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ENABILITY: HOW ARCHITECTURE CAN ENABLE THE DISABLED

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ENABILITY: HOW ARCHITECTURE CAN ENABLE THE DISABLED

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ABSTRACT

Enability is designing with empathy from the very beginning of a design. It incorporates design strategies for a variety of disabilities, as well as tackling the difficulties that are known to disproportionately affect those with disabilities, such as employment and access to childcare. It features a community center, located in Rochester, Minnesota, that incorporates a full restaurant and childcare center with the goal of providing both services as well as employment opportunities for individuals with disabilities in the area. By considering as many aspects as possible it is hoped that this community center can be an example of how architects can move beyond the ADA requirements and choose to truly reimagine how the disability experience is transformed through their designs.

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LIST OF ABBREVIATIONS

ADA ....Americans with Disabilities Act (1990)

ADHD ....Attention Deficit Hyperactivity Disorder

ASL ....American Sign Language

PTSD ....Post-Traumatic Stress Disorder

UDL ....Universal Design for Learning

1. INTRODUCTION

Disability is defined as "a physical, mental, cognitive, or developmental condition that impairs, interferes with, or limits a person's ability to engage in certain tasks or actions or participate in typical daily activities and interactions" by Merriam Webster. This definition outlines the categories of disability but does not expand on them. It is important to understand what all of these categories mean for an individual in order to properly design for the disabled community as a whole.

Physical disabilities are conditions that affect the body's natural function, such as hearing loss, sight loss, or difficulty with limb function that hinders walking, reaching, lifting, or balance. Physical disability can start from birth, or a person can acquire a physical disability, often in an accident like a car crash. Physical disability and the effects of such disability can vary from person to person in severity. Where one person may be born without an arm and learn to do everything one handed from birth, another may lose their eyesight later in life and struggle to adapt to the newness of their disability. Physical disability can also look completely different. When thinking about individuals with a physical disability, one often thinks of someone in a wheelchair or someone that needs a guide dog, but many disabilities are invisible and cannot be spotted. Individuals with complete hearing loss do not look like a "typical" disabled person, but their disability is just as valid as another, and design should consider all kinds of disability.

Mental disabilities are conditions that affect a person's mood, thinking and behavior, such as depression, anxiety, schizophrenia, or bipolar disorder. They can also be known as mental illnesses. Mental disabilities play with a person's reasonable thinking and can cause disorientation, paranoia and mood swings. Many of these disabilities are commonly treated with

medication to regulate symptoms and improve a person's ability to function in society, but they are hard to cure or cannot be cured at all (Mayo Clinic, 2023).

Cognitive or intellectual disabilities affect a person's ability to think and understand information around them. Examples of cognitive disabilities include autism, Alzheimer's, an acquired brain injury or learning disabilities like dyslexia. Conditions like these can affect a person's learning and ability to retain knowledge and skills that are useful for independent living (Deque, 2023). Some intellectual disabilities like dyslexia can be worked on to give an individual the tools to push past these struggles reading, and assistive technology for those with dyslexia has been added to many web formats. Other disabilities like autism are a constant struggle, but methods can be utilized to calm individuals that are feeling overwhelmed. Each person is as unique as these solutions can be, but creating a space where someone can feel safe while figuring them out can be crucial to the future of anyone with a disability.

Down syndrome is another common intellectual disability, but like some other disabilities, down syndrome overlaps into the developmental disability category as well. Developmental disability can include an impairment in motor function, learning, language, or behavior (CDC, 2022). They are disabilities that a person is born with that hinder the individual's ability to develop. Developmental disabilities can be apparent at birth or require diagnosis as a child begins to grow. Down syndrome, cerebral palsy, and muscular dystrophy are all examples of developmental disabilities.

Disability can come in many shapes and sizes, but it is important to understand the needs of all forms of disability when designing a space to cater to their needs. Disability makes a person different, but it does not make them less. These individuals already have to work harder to accomplish the same tasks as anyone else, but that does not mean there aren't design solutions

that have been proven to ease that struggle. Every person deserves to have a fulfilling life, and by recognizing the ways we can work against societal norms and help provide everyone with the same opportunities, we can create a better environment for everyone.

1.1. Problem Statement

Currently, in architecture there is a lack of urgency to design for inclusivity. There are guidelines put forward to create accessible buildings, but these guidelines are the minimum. The ADA guidelines, in general, ensure that all people can use all parts of a building and that people can get required information to get around a space. There are many kinds of disabilities that are not accounted for with these bare minimum rules and just as many creative solutions to include in designs to create a new way to design accessible buildings.

