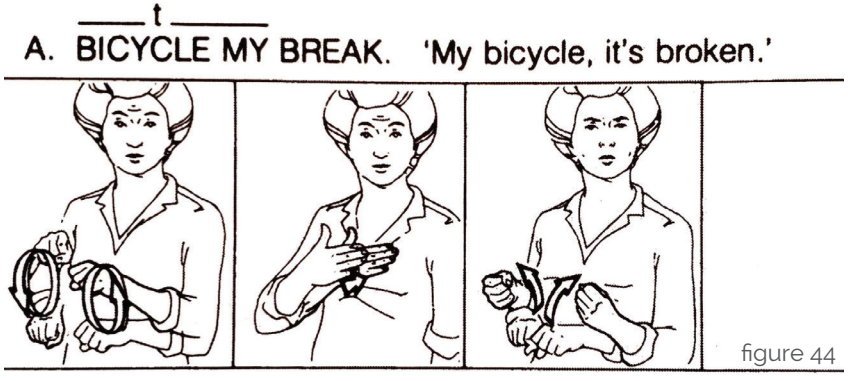
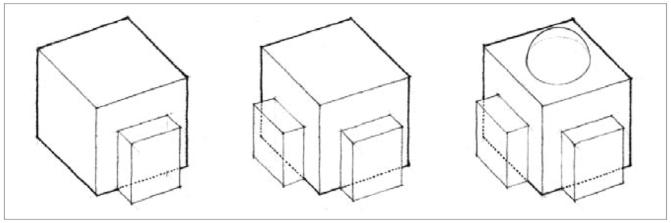


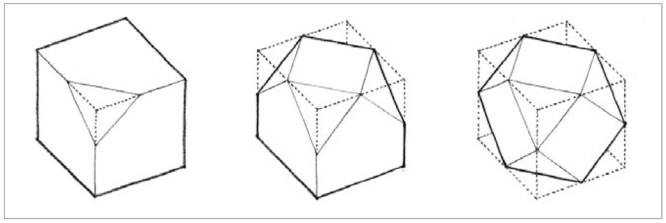
figure 44

Architectural Sign Language



Additive Transformation

A form can be transformed by the addition of elements to its volume. The nature of the additive process and the number and relative sizes of the elements being attached determine whether the identity of the initial form is altered or retained.



Subtractive Transformation

A form can be transformed by subtracting a portion of its volume. Depending on the extent of the subtractive process, the form can retain its initial identity or be transformed into a form of another family. For example, a cube can retain its identity as a cube even though a portion of it is removed, or be transformed into a series of regular polyhedrons that begin to approximate a sphere.

figure 45

Morpheme: an element in architecture that cannot be divided into smaller units, but rather combined to form a larger element. Also thought of as a variation of form topology.

Form: the formal structure of a work, arranging and coordinating elements as part of composition.

Form is both the internal structure and external outline of a mass that depicts its appearance and how it reads to an outside perspective.

figure 46

figure 47

figure 48

Pronunciation: a variation in the expression of an architectural form based on the material used.

Defining Space & Surface Articulation: a variation in the expression of an architectural form based on the material used. Any three-dimensional form naturally articulates the volume of the space surrounding in and generates a field of influence or territory to claim as its own. -F. Ching

ARCHITECTURAL COLUMN STRUCTURAL COLUMN

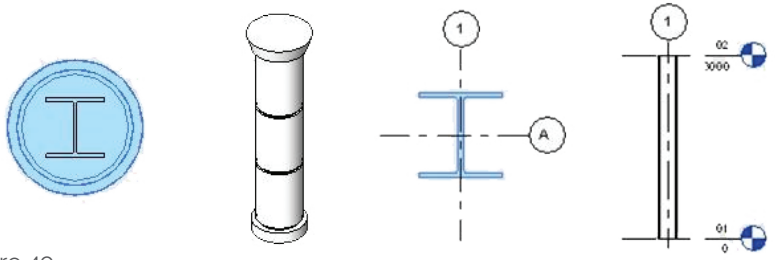


figure 49

Inflection: a change in form to express the functionality of an element. The *architectural column* on the left is a simple element to appear structural but only serve the purpose of looking a certain way. The picture of the *structural column* on the right only serves the purpose of supporting a structure, it doesn't related anything to the appearance of the element or surrounding context.

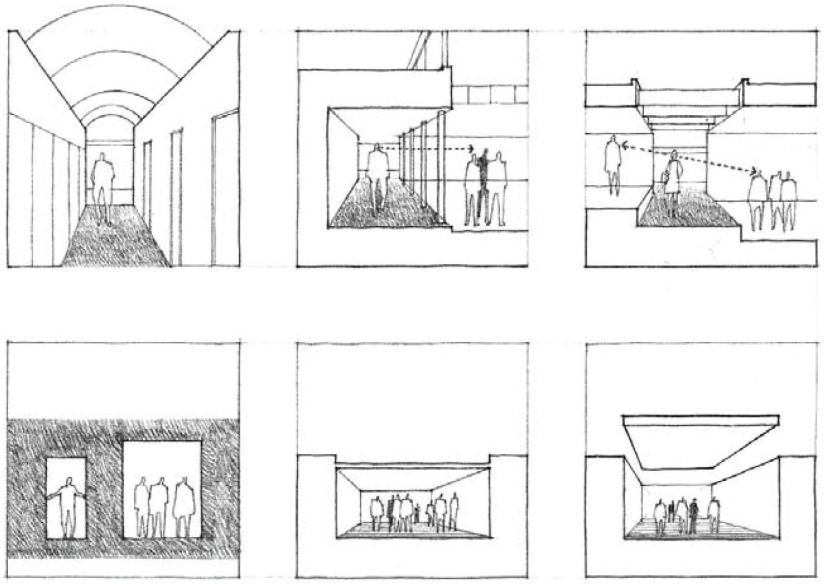
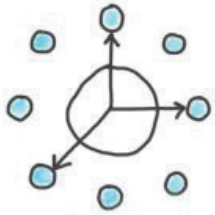


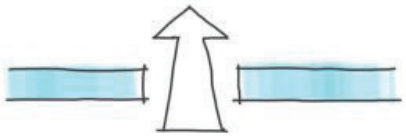
figure 50

Phrase: a variation in the expression of an architectural surrounding through circulation in a space. The images above demonstrate visibility and comfort within a space. The height and width of a space needs to proportionate for the activity and number of people that will be occupy the space. A larger space encourage groups to gather while small corridors produce movement to continue through a space.

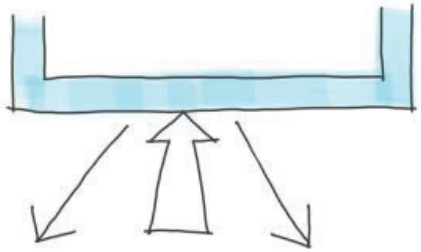
SPATIAL ORGANIZATION

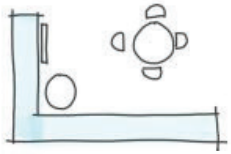


Individual vs. community

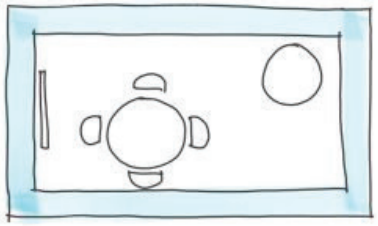


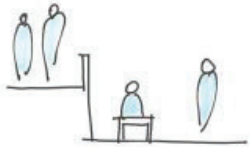
invitation vs. rejection



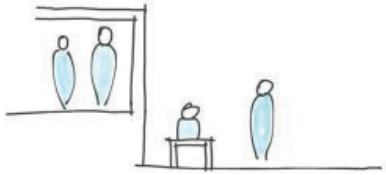


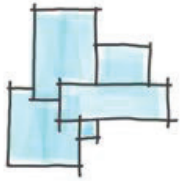
openness vs. enclosure





integration vs. segregation





combination vs. dispersion

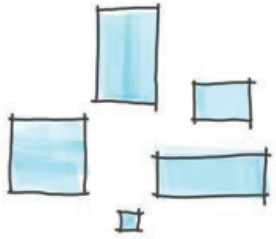


figure 51

Syntax: is the combination and spatial relationship between both interconnected and adjacent spaces.

Organization: the construction of sentences, the construction of laying out spaces in an environment; space grammar. "Spaces are arranged in a way that can clarify their importance and functional or symbolic role in the organization of a building." -F. Ching

DeafSpace

DeafSpace is an architectural approach that stems from the ways Deaf people perceive and inhabit space; a subset of architectural sign language. DeafSpace isn't just about the auditory with the visual - it's about creating a rich multi-sensory environment that eases mobility, expresses identity, and enhances overall wellbeing.

DeafSpace acknowledges the individuals that are deaf or hear of hearing use a form of sign language as their primary form of communication. Utilizing these elements of design enhance the quality and experience of the built environment. They also aim to address not only the practical needs of communication, but also the need we all have to feel safe and secure in our surroundings.

5 Basic Principles of DeafSpace:

Space and Proximity: A visual-spatial language as ASL, requires the signers to maintain enough distance to accommodate each other's signing space when conversing. The layout of furniture in rooms takes into account the characteristics of a signed communication. Movable chairs without armrests make it possible to adjust the size of a "conversation circle" and permit signers the full use of their signing space.

Sensory Reach: Deaf people need to be spatially oriented and visually aware of the activities in their surroundings. They are highly attuned to visual and tactile cues such as shadows, vibrations, and the position of people in an environment. Deaf people "read" their surroundings and various activities in ways hearing people do not. Installing windows in walls that divide rooms or building walls to waist-height can allow Deaf people the visibility to see what is happening in surrounding areas.

Mobility and Proximity: When walking and signing at the same time, signers usually maintain a wide space between them in order to facilitate clear visual communication. They will also scan the surrounding area checking for hazards and adjusting their path accordingly.

Light and Color: Glare, shadow patters, and back lighting are all examples or poor lighting conditions that disrupt visual communication. They also increase eyestrain, which in turn leads to a loss of concentration. Proper lighting design and architectural elements such as natural lighting and quality electrical designs are better suited for visual communication.

Acoustics: Deaf people use hearing aids or cochlear implants to increase some levels of sound in an environment can be distracting specifically to these people. Hard building surfaces can reflect sound waves in a way that causes reverberation that can also be painful at elevated levels. Reducing the noise levels of air conditioners and generators prove to increase the noise quality of a space. Materials such as carpet tiles and other soft materials can help eliminate these additional noise levels.

"Deaf people don't see themselves as having a disability just because they interact with the built environment differently than those that are hearing."

"The practical act of making a DeafSpace are long-held cultural traditions that are the basic elements of an architectural expression unique to deaf experiences." - Gallaudet University, Washington D.C.

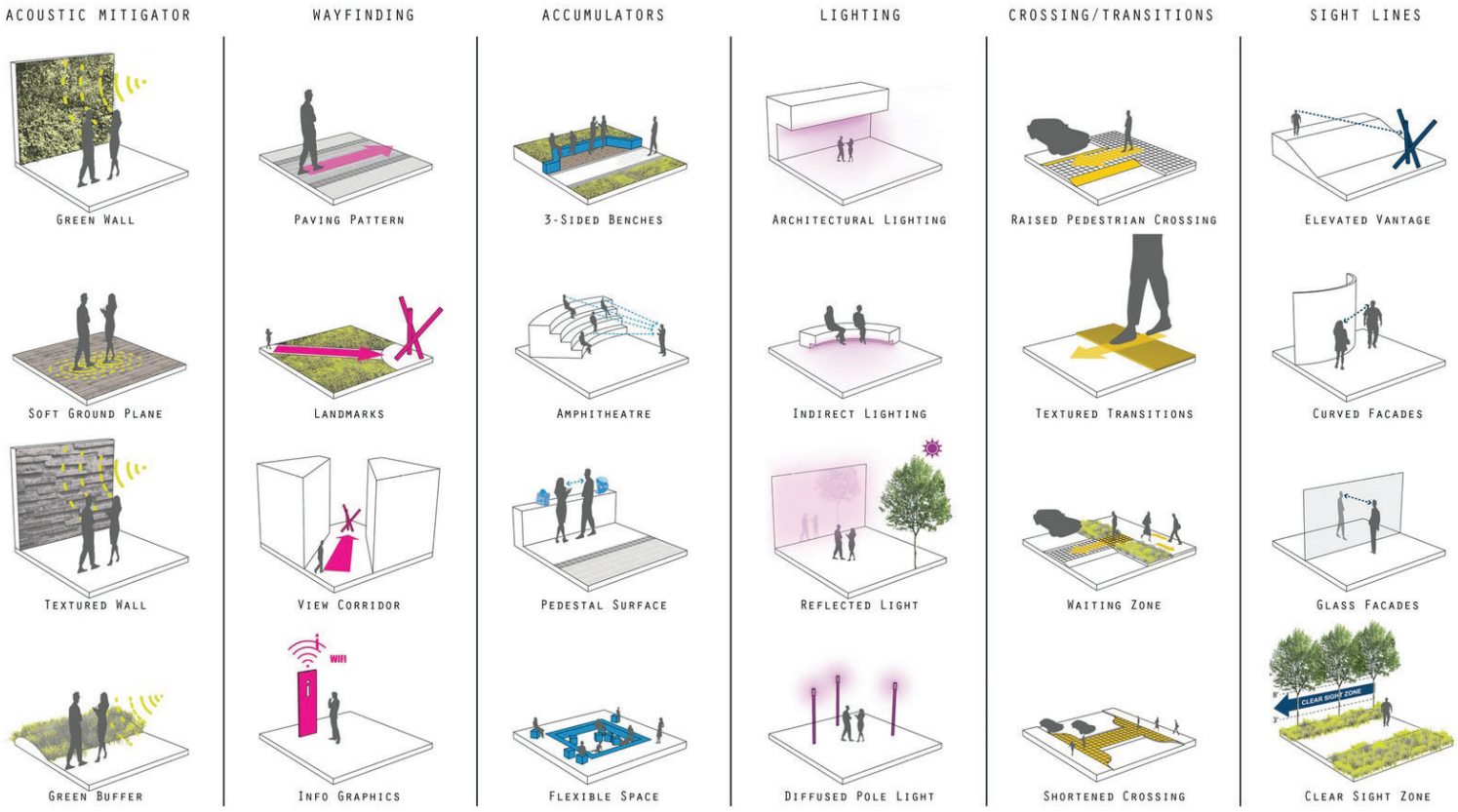


figure 52

Language Units	American Sign Language (ASL)	Architecture Sign Language (ArchSL)	DeafSpace as ArchSL
Lexicon: language framework = combined conventions	Ex. Language (vocab.) Signs, finger spelling, facial expressions, & additional body movements	Architectural Elements (listed below) Primary elements (FSO) Point, line, plane, volume	"What is DeafSpace?" The DeafSpace philosophy outlines specific elements of design suitable for DeafSpace.
Phonology: the study of speech sounds	(hand movements, shape, location) Ex. FATHER, MOTHER, FINE These signs all have the same handshape but signed in different locations on the body.	Form (FSO) "Architectural form is the point of contact between mass & space. Forms, textures, materials, etc. all combine to articulate space." Architectural form contains different materials, i.e. a plane, it is one primary element but embodies different phonologies by the material of that plane. Ex. The plane being made of wood, marble, brick, concrete, etc. *Pronunciation* expression of an architectural form based on material use *Inflection* a change in form to express the functionality of an element	Sensory Reach (tactile cues) Deaf people can "read" their surroundings, they are highly attuned to visual and tactile cues that aid in their awareness and spatial orientation within the built environment. *Pronunciation* expression of an architectural form based on material use *Inflection* a change in form to express the functionality of an element
Morphology: study of words & means of units, ex. Suffix & prefixes	Ex. Free vs. Bound Signs Free- AGAIN, SEE, YOUR (stand-alone sign) Bound- TEACHER, 2-WEEK, 1 year ago (compound sign)	Form & Space (FSO) Defining space & Surface articulation; changing the base plane to articulate the specific environment. *Morpheme* the variation in a forms' topology	Space & Proximity A visual-spatial language such as ASL requires enough distance between signers to accommodate the characteristics of a signed conversation. *Morpheme*; combined smaller units to form a larger element
Syntax: sentence construction, word order	ASL has many sentence structures and formations Ex. GIRL KICK BALL (The girl kicked the ball) or BALL(t), GIRL KICK (The ball was kicked by the girl) Vs. BALL KICK GIRL (The ball kicked the girl)	Organization (FSO) Spatial relationships & Spatial Organization; like the construction of sentences, the construction of laying out spaces in a particular environment. Space grammar. *Syntax* the combination and spatial relationship between both interconnected and adjacent spaces	Mobility & Proximity Moving between spaces can be a hazardous during signed conversations. During this transition, the signer is constantly scanning their surroundings and adjusting their path accordingly. Wide paths and fewer sharp corners ease navigation during conversation. *Syntax* the combination and spatial relationship between both interconnected and adjacent spaces