1.1.1. Research Questions

1.1.1.1. How do you enable the disabled?

There are many ways to answer this question, in the same way there are many different disabilities and multiple ways to enable each person within the community. Creating physical spaces that are accessible is one way. By including ramps, accessible bathrooms, and making sure information is accessible to everyone, such as the inclusion of Braille or larger print, we can create inclusive spaces that enable the disabled. Technological aspects are also important. The use of wheelchairs, hearing aids, screen readers, etc., can assist people with disabilities in multiple ways. In general, the inclusion of variation in everyday activities and options based on individual needs can be the best way to assist individuals with disabilities. Beyond these physical ways, we can enable the disabled community by showing support throughout day-to-day activities and advocating for them. We do this by encouraging businesses to hire people with disabilities and supporting organizations that advocate for their rights. The spread of public

education on disabilities is also a great step and teaching this can prevent discrimination and break down societal barriers created by ignorance.

1.1.1.2. What is the broad spectrum of disabilities among humans?

Disability is defined as "a physical, mental, cognitive, or developmental condition that impairs, interferes with, or limits a person's ability to engage in certain tasks or actions or participate in typical daily activities and interactions" ("Disability definition", 2023). Physical disabilities affect the human body and can create difficulty in motor function or sensory disfunction. Cognitive disabilities are disabilities that create difficulty in adaptive behavior and thinking, which hinders development of social skills. On the other hand, mental disabilities affect a person's thoughts and feelings. Developmental disabilities affect development and learning.

1.1.1.3. What can architecture do specifically to enable the disabled?

How can we create a functioning community of care for use by both the disabled community primarily using the facility and the general public? What can architecture assist with to help create these spaces? What does this kind of space look like? And which of these design strategies can we implement in general work to improve the experience of people with disabilities? These are the questions this study will answer.

1.1.2. Proposed Outcomes

The goal of this research is to determine what design aspects can be implemented to better architecture for use by the disabled community through the study of designing a community center accessible to all people, regardless of ability. The research will acknowledge key flaws architecture has within the realm of disability and suggest strategies to correct and improve these shortcomings. This work will include an organizational structure of uses and benefits, physical necessary facilities, and a prototype design layout for a community center for

disabled individuals, following these guidelines to create a beneficial and functioning space for all. In the end this will create guidelines for the future structure of buildings and programs designed with increased accessibility options.

The project will push the boundaries of what makes a building accessible and what designers can do to further their impact on the built environment. By identifying new design strategies to create more accessible spaces in a focused project, like a community center specifically designed to be inclusive, we can use what is discovered about functionality of aspects of the design to learn what strategies are successful and implement them in various locations and building typographies. By doing this research, the goal is to create more and more truly accessible buildings and suggest a new standard that goes beyond ADA requirements and can serve as a model for future buildings. A large part of the problem when it comes to accessible attributes is the lack of precedent in architecture currently. There is a small list of requirements to adhere to ADA, but beyond these the majority of buildings do not have additional measures put in place to promote accessibility because they do not have a model to follow in order to do so.

1.2. Objective

As designers, our goal is to create creative solutions to architectural problems, so why is this problem not focused on? Going beyond the minimum in terms of inclusivity is not only thinking about physical disabilities and their limitations, but also considering other types of disability and putting just as much emphasis on their design solutions as we do the physical ones. Creating spaces that are accessible for cognitive disability should be just as important as creating spaces for physical disabilities. Along with that, physical disabilities can look different than being wheelchair bound or having a visual impairment and can also be overlooked due to a lack

of awareness of less common disabilities. An example of this is restroom changing stations. Restrooms have guidelines that require mothers have access to a location to change babies' diapers, but many adults or grown children with disabilities could also benefit from a space to change diapers, yet that is not a requirement and very rarely included in design.

A main way to promote accessibility is to have variation in elements of design and program of a building. Different elements of design have different causes on the environment that can either be helpful or harmful to a person with disabilities' experience in a space. Materiality, lighting, texture, and color choice can all influence a person's experience of a space and assist with creating a more inclusive space for everyone who visits it. These are just some of the ways we, as designers, can choose to think beyond the requirements and improve our designs. Each of these elements can assist with a variety of disabilities, but specific elements can be incorporated to assist with particular disabilities, such as designated materiality of walls or flooring to distinguish between rooms for those with visual impairments.

The inclusion of many different examples such as materiality in one space can help to create a precedent for future designs and make designing with accessibility in mind more common in everyday designing. By creating a precedent study of how to include elements specifically designed to promote accessibility within architecture we can change the way architects design and promote going beyond basic requirements for architecture.

1.2.1. Aim

The goal for accessible design is to create examples of when designers prioritized accessibility in their architecture and show how that mindset from the beginning of the design process can yield effective design solutions specifically catering to accessibility and the users experience depending on their individual abilities. This project should be that example and allow

other designers to consult the design strategies used within it and help them understand more about the experience they are designing for.