Language Units	American Sign Language (ASL)	Architecture Sign Language (ArchSL)	DeafSpace as ArchSL
Semantics: sentence meaning, the application of combining syntax	Ex. (reference *Syntax* example) Context contributes to the meaning of the signs and sentence	How you come to understand the meaning of the arch. paragraph Circulation (FSO) the means of navigating through related spaces (semantics); in terms of organization (syntax) Semantics how architectural elements acquire meaning	Light & Color the proper application of lighting and color in a deaf-friendly space is crucial to minimize eye strain Semantics how architectural elements acquire meaning
Grammar: language rules, combined paragraph of semantic sentences Rules applied to a setting as a whole	Focus on the topic or question first. Gives an understanding/preface to what the sentence (conversation) is going to be about.	Rules for expressing arch. ideas Principles (FSO) "Order: condition in which each part of a whole is properly disposed w/ reference to other parts & purpose to produce a harmonious arrangement" Like writing an essay, introduction, body, conclusion. Syntax the combination and spatial relationship between both interconnected and adjacent spaces	Proximity to the signer and signed characteristics of a signed language Syntax the combination and spatial relationship between both interconnected and adjacent spaces
Language: method of combining elements, conveyed meaning of a topic Combined language units form the resulting language	Ex. Facial expressions, body position, hand movements, language signs & finger spelling all combine to produce ASL	Elements in place of the architectural solution. How are these elements interpreted by the user? To convey the desired meaning; combination of elements to provide a meaning in architecture. Phrase a grouping of elements together to form a unified element or space, creating formation	Light, Color, Acoustics Combined elements in a space. Phrase a grouping of elements together to form a unified element or space, creating formation

figure 53

Signed Language Elements: "verbal" sign itself; "non-verbal" facial expressions, body position

Architectural Elements: proportion, color, arrangement, scale, intimacy (mood), light, materiality, landscape (context), style, form, point, line, plane, and

literature reviews

Elements of Language | Language is the composition of carefully selected components and elements. Each element is applied in combination to create a language. Language commonly refers to the spoken, written or signed forms of communicating. It constructs out interactions and choices in life as humans and how we choose to live our daily lives. There are many resources on language and the many different parts that make up a language. The following resources will focus on the composition of language followed by a specific application of the elements in American Sign Language.

Source: Introduction to Language

An article on Lumen Learning breaks down the fundamental elements of language. It articulates the importance of each element and its contribution to forming a language. Primary elements discussed include grammar and lexicon. It's important to understand how a language is formed before moving on to linguistics and the articulation of a language. Linguistics studies the individual elements of sounds, works and phrases used in grammar and the lexical framework of creating language. Elements of linguistics include the study of phonetics, phonemes, morphemes, syntax, semantics and pragmatics. Context is also discussed in the end of this article and the importance to understanding the meaning of a sentence, phrase, or individual word.

Source: Sign Language Structure

The Journal of Deaf Studies and Deaf Education produced by the Oxford Academy published the article "Sign Language Structure: An Outline of the Visual Communication Systems of the American Deaf". Stokke discusses the language structure relating to American Sign Language (ASL) as a type of signaling system, used primarily by the Deaf.

Like a spoken language, such as English, French, or Spanish, ASL is composed of language elements and comprised of their own grammar functions. The history of ASL originates from the French language which is why the grammar structure seems so similar between the two different languages. Learning the French language was the primary source for setting up the initial framework for learning American Sign Language. There are many attributes that go into Deaf Culture, these attributes are held together by the language. ASL aids in developing cultural connections and highlighting the importance of common language within the deaf culture.

Stokke also mentions the use of different signs and their meaning to help aid in the sign language learning process. Natural, home, and conventional signs are and can be used in an appropriate setting, but all contain different grammar and language conventions that would prevent them from qualifying as the American Sign Language.

Source: A Basic Course in American Sign Language

A Basic Course in American Sign Language is a textbook to aid in learning the American Sign Language. ASL is just one of many different signed languages used around the world. Interestingly enough there is a big difference between French Sign Language, Chinese Sign Language and even British Sign Language. These are just few examples but ABC in ASL discusses the grammar of American Sign Language and the importance of each rule, Similar to the language most familiar to us, English, there are a variety of different ways to form a negative sentence. Each of these are explained per chapter and contain example sentences to give the student a better understanding of how each sentence is structured.

In conclusion, languages are not only a form of communication composed of many elements, but language is an identity. In the instance of the deaf community their main form of communication also binds them as an independent culture.

What is a Sign? | Sign can be many different things. They can describe a situation, be a warning for something ahead, or not mean anything without being aware of the general context. Semioticians are trained professionals and analysis's of signs. What does it mean to be a sign, are there certain qualifications that need to be met to be classified as a sign? The following sources dive into the analytics of what it takes to understand what a sign means and can communicate.

Source: Semiotics for Beginners

Semiotics for Beginners is a brief article that describes the fundamental topics for understanding how to study a sign. Semiology and semantics refer to the study of signs as a representation of art, literature, and mass media. Even with the most basic terms there are many interpretations of semiotics. This article touches on the significance of linguistics and grammar in media that use signs to form and articulate a language. The reference of film in this article is used to articulate the linear connections between mass media as a sign and how it can be analyzed and communicated as a language.

As with everything, signs also have a significant history with their original studies. Philosopher Charles Sanders Pierce and French linguist Ferdinand de Saussure have combined theories on semiotics that built a foundation for semiotic studies. Semiotics have been analyzed from many points of view, Significant comparisons related to semiotics can be discovered through paradigms and syntagms, the denotation and connotation of a sign, and the expressions of codes (social and textural). The importance of the comparisons provides outside researches to take the provided facts and information and form their own conclusions to make discoveries of their own.

An example from the text that articulates the comparison between the denotation and connotation of a sign. Dominic Strinati asks the question, "How can we know that a bunch of roses signifies passion unless we also know the intention of the sender and the reaction of the receiver, and the kind of relationship they are in?"

Strinati follows this question with an explanation of the relationship, are they lovers or are they family members, such as a grandparent and grandchild. The concept of giving or receiving flowers is dependent on the relationship and may hold many connotations as a sign. The sign or act of giving someone flowers is typically seen as a romantic gesture and we would see this gesture between lovers. If this is an interpretation of the gesture we do so based on the social relationship, not as a sign, but we can refer to the connotation and social effects to locate the sign. (SemioticsforBeginners)

Understanding relationships and contexts in which they are appropriate is part of what it means to make a meaningful culture related to sign. The fundamentals of semiotic analysis are that any system of signs is carried out by a medium that contains its own set of principles and structural system. "Semiotics can help to make us aware of what we take for granted in representing the world, reminding us that we are always dealing with signs, and that sign systems are involved in the formation of meaning and understanding"(Cited in Semiotics for Beginners).

Source: Fire Signs

Fire Signs by Steven Skaggs is a novel focused on the analysis of semiotics and theories for graphic design. Though this is an analysis on a specific form of sign it provides fundamental information for understanding sign classifications and the perception of a sign.

All sign displays signal an attempt to communicate a message. These communicated messages are based on context. Skaggs uses the example of an acorn, a stop signs and a couple other common signs to simply explain sign classes and the complex nature of a trichotomy, or the framework for understanding different types of signifying relationships between signs.

Three fundamental question are asked before the analytical categories (trichotomies) of a sign are discusses. "What kinds of things are fit to be signs? What kinds of relation can a sign have to its referent? What "authority toward action" can a sign/referent have upon understanding in the interpretant? A brief overview of these three questions is analyzed as part of the 3-trichotomy orders. The first trichotomy discusses how fit an object is to be a sign. What are the qualities of a sign? What is the visual element (visent) that provides something with the capability to perform as a sign? Systematically a sign should also have prior involvement with semiotics to be classified as a sign of the first trichotomy. The other two trichotomies have similar contents and classifications. As each order progresses the orders become more specific.

Semiotics is not only the study of signs and what they mean, but the study of signs and how they communicate to the outside world. The world has many ways of interpreting signs which makes it difficult to give every element or object a singular subjective meaning.

Elements of Architecture

Source: Architecture: Form, Space, and Order

Architecture: Form, Space, and Order by Francis Ching is a basic textbook for those pursuing a degree in architecture. Ching opens the text with a simple statement, "The physical manifestations of architecture accommodate human activity. However, the arrangement and ordering forms and spaces also determine how architecture might evoke a response or communicate meaning. Form and space are presented not as ends but as means to solve a problem in response to conditions of function, purpose, and context architecturally".

This book describes form and space in relation to architectural elements such as light, views and openings while exploring the organization of space through circulation, proportion and scale.

Architectural Elements

Primary elements in architecture are simply point, line, plane, and volume. Understanding the basic elements of architecture help designers establish a starting point. From there we can begin to further our designs by establishing a form and the spaces contained within the form. An architect is responsible for designing buildings and spaces to enhance the wellbeing of the user. In a similar way, they need to understand what is wrong with a space and understand the reasons as to why the user is unsatisfied with the space. Building upon these initial elements help further the quality of the design. Ching clearly list out the elements of architecture each as their own chapter. Starting from with the basics, primary elements, then moving on to form, and form and space. He clearly states the importance of starting at the beginning before moving forward.

Architectural Organization

The second half of the book investigates the delivery of these architectural elements, through organization, circulation, proportion and scale, and ordering principles. Since the elements of architecture have been established it is much easier to understand how to use and expand the designer's architectural vocabulary. Ching describes the elements of architecture as the vocabulary of the architectural language. Now we can expand the use of this vocabulary in practice through organization. Spatial relationships in architecture are like creating paragraphs in a language. Each space is placed and laid out in such a way that the spaces begin to communicate with one another to convey continuity or meaning to the user within the whole of the building. Sentences combined create paragraphs, paragraphs make up a small portion of an essay but in sequence with the other paragraphs, or spaces in architecture, meaning is conveyed, and a story is communicated. Adding arrangements, circulation, and understanding the framework of design can be used to communicate a story to the occupant of the space. Architecture is an unspoken language; however, it speaks differently to everyone making every work of architecture unique and diverse.

Ching concludes with a quote that signifies the relationship between architecture and language. "As in language, architectural forms and spaces also have connotative meanings: associative values and symbolic content that are subject to personal and cultural interpretation, which can change with time. The spires of a Gothic cathedral can stand for the realm, values, or goals of Christianity. The Greek column can convey the notation of democracy, or, as in America in the early 19th century, the presence of civilization in a new world.

Although the study of connotative meanings, of semiotics and semiology in architecture, it should be noted that architecture, in combining form and space into a single essence, not only facilitates purpose but communicates meaning. The art of architecture makes our existence not only visible but meaningful." (Ching, 2015)

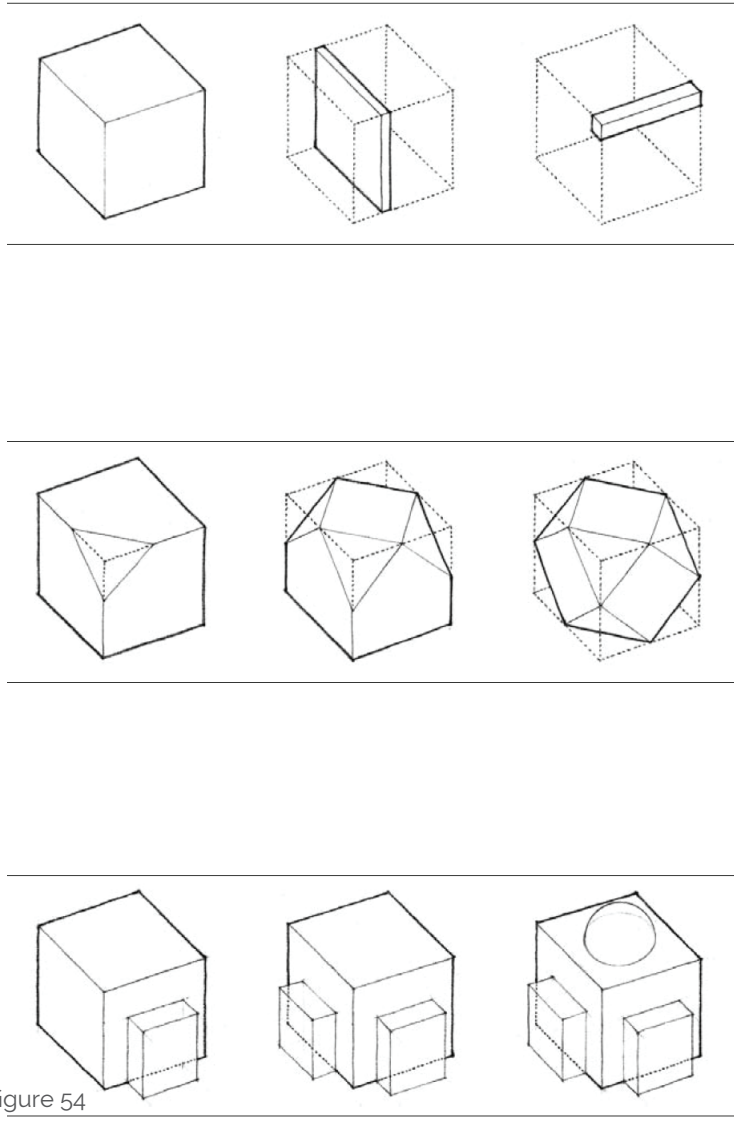


figure 54

project justification

Growing up, one of my close friends in elementary school was deaf. During our snack breaks there would be a small group of us that would meet with her interpreter to play games. The only catch was that we had to play the games in her language, American Sign Language (ASL). I picked up on the language very quickly which made learning it more exciting. My friend moved away after elementary school and I had lost my small connection to the language and those that were deaf but still maintained an appreciation. Now in college I discovered an opportunity to take ASL classes as electives for my degree and through these full immersion classes I rediscovered my love for the language and appreciation for the individuals with hearing impairments.