1.2.2. Significance

This work is important because we, as designers, create lived experiences with our work. If we do not consider as many elements as possible, we cannot create the best environments. In order to create spaces that are truly a positive experience for everyone, designers need to think about what that space would be like for someone in a wheelchair, someone who is blind or Deaf, or someone who may feel overstimulated by certain design choices. The wrong design decisions ruining an individual's experience in that space are not elements to overlook. When designing we should be able to consider all the possible solutions and which of those solutions would benefit anyone using our buildings.

2. BACKGROUND

2.1. Background

The current literature and works of architecture for disability are extensive, but not thorough in their ability to cover a wide variety of disabilities. Through my research I plan to create a more expansive list of design considerations for a larger group of individuals with varying forms of disability. By creating a comprehensive list of these design considerations future designers will have a document to consider that is not based solely on a particular disability but takes into account a variety of them and explains which design considerations are beneficial to which specific disability.

2.2. Literature Review

Accessibility in architecture beyond ADA requirements is not regularly included. This is because there is not a precedent, despite work being done to create accessible designs. Currently, there are specific buildings created to be accessible and writing of how the disabled community can be affected by certain aspects of design, but not studies showing how to create accessibility throughout all architecture.

2.2.1. Previous Research

In *What Can a Body Do?* by Sara Hendren, she outlines how different aspects of life are affected by disabilities. The book outlines things such as independent living, navigation, and time, explaining how disability affects these aspects of life. In her chapter about time, she talks about streetlights and their countdown for crossing a street. She points out that depending on ability, this limited time can create a struggle for some individuals (Hendren, 2020, pg. 163). Her book is primarily an explanation of elements of life rather than speaking directly of architecture and how to implement elements in design.

There are many articles talking about specific disabilities, such as hearing loss and how Deaf Space includes the use of natural lighting which promotes the use of ASL and limits the strain on the human eye (Intro-Digital, 2021). These works are steps in the right direction but are not inclusive of the many other types of disabilities affecting a large portion of the population.

Much of the information about disability and architecture points out the lack of variation in disabilities considered in the general requirements to consider a building accessible. Most designers meet the requirements and do not think to go beyond. "In the UK, only 8% of the 14 million disabled people are wheelchair users, so the most inclusive developments are those that consider the needs of wheelchair users and the 92% of people who may have another physical, sensory or cognitive disability, including neurodiverse conditions such as autism, dyspraxia and ADHD (*Accessible architecture?* n.d.)"

One of the most progressive works on architecture and disability is *The Architecture of Disability*. The book reevaluates architectural history and looks into the biases we hold as truth. David Gissen calls for a reform in architecture by rethinking, designing, and writing about disability in architecture to create a new history that the future can look to. His work should be the standard and is what I aim to do with this study.

2.2.2. Gap Identification

The gap in the research comes from current research not being expansive in terms of the disabilities that are discussed. Many works are specifically catered to an individual disability, but not many works cover disability as a whole while also being specific about the design considerations to take into account based on each of those disabilities. My thesis will consider disability as a whole and point out specific design considerations as well as providing an example building where these design considerations are implemented.

2.3. Project Type

The proposed project will be a community center that specializes in the disabled

community in Rochester, Minnesota. The community center will also include an attached

restaurant and childcare center. Currently the buildings being designed with special intent for

disability are buildings like libraries or schools. These buildings are largely for anyone, but the

designers have focused on disability throughout design. The proposed community center takes

that one step further by considering lifestyle changes for individuals with disabilities as well. The

building will add jobs to the community. By adding a restaurant and childcare center to the

community center individuals with disabilities that may not be able to find jobs otherwise can be

employed right at the community center.

The childcare center addition of the community center is directly caused by the struggle

to find childcare for children with disabilities. There are a lack of programs specialized to take

care of children with extra needs. This causes parents of disabled children to need to stay home

and care for their child, rather than work to make money for any doctor appointments, assistive

technology, or anything else their child may need because of their disability. To combat the lack

of childcare for disabled children, the childcare center was added to improve the lives of those

children, their parents, and also individuals that may find employment at the community center

in the childcare side of operations.

2.4. Project Issues

It is the hope that this community center will draw a large number of the disabled

population in its area. For individuals with disabilities, it can be hard to find a sense of

community amongst people that cannot relate to what their family and they are going through.

This community center will create a hub for those individuals to find others that are going

through similar issues in their everyday life. The goal is that the community center would be able to host workout classes, sporting events, learning opportunities and more for a regularly neglected community. In these sorts of spaces, it is much more socially acceptable for someone in a wheelchair or that uses other assistive technology to try new activities. This is where we see wheelchair basketball played, or someone with limited mobility painting or trying other art methods. By creating spaces like these, individuals may feel free to try activities they previously assumed weren't made for them. This is also where adapted technology for certain activities comes into play. If someone needs an adapted version of certain sports equipment, this is the location that will provide access to this equipment. Hopefully others would then feel empowered to also try those activities if the necessary equipment to participate in them is already owned and available through their community center.