Having this opportunity to learn more about deaf individuals and deaf culture I started to make connections about the struggles and challenges they may face in our built environment. The American Disabilities Act (ADA) deals with the physical building modifications but is less thoughtful when it comes to designing spaces that are more ideal and appreciated by those that are deaf. Utilizing my background in architecture and ASL, my thesis presented perfect opportunity to find out how architecture is used as a communicated language, in the same way that most hearing impaired individuals use ASL as their form of communication.

I think that it's important as a designer to consciously design for all needs. I can only speak for myself that I will design with deaf individuals in mind because I have a connection and appreciation for them. I want to be able to use my skills to make a space feel inclusive and welcoming for all that enter. My project has significantly expanded my knowledge base about language and the importance of understanding the foundational elements of an idea, whether it be language, architecture, or a certain culture. Understanding these base elements

helps us expand and create new ideas. In preparation for this project I relearned and expanded my knowledge of American Sign Language, which I believe has helped aid in my research for my thesis project. Optimistically, having this language as a set of skills I have the ability to communicate with those that are deaf in both professional and personal settings.

Rochester, NY has the largest population (per capita) of deaf people in the United States. This statistic is the reason I chose to design a community center in Rochester. My site is located on the edge of the High Falls, in the heart of the industrial district. The history of this site used to be encouraging and welcoming people to the city but has since fallen in the opposite direction. My project is challenged to bring the people of Rochester back to this part of the city. I think my best chance at doing this is to design a community center that offers a variety of different spaces for people to utilize for both public or private events. As a designer continuing to study architecture, ASL, and Deaf culture, I will implement elements of Deaf Space into my building. I want those that are deaf to walk into a space and understand that someone thought about their needs and for this specific building to communicate that.

I want my project to communicate the attention to design details and intentional design practices to the profession. I believe that it is being done today in the profession but not to the caliber that it could be. Intentional design for all disabilities and needs should be at the top of our priorities as designers. There is still so much to be learned about individualized design and designing for all forms of disability. My thesis project is just a small contribution to the greater knowledge base that is the language of architecture.

project context

Historic Context

The history of learning a signed language was discovered through the practices of articulation that later developed the teachings for reading, writing, and the manual alphabet. Those that are part of the Deaf community use sign language as a special signing system that can only develop in a culture, built, operated and held together by that language.

Sign language is a system of arbitrary vocal symbols and commonly constructed of three different sign types, natural, home, and conventional. When a signed language was first taught it utilized natural and home signs. Natural signs appeared as common sense and relating to the meaning and home signs are individual unique signs used by a deaf person in their home environment. The natural language of signs is a historic term from 1776 and believed to have an unbreakable connection between a sign and its meaning, however it is nearly impossible to make out the true significance of a natural sign. In the past when a signed language was taught it utilized natural signs when there was no sign one was thought of as a supplement similar to the articulated signs that were already being used.

Home signs are translated as the lazy or modified version of a sign, used to communicate between friends or even family members that are both deaf or hearing. Traditionally, all three sign types borrow from each other to form a cohesive language communicated through signs. These signs are also used as supplemental means where there is a word or phrase not already associated with sign.

Now there are institutions specific to the learning of Deaf culture and sign language. The historic context of sign language provides insight into the challenges that occur in a space where sign language is used and ultimately discover a design solution implemented through architecture.

Cultural Context

A large majority of deaf community members consider themselves to also be members of Deaf culture. Deaf culture is the view that being deaf is a difference in humans experience rather than having a disability or disease. Deaf culture also shares the commonality of using a sign language to communicate. Though some people use their speech skills, that does not exclude them from being members of Deaf culture.

Students who are members of the Deaf community often struggle in educational institutions that consist of mostly hearing people. That is why institutions like the National Technical Institute for the Deaf (NTID) in Rochester, NY, were established as a space for those that are deaf or heard of hearing to attend for a college education beyond their primary institutional education. NTID offers an environment for Deaf culture, through academics by having access to in-class ASL interpreters, additional support services and other students and staff that share the same challenges and communicated language.

A goal for this thesis project is to provide a space for community members outside the realm of NTID, maybe a post graduation student or a general community member that has moved from another city. Designing a space that encourages inclusive interactions between those that are hearing and those that are deaf will hopefully bring awareness to the different cultures in the city's community.

Social Context

The effect on social grounding is largely intensified by the lack of common language.

Regarding sign language as a real language can be characterized by arbitrariness, discreetness, and context independence. Sign Language tends to provide arguments that oral languages utilize context in the same way as signs utilize context (physically) to communicate. However, sign language only appears to be context sensitive, open to interpretation and susceptible to simultaneously produce functions, but in reality signed languages are internally structured like an oral language. Because this similarity isn't visible to someone who doesn't understand sign language, it makes it difficult to bridge the social context barrier between sign and oral language.

site analysis

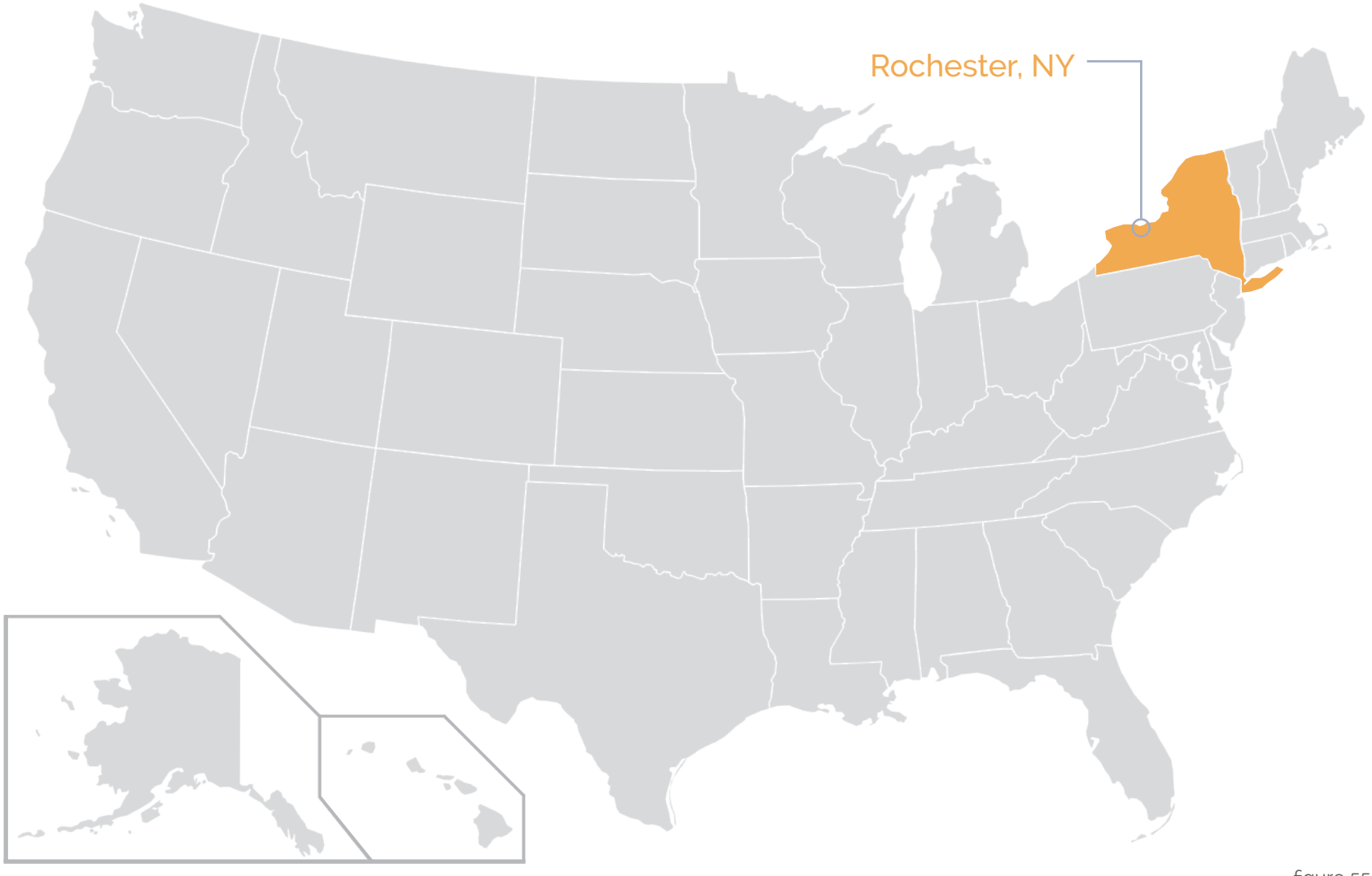


figure 55

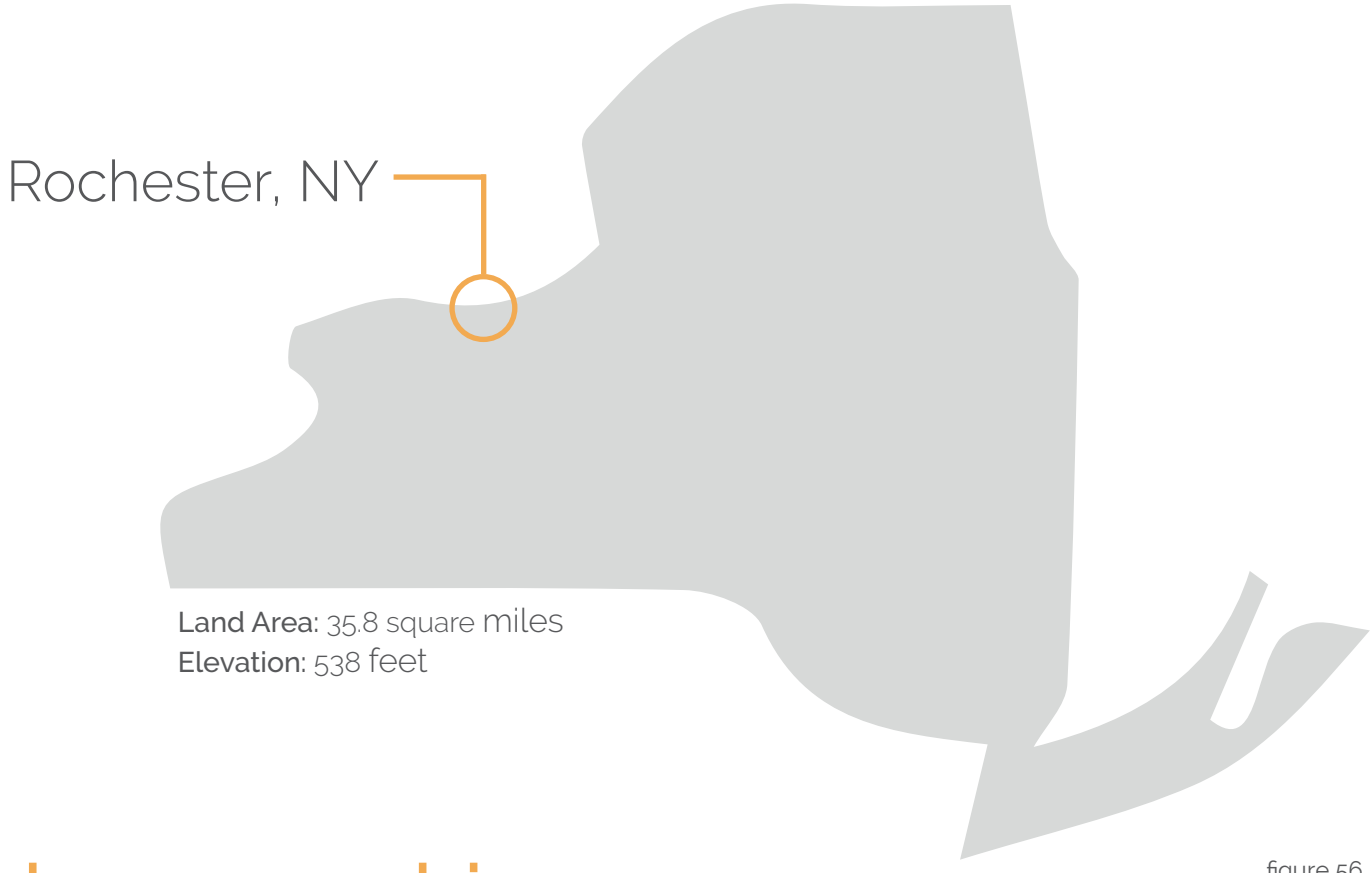


figure 56

city demographics

Founded in 1788, Monroe County

Population in 2017: 208,046

Male: 100,607 (48.4%)	Female: 107,439 (51.6%)

Population Density: 5,806 people per sq. mi. (avg.)
Avg. Resident Age: 31.5 yrs **Avg. State Age:** 38.4 yrs

Common Professions: healthcare, educational services, accommodations & food services
Avg. Household Income (2016): $31,693
Avg. Income per Capita (2016): $21,013
Avg. House Value (2016): $84,600

climate information

Annual High Temperature: 57.3 ˚F

Annual Low Temperature: 39.5 ˚F

Annual Temperature: 48.4 ˚F

Average Annual Rainfall: 34.34"

Average Annual Snowfall: 99"

*wind rose displays average yearly wind speeds

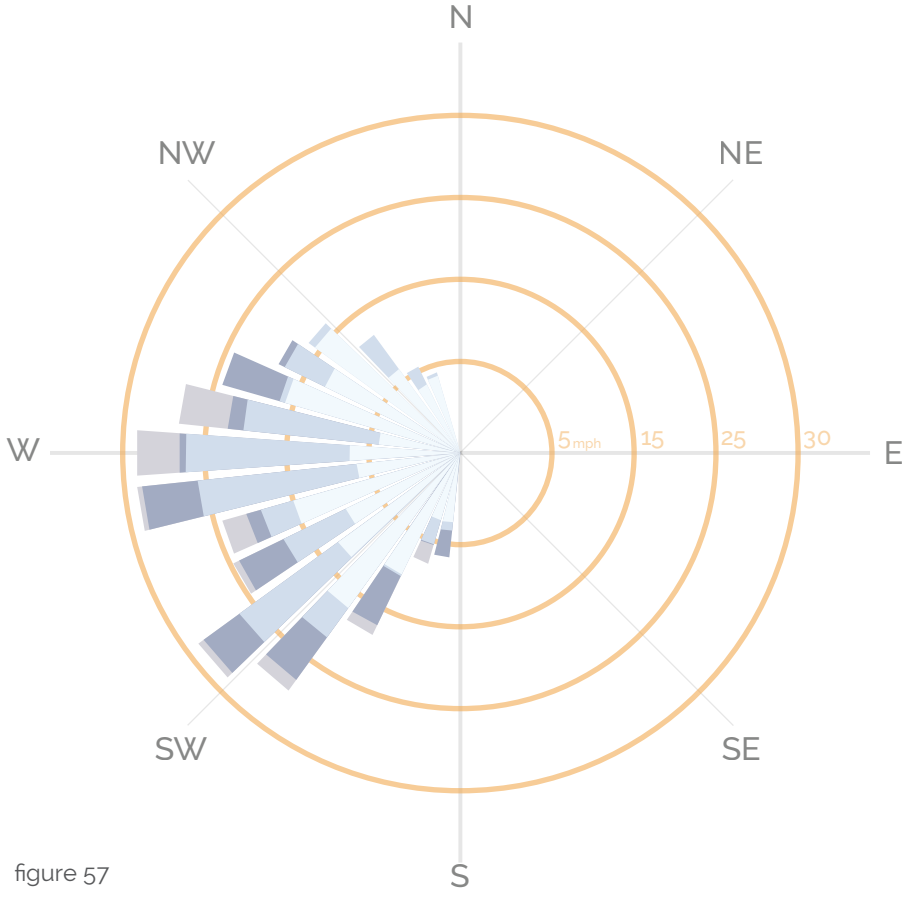


figure 57

site history

Beebee Station: former occupant of 100 Falls St. Famously known for producing hydroelectric power to the city in the 1900s.