3. METHODOLOGY

3.1. Approach

In order to find all of the necessary information to complete this project a variety of methods will be used. Information about the disability experience will be found through written records and interviews, while information about the design considerations that should be implemented will be primarily through written documentation and previous examples. Information about site and building specifics will be obtained through general knowledge of the site, research on the specific area, and through case studies of similar projects.

3.1.1. Data Collection

3.1.1.1. Interviews

Interviews will be conducted with multiple people within the disability space, both the disabled themselves and the individuals who work closely with the disabled community. By reaching out to disability services and community centers, first-hand stories of experience within different spaces will be heard. This will convey what challenges the disabled community feels are most important to address and could bring up new issues that we have not thought to include in design thus far. These interviews will also allow ideas to be brought up and run past individuals with first-hand experience, to better understand if specific design strategies are isolating rather than helpful to the people they are trying to cater to.

3.1.1.2. Case Studies

The inclusion of case studies will provide the knowledge of pre-existing design strategies found to be beneficial to the disabled community. Looking at past work and integrating effective strategies into one location will aim to create the optimal experience for disabled persons. This will include research into architectural firms that specialize or focus on accessibility in their

current work to better understand what accommodations are being made by those leading the industry for accessible design. By studying how different typologies function and draw in different crowds, we can learn what features to add to a design to create a building that functions effectively and is self-sustainable.

3.1.1.3. Literary Research

Relevant literature will be read to better understand the disabled community and identify possible solutions to accessibility challenges. Research on accessible design strategies will be conducted, while research on disability in general is also conducted to get a better understanding of the community this work is aiding.

3.1.1.4. Design Iterations

To get a better understanding of possible design solutions and the way multiple interact within a single space, multiple variations of design will be considered. By creating sketches and computer models of possible designs, different floor plans can be studied to find options for layout of a community center that are more successful. Accessibility requires space. To create a model for future buildings and accessibility strategies we need to determine how much space that really is and how we can create accessible spaces in the most efficient way possible.

3.1.2. Analysis

Once the data is collected, organization is the next important step. While considering so many disabilities and their individual design considerations there is bound to be overlap in aspects that are helpful for multiple disabilities and overlap in considerations that benefit a certain disability while being harmful to the experience of someone with a different disability. Keeping the information organized by disability will be a crucial step in effectively considering that number of disability design considerations. In order to not confuse specific elements keeping

that list and continuously checking it throughout the design process will be a great way to ensure the correct design considerations are being implemented in the design stage of this project.

3.1.3. Conclusion

Every person deserves to experience architecture in a positive way. The implementation of inclusive design solutions is the only way we can succeed in creating spaces that everyone can use. This means going beyond requirements and thinking outside of the box when it comes to designing for multiple types of disability. Considering physical, mental, cognitive, and developmental disabilities can be a challenge, but as designers it is our job to come up with creative solutions to architectural problems. The goal of this research and design is to create a precedent for future architecture and create a functional program and guide to creating accessible spaces. This research will increase understanding of effective, inclusive design practices and promote the use of various elements of design to increase accessibility in all architecture.

3.2. Project Location

The location of a project such as this one is not largely important to its goal. Since disability and its design considerations transcend location and should be considered everywhere, the location of Rochester, Minnesota was purely a choice of a site previously known by me.

Rochester, Minnesota is a medium sized city with a population of around 122,000 people. The city is primarily known for being the home to Mayo Clinic, a renowned healthcare empire. Many of the employment opportunities in Rochester and its surrounding area are based on the fact that Mayo Clinic is located there so, much of the population works for the organization in some regard, whether that be as doctors and medical personnel, administrative staff, construction work, janitorial work, or another area of Mayo Clinic.

The city is in the Midwest of the United States and located in the Southeast corner of Minnesota. The area is largely used for various farming, from crops to a large number of dairy farms. Agriculture is the area's other major employment opportunity, but this is located on the outskirts of Rochester and the surrounding towns primarily.
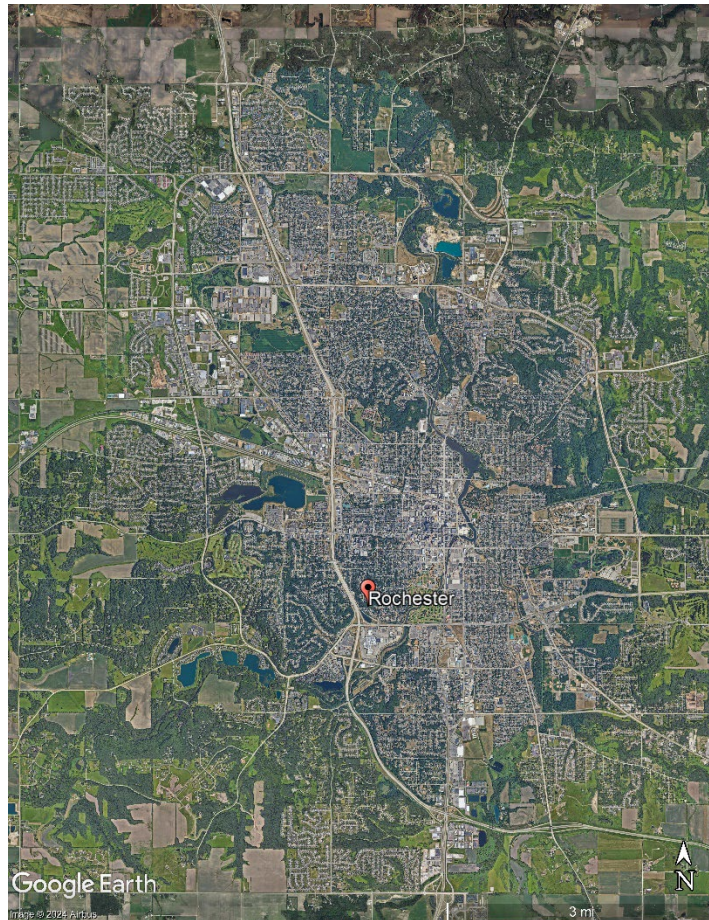
Figure 1 Google Earth. (2024). Rochester [Satellite Image]. Google Earth.

3.3. Project Location

The specific neighborhood the site is located in is primarily a residential area. The site is located on the northeast edge of Rochester on County Road 2/ Viola Road, near two high schools. One of the better-known high schools in the area is Century High School, located almost directly across the street from the site. The other, Schaeffer Academy, is a smaller, private

religious school located further down the road. There are a limited number of commercial

buildings in the area, across East Circle Drive North to the west of the site, which include gas

stations, a workout gym, a gymnastics gym, an animal hospital, and several churches. The

important business near the site is the transportation company west of the site down the hill that

provides transport for individuals with assistive technology such as wheelchairs.

Figure 2 Google Earth. (2024). Site Neighborhood [Satellite Image].
Google Earth.

3.4. Specific Site

The actual site is located at the intersection of Viola Road NE and East Circle Drive NE

in Rochester, MN on its Southeast corner. The site measures roughly 600 feet across and 400 feet

back. The site slightly slopes up towards the south, away from its access road, Viola Road NE.

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The site is currently primarily prairie grasses and towards the southern side of the site the area becomes more heavily populated with a variety of trees.
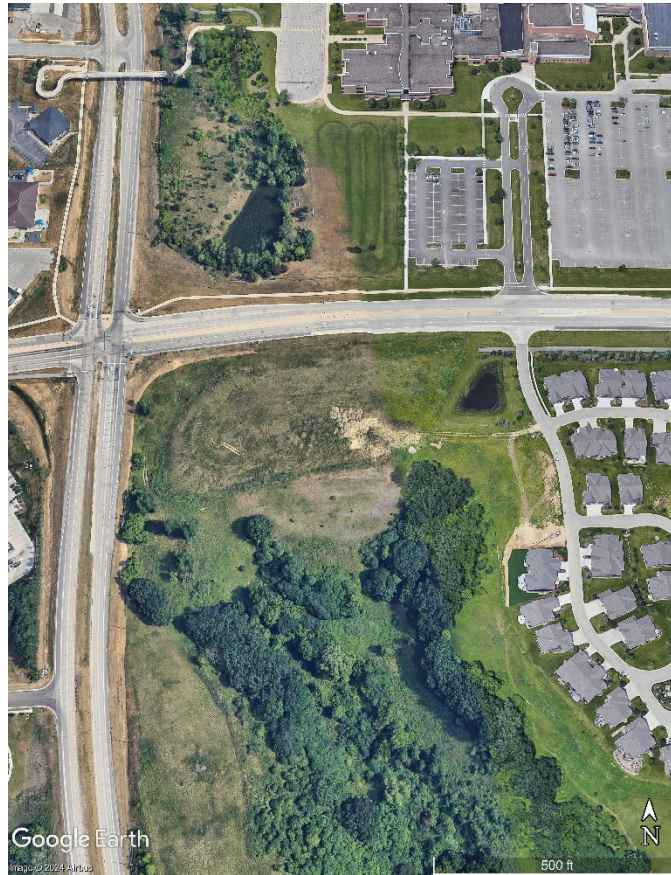
Figure 3 Google Earth. (2024). Site [Satellite Image]. Google Earth.