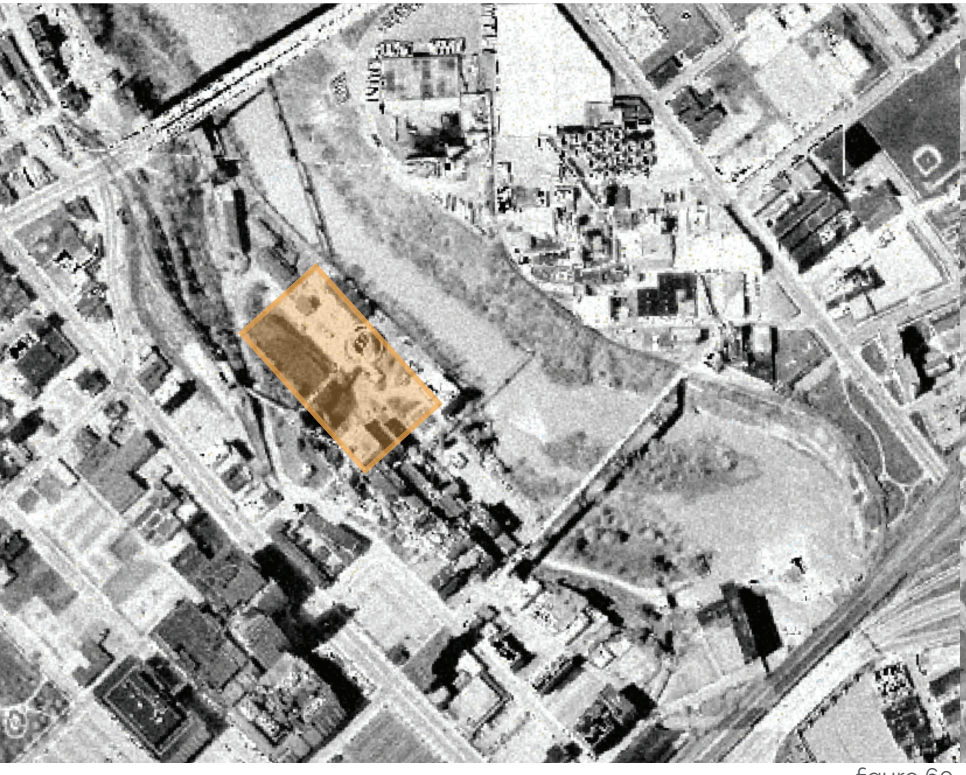
1951

figure 58

1961

figure 59

RG&E shut down the Beebee Station in 1999 and the final two smoke stack were later torn down in 2007. The site now remains an empty lot, anxiously awaiting the next building to occupy the site and continue to contribute to the history and culture of the city of Rochester.



1988

figure 60

1999

figure 61

figure 62

figure 63

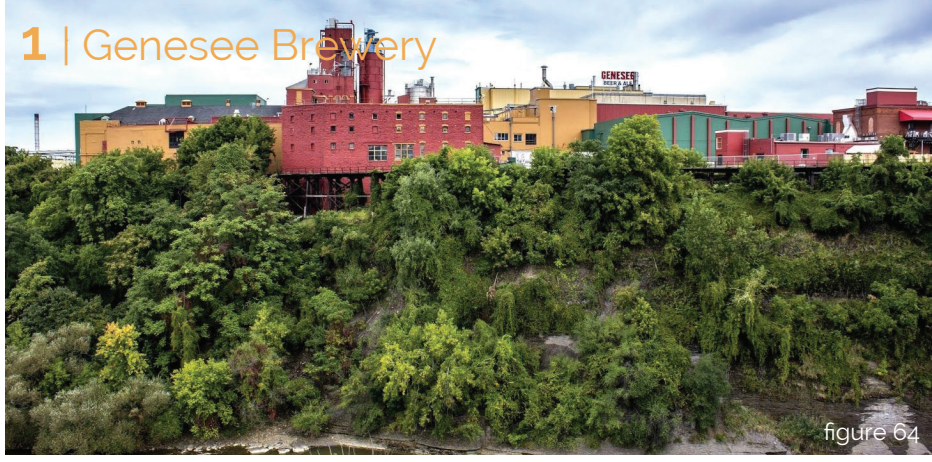


figure 64

figure 65

1 | one of the largest and oldest continually operating breweries in the United States.

2 | water from the falls used to be diverted and used to feed various area flour mills.

3 | originally built in 1891 as a road bridge but later converted to a pedestrian bridge and renamed after Rochester's sister city in France, Rennes.

figure 66

zoning

100 Falls St is part of the Riverfront District in the CCD-R Zone, also part of Rochester's Preservation District. A majority of city codes for this district include specific design criteria specific to the riverfront. Buildings are required to provide a prominent entrance on both the street and riverfront facades.

Buildings adjacent to the river must also be **set back 30' to a maximum of 3 stories and 60' to a maximum of 6 stories** beyond that. These set backs are in place to improve visual and physical access to the riverfront.

The development of the riverfront has been an initiative through the city of Rochester to promote a place for public gathering and activity along the river. Promoting public spaces along the riverfront ensure the compatible development with the existing buildings already located on the river and maintain the current desirable character of the riverfront.

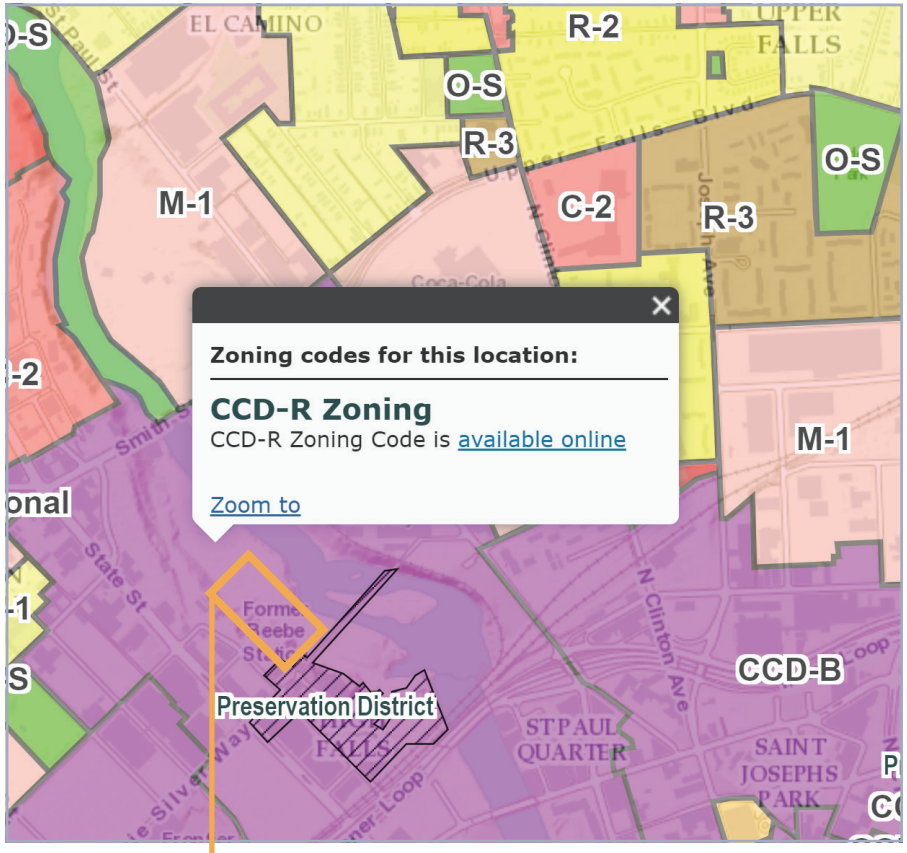


figure 67

Site: 100 Falls St

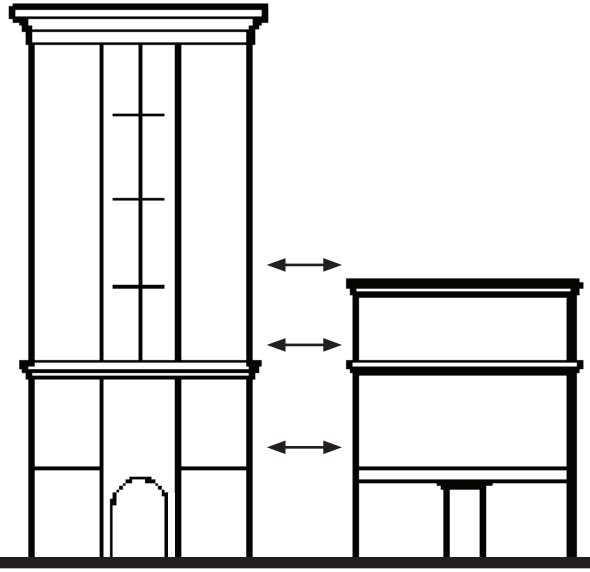


figure 68

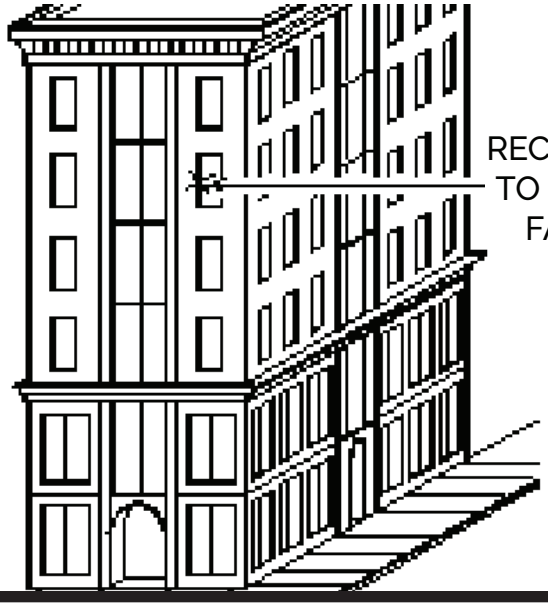


figure 69

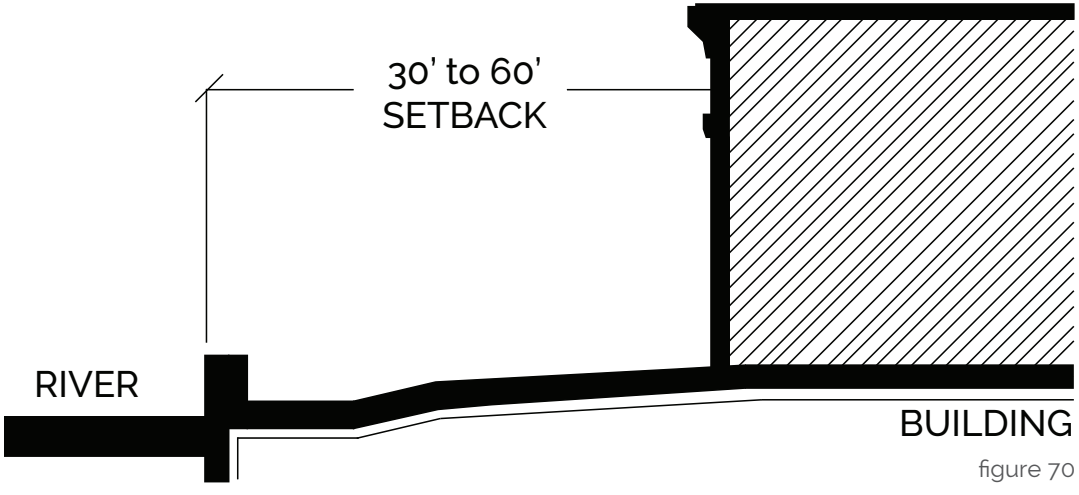


figure 70

Other requirements in the code state, in the historic district all horizontal building elements must align. This code is to ensure that the street or riverfront facades form visual continuity. This helps the historic district develop their sense of place within the city.

performance criteria

There are two major parts to this thesis design. The first part being that the architecture must communicate a welcoming and inclusive environment and provide the space for many different community events and activities to occur. The second part is that this space must consider the display elements of Deaf Space. Deaf Space acknowledges the individuals that are deaf or heard of hearing and use a form of sign language as their primary form of communication. Utilizing these particular elements of design will benefit the quality of their experience when occupying the building.

Signing Zones
The area around the body where the sign language occurs is known as the signing zone. The design elements surrounding one who is signing should be distraction free and provide a neutral background. This lessens the amount of eye strain for the person reading the signs.

Color
Contrast is vital for reading signs more clearly. A mixture of colors that do not provide an adequate contrast from the signer makes it more difficult to read and sometimes understand the signs being communicated. The same is to be understood about the use of patterns in design.

Sight Lines
The sense of sight is essential for the use and understand of sign language. Hanging objects or objects that pose a visual obstruction should be avoided during design. Unless the object is hung intentionally to create privacy.

Light
When entering or exiting a space, the pupil of the eye adjusts accordingly to the intensity of the light. The quality of natural light in a space is an important factor to consider for eliminating eye strain while signing. Natural light fills a space while eliminating the amount of shadows on faces or within the signing zone. Keeping a consistent light level with natural or diffused artificial light decreases the time it takes for the eye to adjust and eliminates excessive eye strain.

Intersections
Most commonly know as the crossing of paths, include but are not limited to hallways, corridors, doorways, and walls. These are a couple examples of potential collision areas. It is very important to provide clear visual connections between adjacent spaces to prevent these potentially dangerous collision areas. Design solutions include translucent surfaces that allow the visual of someone on the other side while still providing a feeling of privacy. This element is commonly used in office doors.

Room Layout
Sign Language is not a linear language and cannot be communicated without eye contact. A standard classroom layout is linear and faces one direction, but with the use of sign language a curved, circular arrangement is more conducive to clear eye contact.

Material
When one sense is reduces or eliminated, the remaining sense are enhanced. Wood is a great material for the transfer of vibrations. In the case that someone who is deaf, if an individual is approaching from behind the deaf individual would feel the vibrations from their foot steps through the wood floor and turn around to see the person walking up to them.

Designing a community center requires and extensive list of criteria to be met, especially when design with a focus on Deaf Space. The total square footage of the building was determined by the size of the site and by research of existing community centers and their list of programmed spaces. The majority of space is allocated for public use with the exclusion of staff space, administration offices, and kitchen facilities used for private personnel only. The following list of design criteria is specific to designing elements and spaces for Deaf Space design.

space allocation table

SPACE	SQUARE FEET (SF)	PERCENT (%)
ADMINISTRATION SPACE	1,200	2%
STAFF SPACE	3,000	5%
MECHANICAL	6,000	10%
CLASSROOMS	3,600	6%
PERFORMANCE SPACE	6,000	10%
LOBBY	3,000	5%
CIRCULATION	9,000	15%
BATHROOMS	4,800	8%
FOOD SERVICE	3,000	5%
CAFE	3,600	6%
RECREATION AREA	6,000	10%
MUSEUM/GALLERY	3,600	6%
EVENT HALL	7,200	12%
TOTAL	60,000 SF	100%

figure 71

spatial interaction table

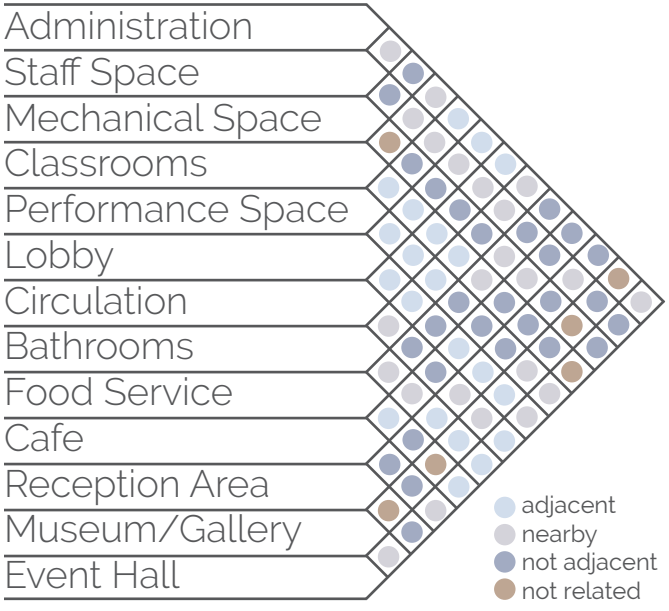


figure 72

Based on precedent research, the space allocation table and spatial interaction net are tentatively arranged to reflect what I believe will provide the most diverse building program for the community of Downtown Rochester. Key elements within the program include the education and recreation spaces.

spatial interaction net

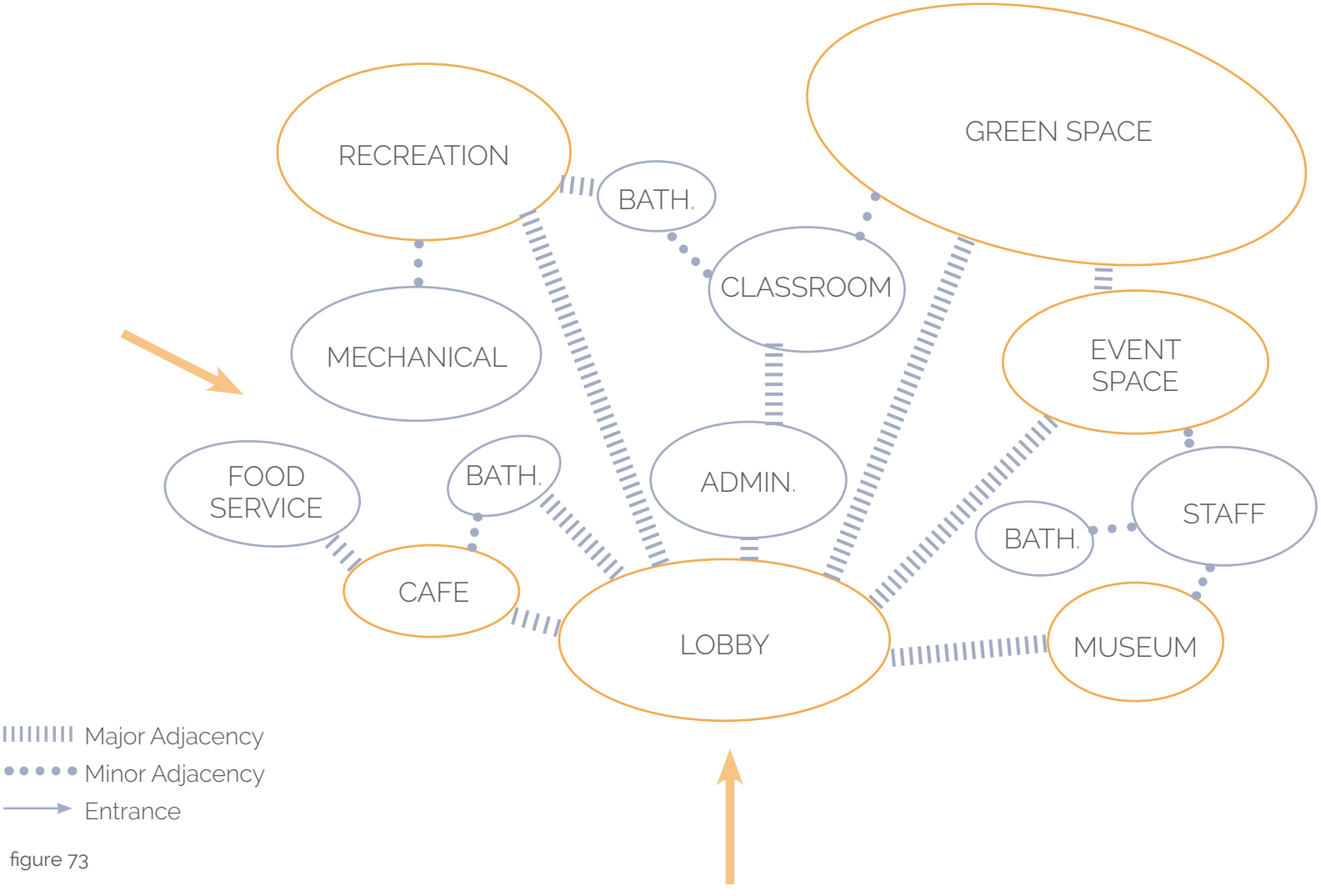
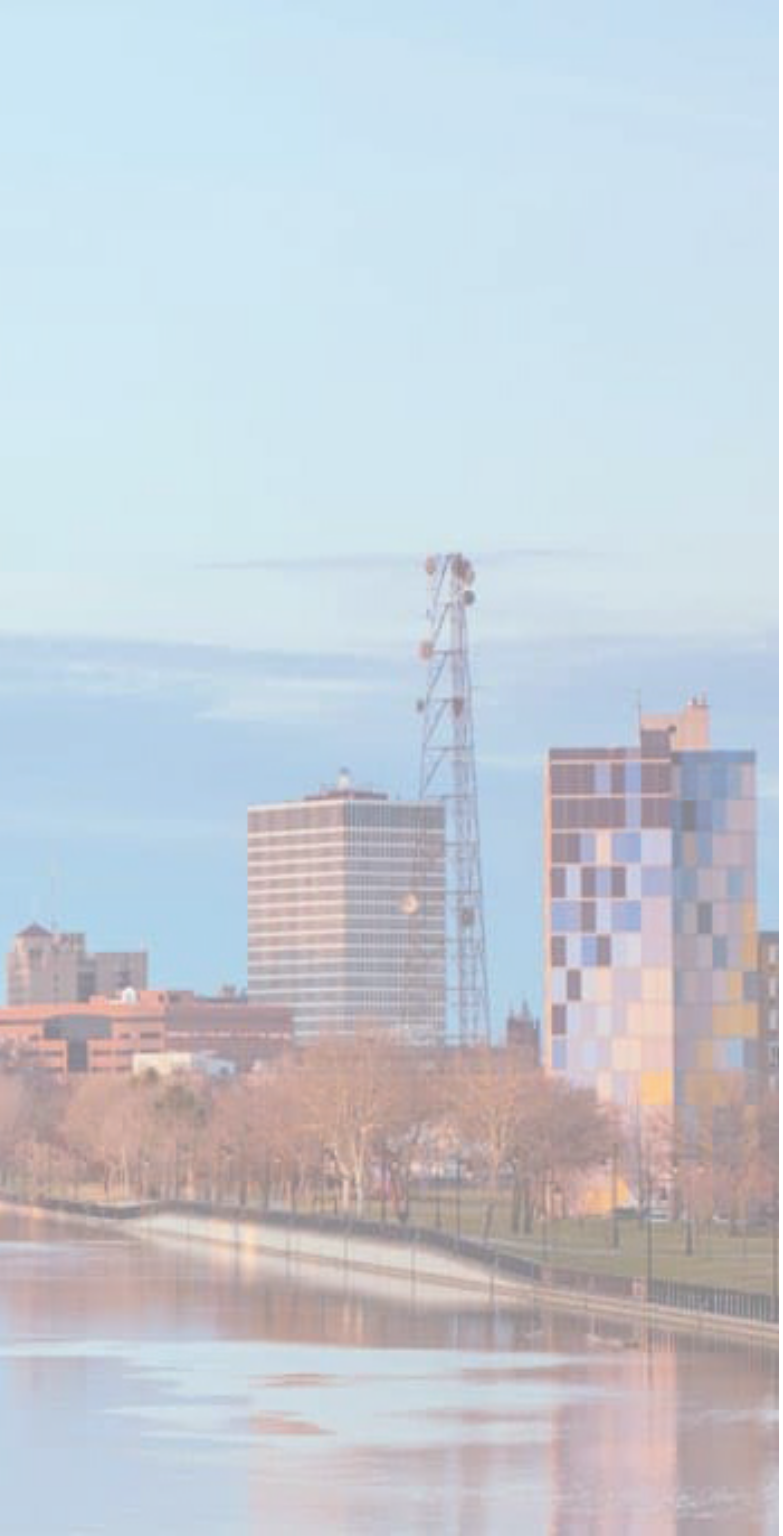