3.5. Design Strategies

The knowledge of beneficial design strategies for individuals with disabilities is extensive, but generalized articles on the matter cannot cover all that needs to be addressed when designing for a range of abilities. Each specific group of individuals has a variety of elements to consider that can sometimes contradict each other, which makes it impossible to create a perfect example of design requirements. Though it may be impossible to address every design consideration it is important to consider each and decide from there which elements are right for your design.

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3.5.1. Physical Design

Physical design is an important aspect to consider when designing for individuals with varying abilities. Open floor plans not only assist with mobility, but also increase ability for effective communication between individuals that rely on sight. Designing wide hallways can be helpful for people who move with assistive technology such as wheelchairs, crutches, or human assistance. They are also helpful for two people to communicate using ASL since it allows them to walk next to each other rather than in a line. This also applies to sidewalks and pathways between furniture ("Customizing a Home for Deaf or Hard of Hearing Inhabitants" n.d.).

Color can also have a major impact on a space. In general, neutral and soft colors are used to limit distractions and promote a calm atmosphere. For individuals that suffer from PTSD dark colors can be triggers and should be avoided, while green and orange promote joy (Westerlund 2023). For individuals with depression, blues and greens promote calm, while reds and oranges signal alertness in the body ("Stressed Spaces: Mental Health and Architecture" n.d.). In general, across most groups of people, blue is universally used to promote a sense of calm, but for individuals with dementia using cool colors to distinguish items can be a hindrance as warm colors are easier to identify and are preferred (Lifestyle 2014).

3.5.2. Lighting Design

Lighting requirements for many disabilities are often the same, but for a multitude of reasons. A space designed for various abilities should be designed with plenty of natural lighting. Natural lighting, in general, raises moods and settles people. Harsh lighting can cause strain to anyone's eyes, but in cases where vision is relied on more heavily this can be even more damaging. For example, the Deaf and hard of hearing community relies heavily on vision to communicate, whether they are reading lips, signing using ASL or another form of

communication. Natural lighting is less straining and thus preferred ("Customizing a Home for Deaf or Hard of Hearing Inhabitants" n.d.). In other cases harsh lighting can trigger stress or discomfort. Some individuals with autism have a sensitivity to lights and can struggle to be comfortable in spaces that have harsh, fluorescent lighting (Chatterjee 2021).

Lighting can also be used to promote safety and wayfinding. It can be used both inside and outside to highlight walking paths or aspects of a building. In restrooms it is important to heavily consider lighting. Oftentimes multiple-stall restrooms are sparsely lit, with lights only every few stalls. This can be a problem for individuals with poor sight, so lighting in restrooms and other regularly used spaces must be chosen and placed carefully. Lighting is also an important wayfinding component, highlighting important areas and directing traffic of people moving within and outside a building at that moment. These individuals may also find it difficult to stay within outdoor gardens or courtyards if there is no lighting to represent designated areas of such spaces (Lifestyle 2014).

3.5.3. Acoustics

Acoustics also play a part in designing for varying abilities. Sound affects everyone, but there are certain characteristics that are affected more than others. Deaf individuals communicate through vibration in flooring or other materials to get another's attention sometimes, so it is important to consider proper materiality when looking at how acoustics affect designed space. For individuals with hearing loss, it is also important to consider acoustics and the way sound echoes in our spaces. Echoes can make it even more difficult to hear, so for individuals that already struggle with this it is creating a space that works against what hearing abilities they do have. Machinery and electronics that emit sound also create unnecessary extra sound that can limit a person's ability to hear clearly. This extra noise can also be triggering to sensory sensitive

individuals and affect the way they experience a space. By limiting echoes and extra sound, we can create spaces that assist limited hearing capabilities, instead of hindering them ("Customizing a Home for Deaf or Hard of Hearing Inhabitants" n.d.).

3.5.4. Navigation

Navigation is a key aspect in designing for a range of abilities. In some cases, a person may be in a wheelchair, or need assistance getting around and need more space for such help to be given. In other cases, someone may get lost and confused in large spaces and need reminders or visual cues to navigate a space effectively. Needs vary, as do the design considerations implemented.

Physical disabilities can mean many different things, but some of these aspects overlap. Blocked pathways and unnecessary hallways can affect someone who is blind, deaf, has a mobility impairment, or is autistic. All of which rely on clear paths to effectively use and get around in a building. Their reasons vary slightly, but in general limiting obstacles that can hinder the use of assistive technology is a crucial way to ensure a space is accessible ("Customizing a Home for Deaf or Hard of Hearing Inhabitants" n.d.; "Universal Design & Inclusive Mobility: Keys To A Livable Community For All" 2018; Scope 2022; Lise 2021). Flooring should promote wheelchair use without strain and rugs used should be no slip rugs to prevent falls ("Home Modifications for Cerebral Palsy" n.d.). When considering rugs, it is important to consider color, as dark rugs can sometimes appear as holes to those with sight limitations or dementia. Another design consideration to implement for physical limitations is to reduce the demand on the physical body. Some individuals may be able to walk, but that does not mean that this is an easy task or that we should assume that means they can maintain physical activity like walking for extended periods of time ("7 Principles of Universal Design" 2020). To combat this

a space devoted to accessibility should have adequate seating for individuals that may need to take a break between stretches of activity.