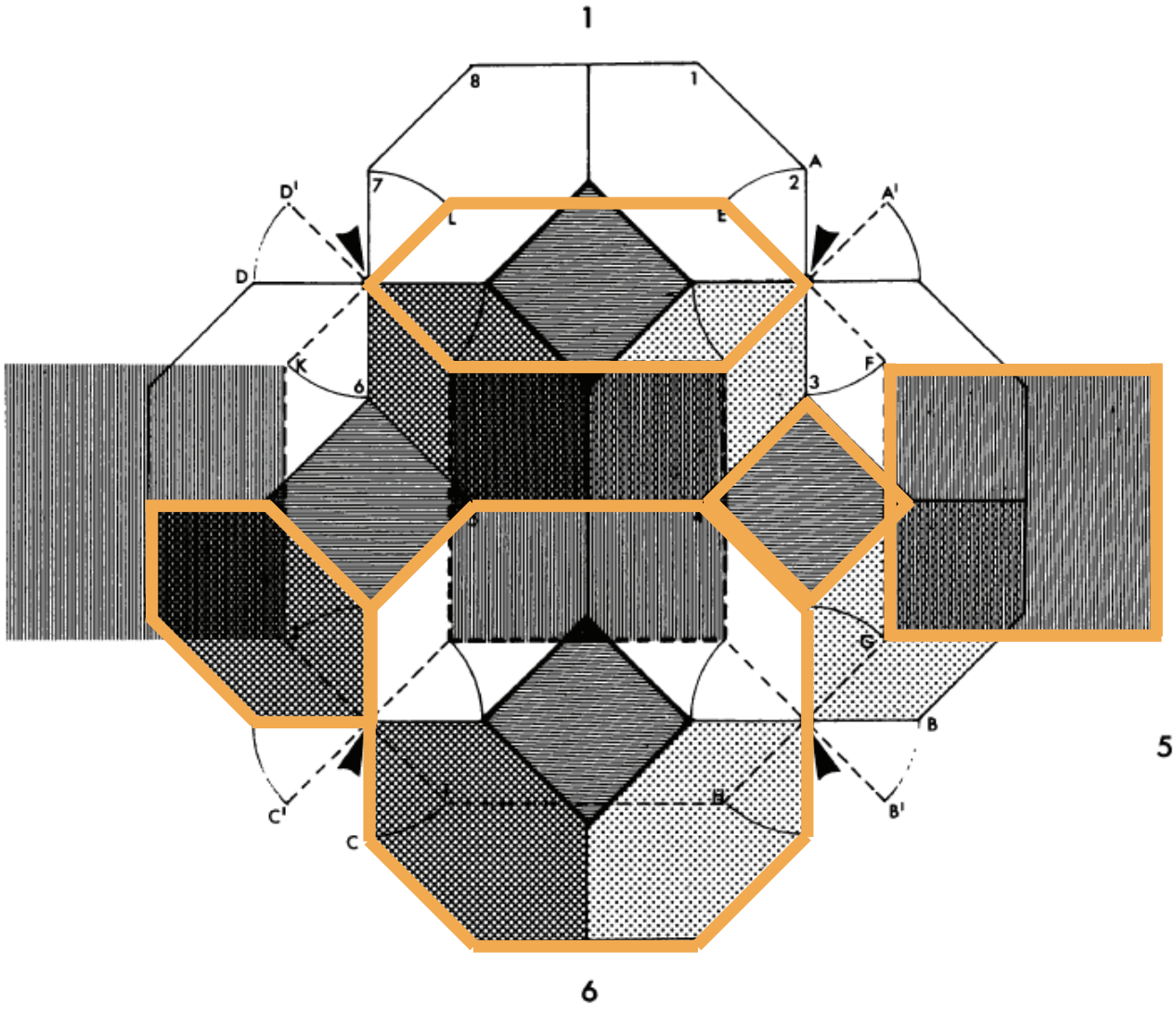
figure 73

thesis design



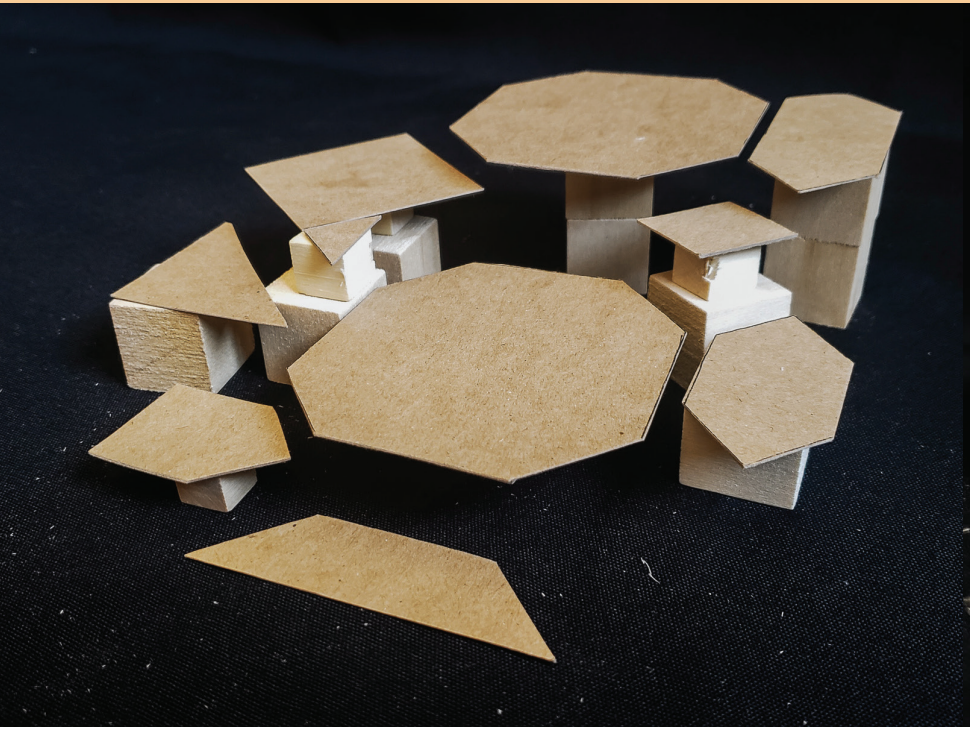
process work

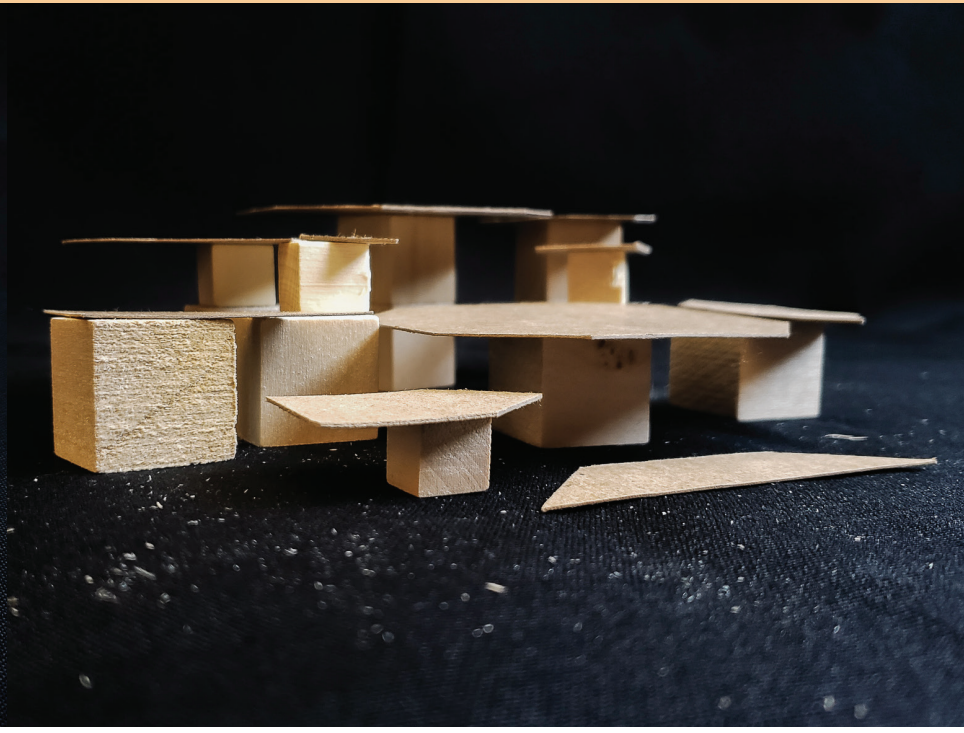
site model



The diagram above illustrates the original space filling geometry utilized in this design. A space filling diagram derives from a solid object that has been cut and flattened. In the flat state the object can be cut or folded into additional shapes and variety of sizes, creating a space filling geometry.

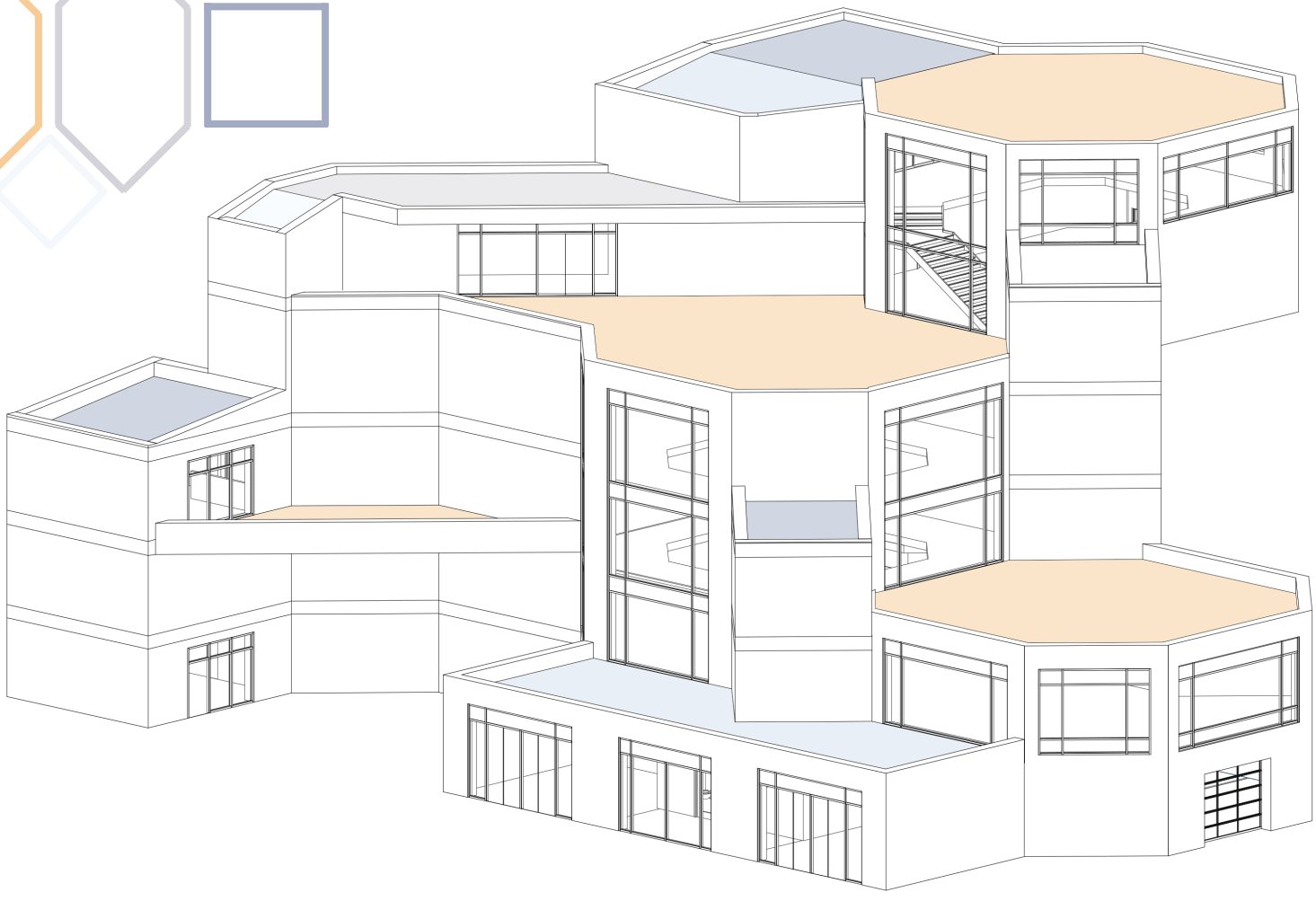
Below are images of the physical iterations and steps that were taken to achieve a space filling geometry suitable for my building typology. I started by cutting the original geometry design into individual chipboard pieces. Then added 1/4" and 1/2" square blocks to the mix to help give a sense of vertical dimension and circulation potential, this second part was heavily influenced by the drastic elevation change of about 30' on the site.



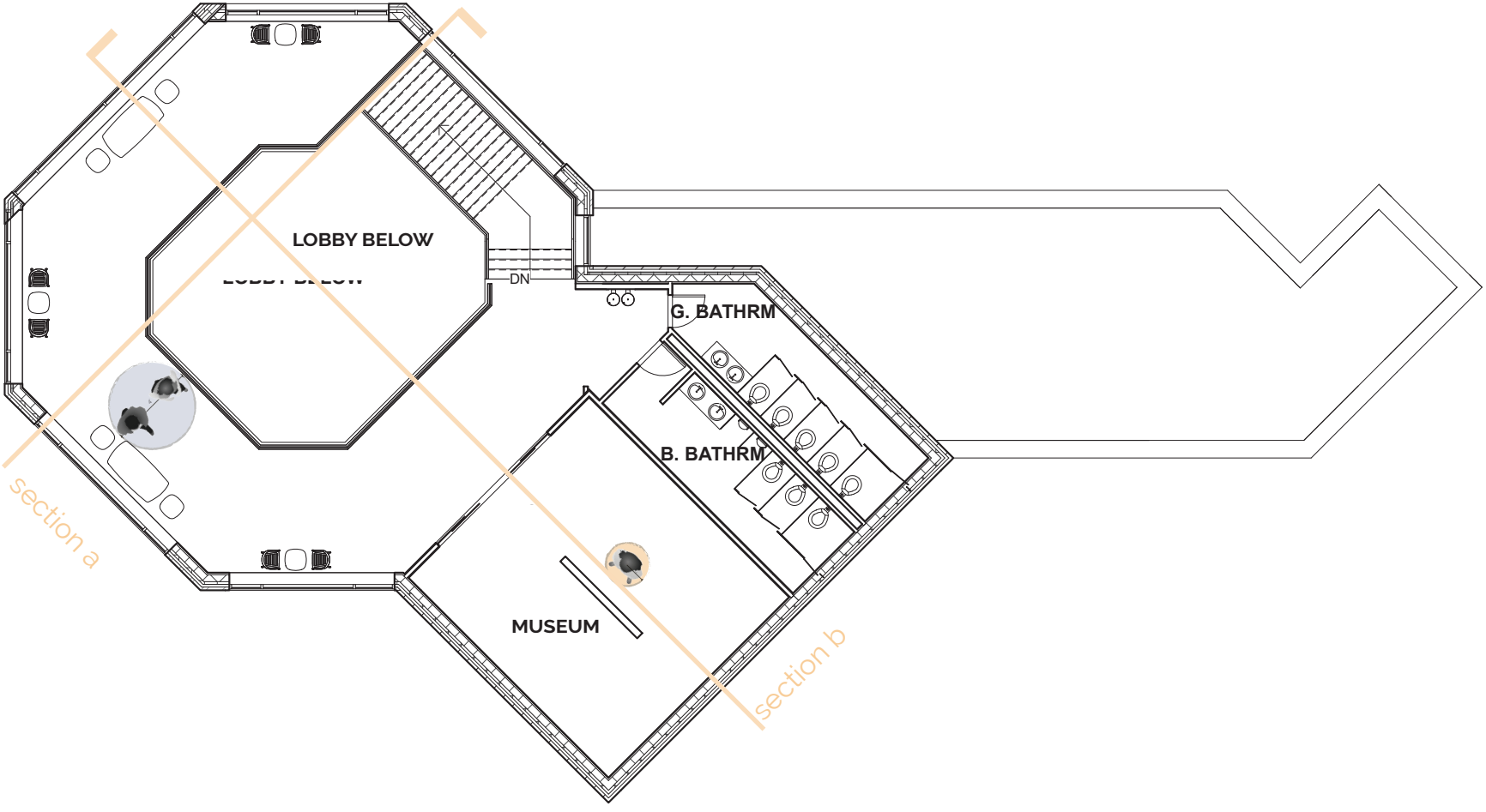


The final results of modeling the space filling geometry aided in designing for the site along with designing for the interior spaces of the building. This building typology has the unique added challenge of minimizing structural elements within a space, specifically large gathering spaces. Using a space filling geometry has allowed the design to use the connection points between “shapes” to perform as the structural column grid. The diagram on the following page displays the specific space filling geometry used for the building typology. Note that like spaces in the building used like shapes from the space filling geometry.

Space filling geometry applied



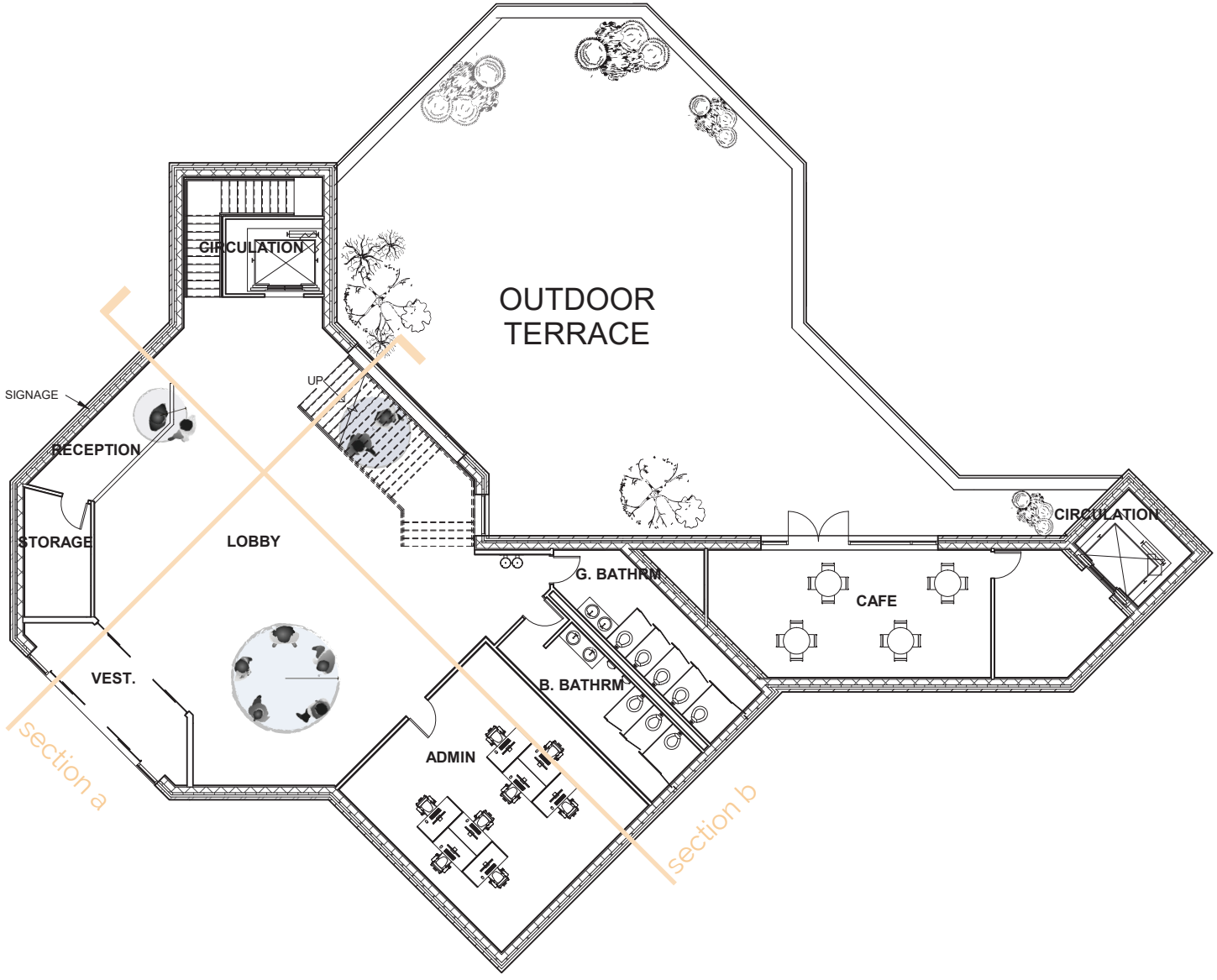
drawings



level 6 floor plan

*drawings not to scale

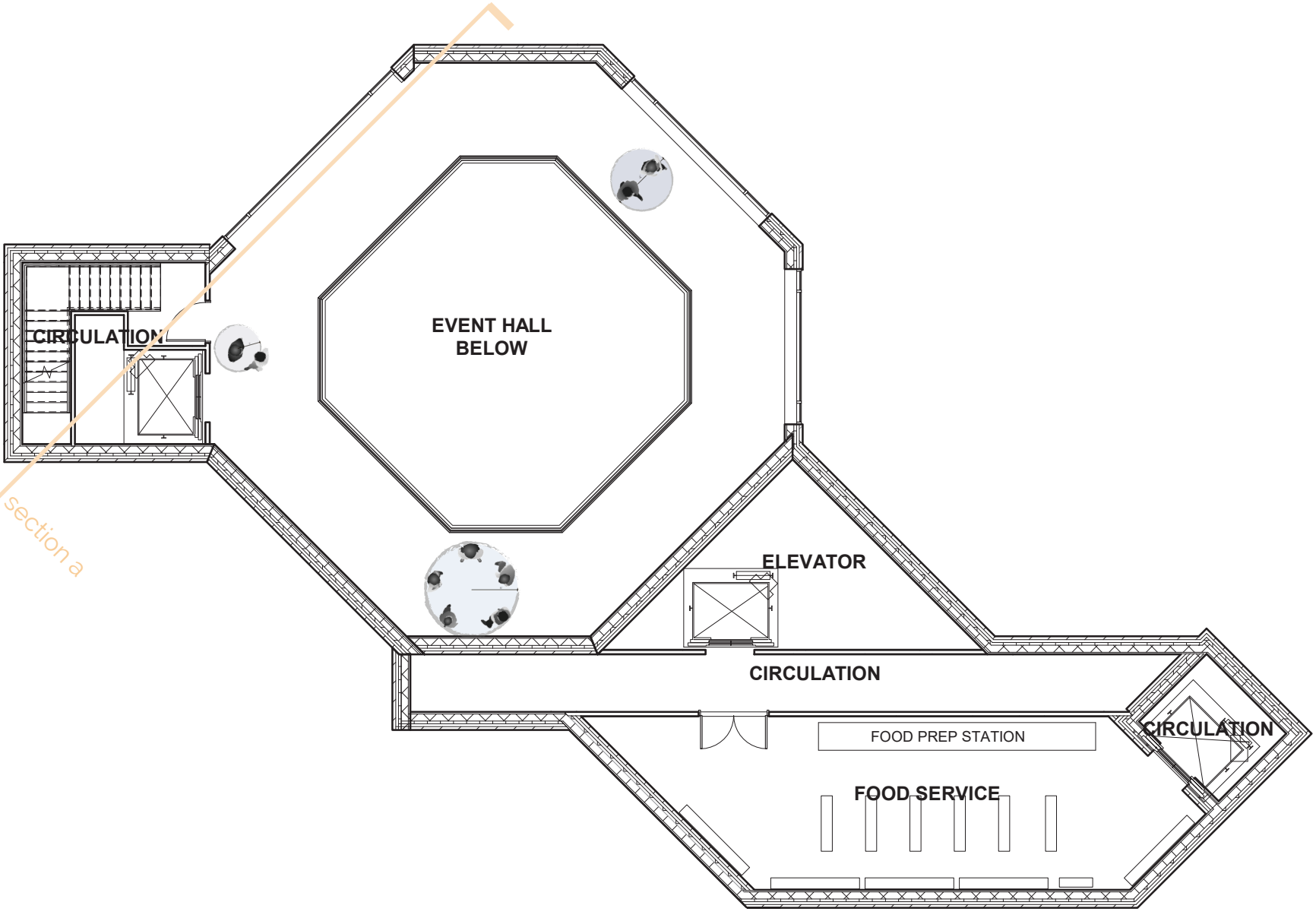
N



N

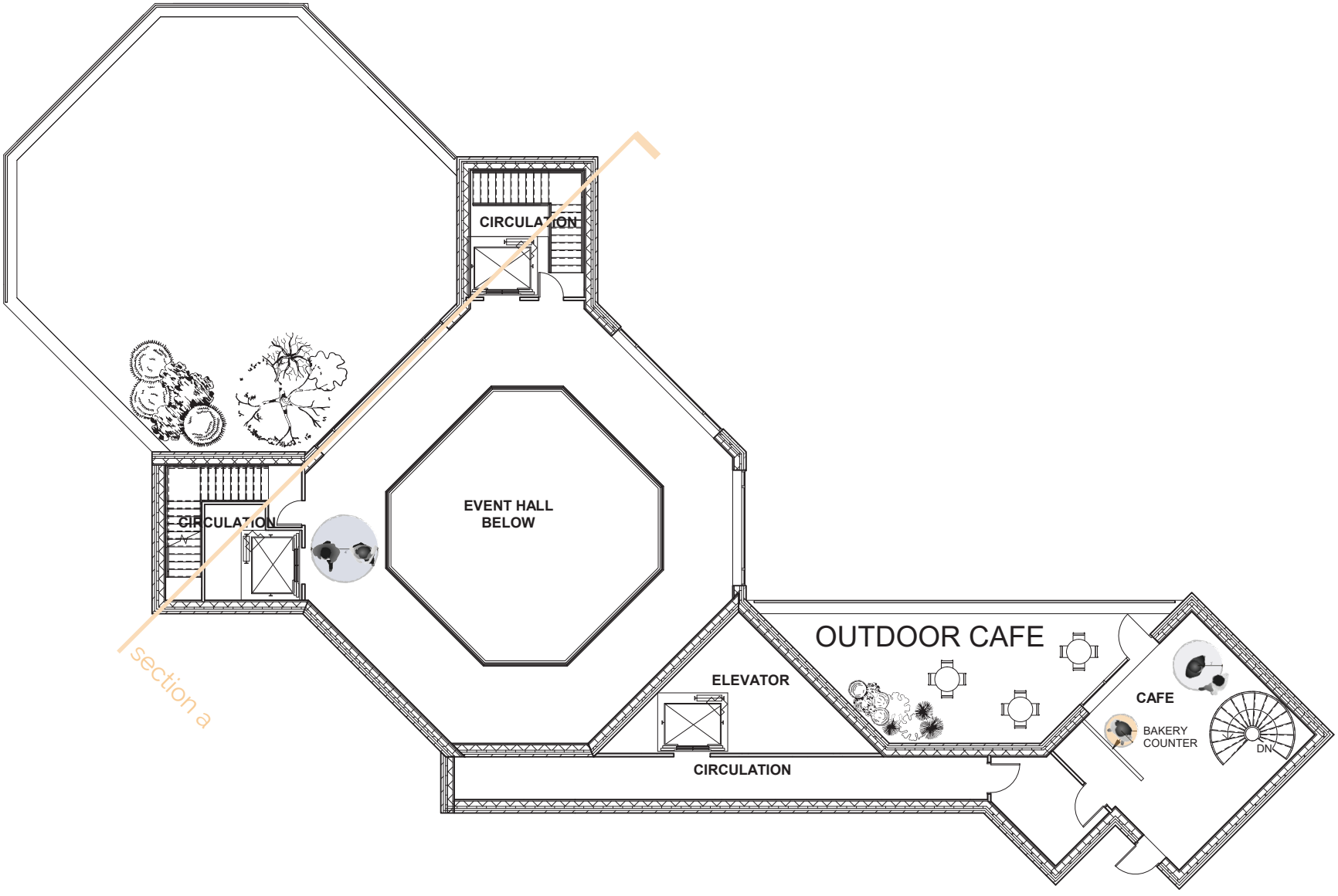
level 5 floor plan

*drawings not to scale



level 4 floor plan

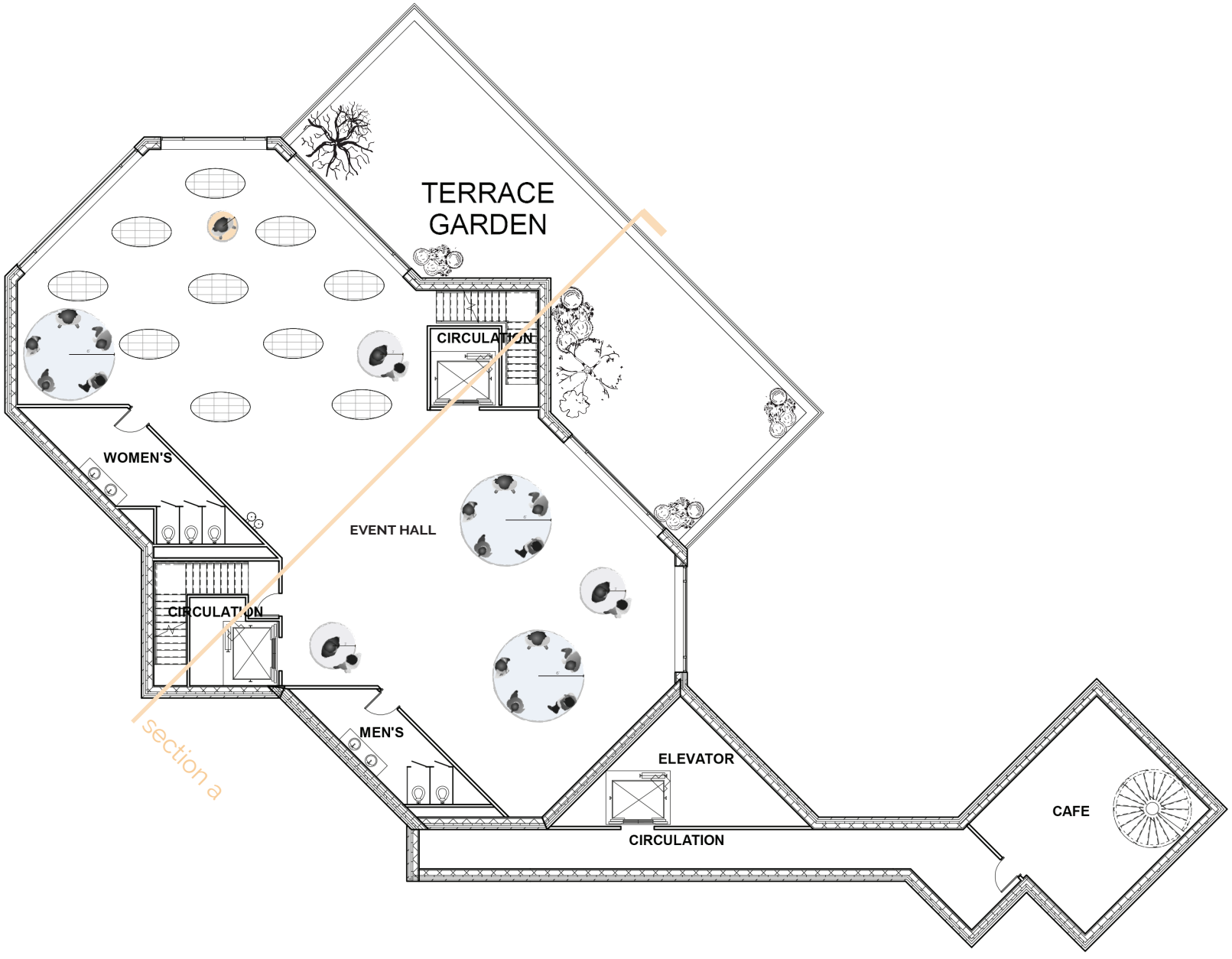
*drawings not to scale



N

level 3 floor plan

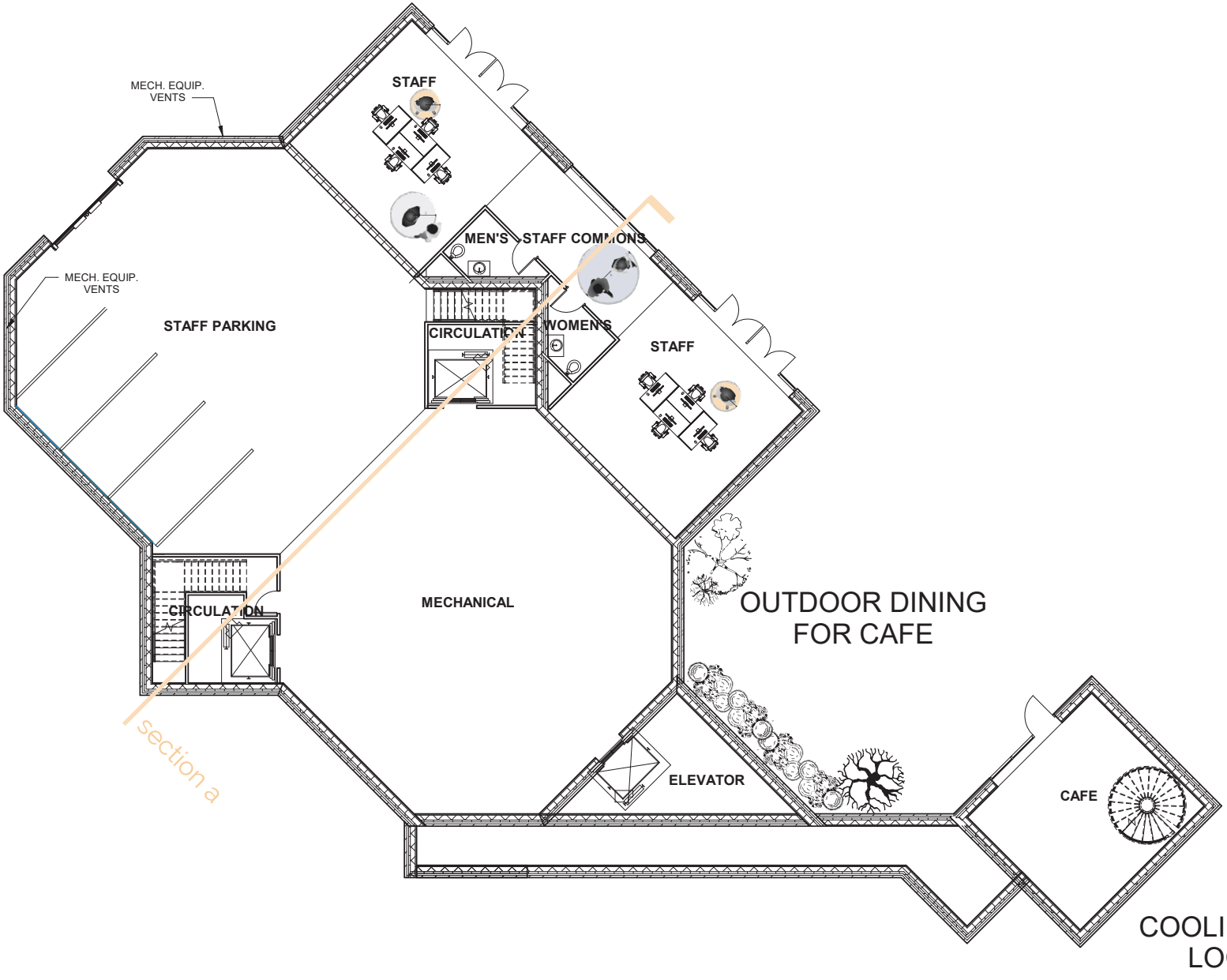
*drawings not to scale



level 2 floor plan

*drawings not to scale

N



N

level 1 floor plan

*drawings not to scale

section a

*drawings not to scale

section b

*drawings not to scale

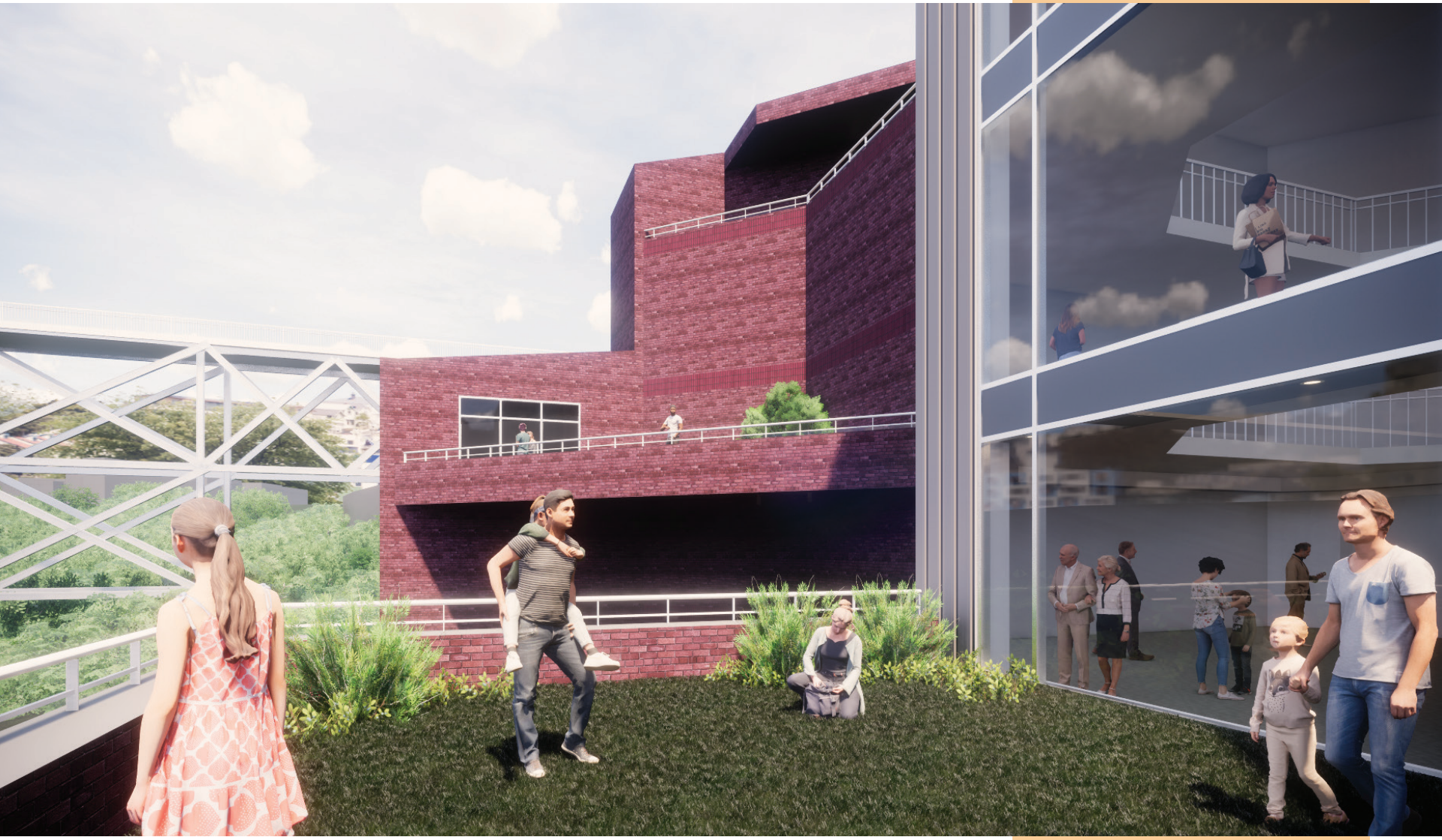
renderings

main entry

entry balcony

event hall

outdoor terrace



design conclusion

How is architectural sign language expressed in the design?

lexicon

"All form begins with a point ... then the point moves and becomes a line ... eventually the line becomes a place and planes crash and erect into 3d structures" -F. Ching

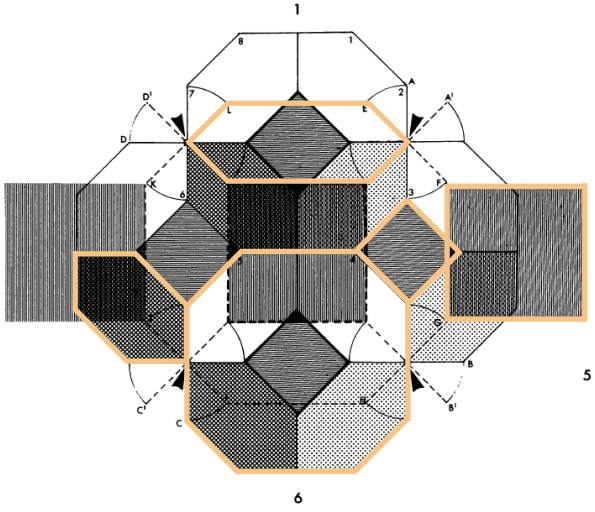
a position in space

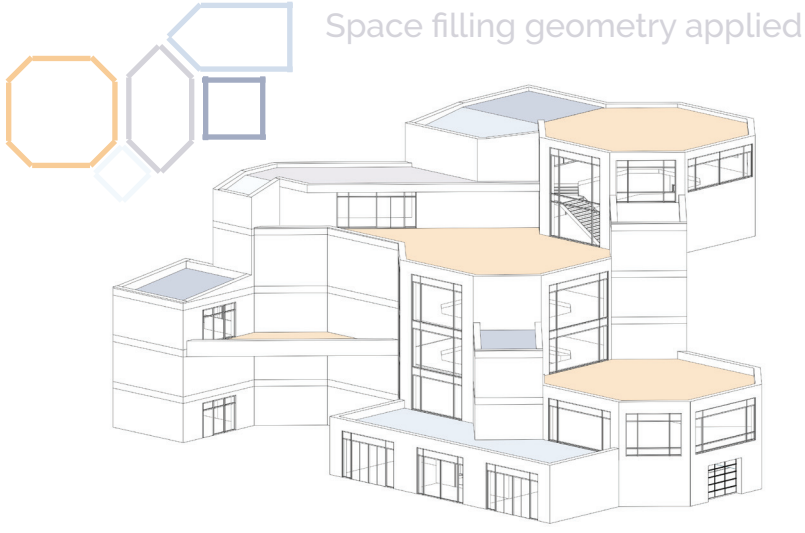
contains properties of length, direction, and position

contains properties of length, width, shape, surface and position

contains properties of length, width, depth, form & space, orientation and position

Space Filling Geometry





phonology

Pronunciation is the expression of an architectural form based on the material used. How is the building communicating to the surrounding elements?

Inflection expresses a change in functionality of an element or space.

Exterior brick facade exhibits characteristics of the historic district located in the neighborhood behind the building.

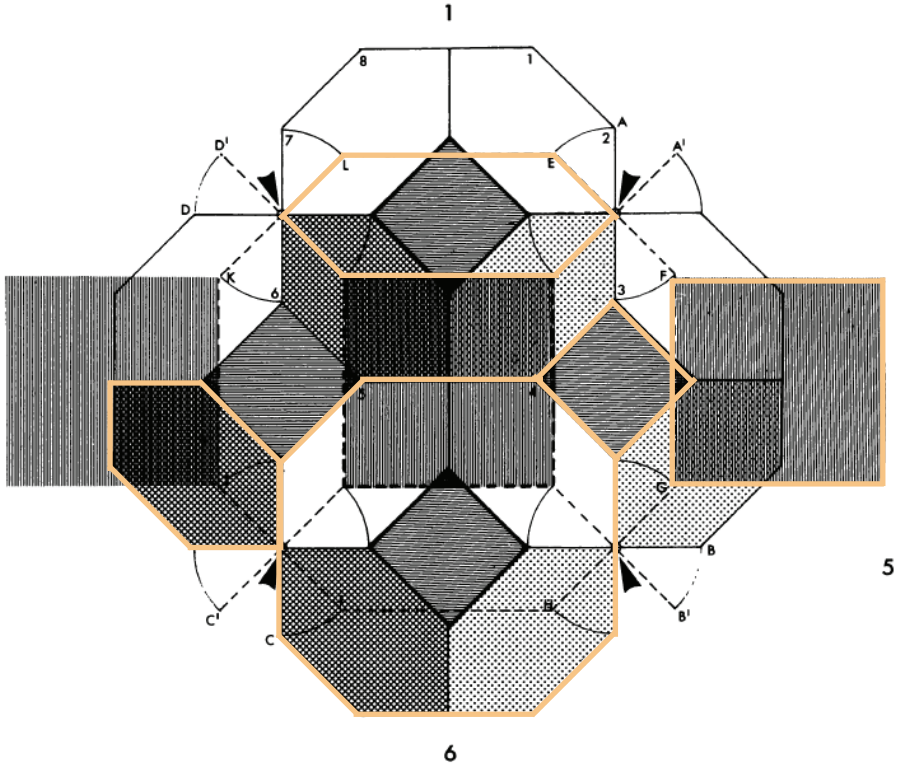
Exterior metal panel reflects the nature of the industrial district and the Genesee Brewery, located directly across the Genesee River. It also communicates the location of the large gathering spaces within the building.

Using large amounts of glazing allows the building to continue a communication between the site and the surrounding site landscape.

The cascading design of the building communicates with the surrounding site context my mimicking the High Falls located adjacent to the site.

morphology

A morpheme in architecture is the variation in a form's topology. This also includes the combination of smaller units to form a larger element or form.



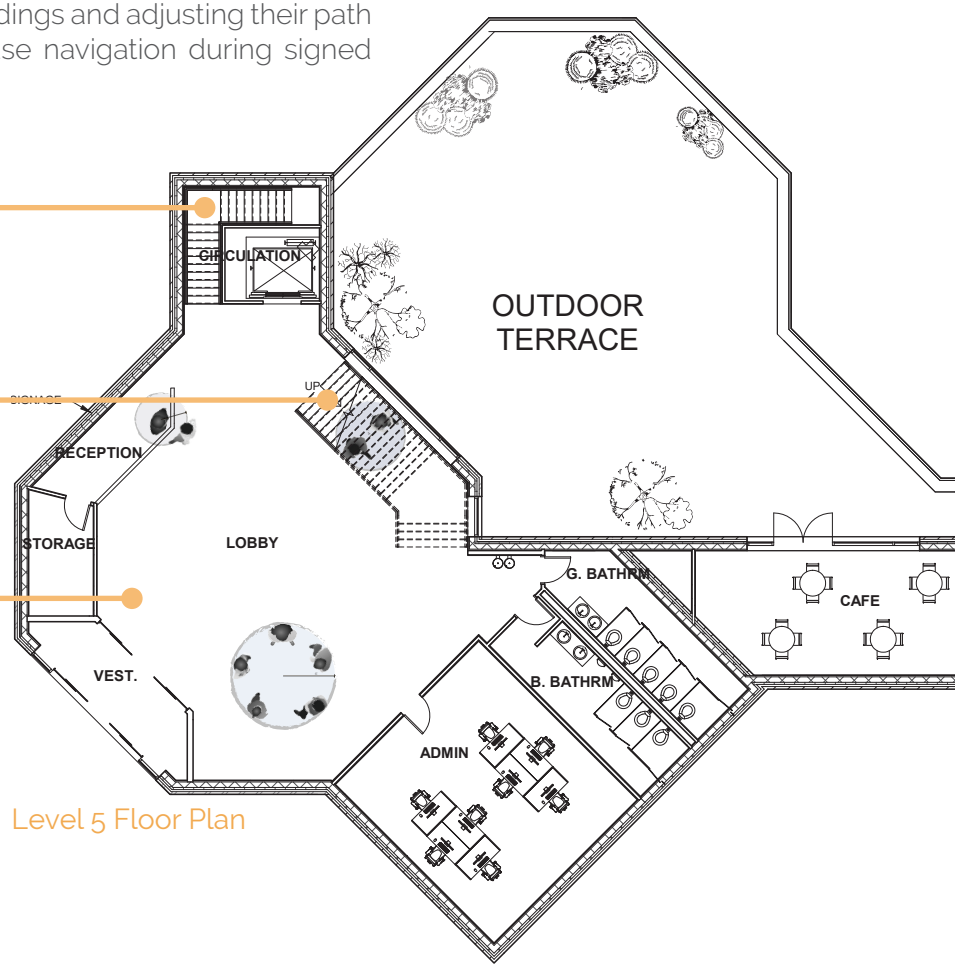
syntax

Syntax is the combination and spatial relationship between interconnected and adjacent spaces. Moving between spaces can be hazardous during signed conversations. During this transition, the signer is constantly scanning their surroundings and adjusting their path accordingly, Wide paths and fewer sharp corners help ease navigation during signed conversation.

This is a rare sharp corner in the building, the main purpose of this stair is for emergency vertical circulation.