The same can go for other physical activities, despite how small the activity is perceived to be. Some individuals may struggle with upper body mobility and find it difficult to write or reach and push buttons, as well as do continued repetitive movements, so it is important to have alternative options to such tasks. Audio recordings rather than physical writing can be a successful alternative. Accessible handles, light switches and outlets help individuals with physical disabilities do tasks without assistance and automatic elements like doors and sinks can be helpful for some individuals as well.

Keeping spaces clear and simple is helpful for individuals that struggle with direction or mobility. Clear sight lines are important for those with visual impairments and can assist with the use of ASL for Deaf individuals, this should be considered from both standing and seated positions to ensure it is also useful for those in wheelchairs ("Customizing a Home for Deaf or Hard of Hearing Inhabitants" n.d.). It is important to carefully consider the placement of important features such as entrances and front desks, as people should not have to go out of their way to get assistance. Every space in an accessible building should be large enough for someone to use with the help of assistive technology, human help, or a guide dog. For individuals with autism, it can be helpful for a building to be thought of in zones, with busier, louder spaces separate from spaces of relaxation or learning (Chatterjee 2021).

Bathrooms are a key space when designing for varying abilities. For wheelchair bound individuals it is important that bathrooms allow the needed space for transfer from a wheelchair to a toilet and also have handrails to assist with the process. Lowered sinks, hand dryers, soap dispensers, and even changing stations can assist in creating an accessible space. For individuals

with dementia, color plays an important role in differentiating spaces and objects. Bathroom doors should be designed using a designated color to direct users to the correct spaces. Light switches, outlets, door handles, and other controls should also be colored to differentiate between wall colors for easier use by both individuals with dementia and those with visual limitations. For those with dementia it can also be important to include features like water overflow sensors to minimize the risk of someone forgetting to turn off water sources (Lifestyle 2014).

In order to ensure easy access in a building, multiple aspects of design should be considered throughout your space. Outdoor considerations such as accessible parking with clear paths to front doors are important to many disabilities. Creating space between accessible parking and general parking and reducing traffic in that area can help ensure safety for those leaving a car. For blind individuals it is important to include navigation systems like directional paving, handrails, and braille signage to direct people to key spaces. Directional paving should be carefully considered and remain consistent throughout a space. For use of elevators or stairs, coloring important aspects like buttons or first and last steps of a staircase is helpful for a user's safety. Use of vocalization for elevator floor numbers and cabin movement can help blind individuals navigate elevator use (Lise 2021).

Non-physical disabilities can also benefit from accessible design for navigation. Signage and virtual navigation options can assist in an individual's ability to find their way around a space. Certain disabilities, like autism, down syndrome, or dementia, hinder the individual's ability to navigate spaces easily, making clear and concise communication both verbally and through the use of signage necessary. Since color blindness is a common condition, designers should try to use color blind friendly colors in signage to ensure the information is clear and visible. The use of both words and images, as well as patterns and textures, can help clarify this

signage. For individuals with down syndrome visual memory is usually superior to verbal memory so the use of visual elements to direct building users is key ("Color Blind Design Guidelines: A Comprehensive Guide" 2023).

3.5.5. Assistive Technology

Assistive technology is a key component to improving a space to create a more inclusive environment. For those with dementia adaptive tools that have larger handles and are colored or indicated with tactile guides can be helpful (Lifestyle 2014). People with learning disabilities can benefit from digital media options like increased text size, dyslexia reading tools, easy access to translations, text-to-speech, and definitions, along with variation in content presentation formats. For individuals with ADHD, assistive technology can be used to reduce visual distractions and contrast items of importance to draw attention to necessary information ("Designing for Users with ADHD" n.d.). People with spina bifida can benefit from adjustable furniture like tables that can tilt for better access, and variation in the way all necessary equipment is used ("Classroom Adjustments: Spina Bifida - Nationally Consistent Collection of Data" n.d.).

3.5.6. Communication

It is important for visitors to a building to understand everything going on around them. To ensure this, designers must take into consideration various forms of communication and the adaptations needed for each. It is particularly important for us to consider the Deaf and blind communities when approaching this subject. While many people may be able to see necessary information others cannot and require information to be audible. The same goes for individuals who cannot hear and need visuals to communicate this information. So, as designers, it is important to include variation in forms of communication, including both auditory and visual methods. This can include audio information systems, subtitles on video forms of

communication, and staff trained to communicate effectively with both Deaf and blind individuals to assist with directions or necessary information to the use of a space (Carole 2021; Lise 2021). Variation in methods of communication can also include programs for phone or video-based communication. Typing or writing as a means of communication can also be utilized for individuals who may be non-verbal, but in some cases where an individual does not have proper use of their hands to write or type other methods should be available.