The stairs located directly across from the main entry to the building was designed to ease signed conversation during vertical circulation. The slight bend mimicking the perimeter of the room was also designed with the same intent.

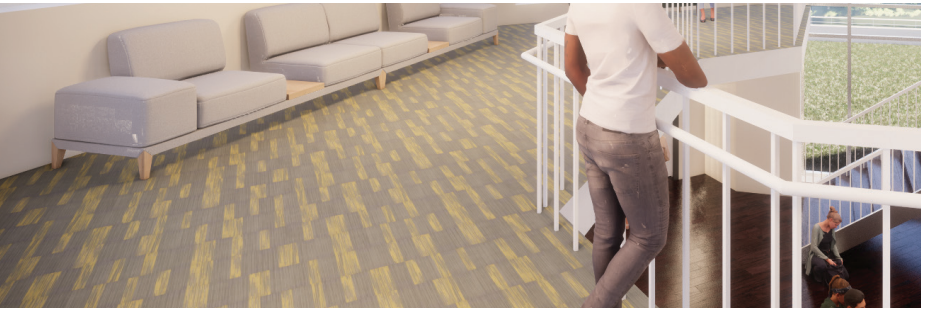
The large octagonal shape of this gathering space decreases the potential of tripping hazards, easing any navigation concern a Deaf or heard of hearing individual may have.



Level 5 Floor Plan

sentence & semantics

Semantics is the sentence meaning or the application of combining syntax. The composition of architectural sentences and semantics convey meaning. It can also be described as how one comes to understand the meaning of architectural elements in the built environment.



Certain colors, especially muted blues and greens, contrast will with a variety of skin tones, making them easy on signers' eyes. Although those colors are used in the carpet pattern they are still effective in reducing eye strain because they are blend in with their surrounding instead of competing for the attention of the eye.

Increasing the amount of windows on the North elevation of the building is most ideal for naturally diffused light to enter the building. However, if the sun gets too intense there is technology, such as *Sage glass,* that uses electrochromic glass and it can be manually or automatically controlled to let in exterior light.

Lighting should be soft and diffused, avoid dimness, and backlighting, glare, and abrupt changes in illumination levels. One of the best solutions when using artificial lights is to use up-lit fixtures. This will illuminate the harsh direct light that would otherwise occur and increase eye strain.

language

An architectural phrase groups elements together to form a unified element or space, creating a sense of formation through a built environment. Light, color, and acoustics are designed for optimal space performance and satisfaction. The rendering below is a perspective looking into the building from the main entry doors. There is a clear combination of in-direct natural light coming through the North facing windows. The large hanging lights do not emit any direct artificial light that could enhance eye strain. Translucent glazing in the bathroom doors let you know if someone is coming or going from the space, the hardwood floors conduct the vibrations of footsteps, and the balcony of the level above is designed with softer materials to minimize any unwanted acoustic reverberations that may travel up from the main entry lobby. The lobby balcony was designed to encourage conversations between levels and spaces.

appendix

figures

cover	Personal photograph, taken September 2019
figure 1	lttarchitects.com/gallaudet-university-residence-hall
figure 2	archdaily.com
figure 3	archdaily.com
figure 4	archdaily.com
figure 5	lttarchitects.com/gallaudet-university-residence-hall
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