On top of person-to-person communication, it is important to communicate equipment uses and hazards in various ways as well. Much like how fire alarms both audibly alarm and flash, the same can be implemented for any equipment in a building. ATMs, intercom systems, or timers are examples of systems that may require multiple forms of communication. Audio cues can help blind individuals use these items in a way that does not require assistance from another person.

3.5.7. Safety

There are many safety considerations to make when designing for all abilities. The wide range of abilities create a wide range of solutions to ensure a safe environment for all visitors. For example, when designing for individuals with dementia it is important to draw attention to aspects you want people to interact with and draw attention away from aspects you don't, such as emergency exits or doors that contain safety risks. Distinguishing components of your design with color can be crucial to clearly show the difference between hazards and importance (Lifestyle 2014). For individuals with spina bifida it is important to be aware of hazards at lower levels, since many individuals with spina bifida have limited sensation in parts of their body and may not feel it if they come into contact with hazards. Water pipes and heat sources should be raised, and metal outdoor surfaces should be limited as all of these can cause burns that some

individuals will not be aware of until too late ("Hints and Tips for Bathroom Design: Spina Bifida - Closomat" 2023). Removing regular hazards is also important, especially for individuals who are impulsive or unsteady on their feet. Tripping hazards can be harmful to anyone who is unsteady or be a burden to those with assistive technology to get around a space. Many autistic individuals struggle with self-control, so it is crucial to remove or limit sharp edges or potential launching pads and conceal wiring and plumbing, as to remove temptation surrounding these objects. Weighted furniture can be helpful also, to reduce the ability of an individual to throw objects (Chatterjee 2021).

3.5.8. Stimulation

Overstimulation can be a problem for anyone, but there are design solutions to limit visitors feeling overstimulated in your design. Air quality, temperature and smell can affect a person's mindset unknowingly, so it is important to carefully consider both when designing a building. Unnecessary clutter can also take away from a person's feeling of calm in a space. Conditions like PTSD and anxiety struggle with the addition of extra stuff in a space and can be negatively impacted from a disorganized space (Westerlund 2023).

Time outdoors is shown to help with overstimulation, so creating an accessible entrance to an outdoor courtyard or garden can be a successful tool in design. Outdoor areas encourage activity, as physical activity can allow some individuals the ability to let out nervous or built-up energy. It is also encouraged to prevent early aging in individuals with down syndrome ("Sensory Rooms for People with Down's Syndrome" 2019). The transition from indoor to outdoor spaces can be overwhelming for some individuals going from a quiet and calm indoor environment to a loud, busy outdoor area, so the decision of which spaces to connect to outdoor spaces should be heavily considered (Chatterjee 2021). Access to the outdoors is a great strategy,

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but bringing greenery inside can also increase mood. Indoor plants are recommended for a variety of disabilities, such as PTSD, schizophrenia, and depression.

Sensory rooms can be a good solution to when someone is feeling overwhelmed as you can change your environment to suit your current needs. Because a person with down syndrome might feel the need to run from stressful situations, a sensory room is a good option for a retreat space in scenarios like this. Sensory rooms encourage interaction with items like lights, textures, and movement because of their specific materiality, as well as interaction with others. A sensory room should include various options for stimulation as well as various options for sitting or lying down like different textures, heights, materials, and form of the sitting area. Sitting areas like this can also be helpful for relieving pressure for individuals with spina bifida. The room should limit distraction in a way that allows relaxation and promotes a better attitude. For individuals with Tourettes stress triggers ticks, so having a space to relieve stress or just go to let them out can be helpful. Sensory rooms are also a good place for fidget toys that may be loud or distracting in other spaces ("Sensory Rooms for People with Down's Syndrome" 2019; "Classroom Adjustments: Tourette Syndrome - Nationally Consistent Collection of Data" n.d.).

3.6. Case Studies

Case studies in video form informed the ways businesses can assist to help individuals with disabilities learn valuable life skills and improve independence. A successful space for the disabled community should include ways for willing individuals to get involved in the running of that space. Encouraging personal improvement for those individuals is a key step in enabling people of all ability levels to have fulfilling lives in the future.

3.6.1. Echoes Café

"The Delhi Cafe Run By The Differently Abled" shows Echoes Cafe, a restaurant in Delhi, India that employs deaf individuals to work as servers. Echoes has become very successful, to the point that its customers have started to learn sign language to communicate with the workers more easily. Aside from the customers that learned sign language, the cafe has coded menu items that customers write out for the staff and communication cards to communicate common phrases in restaurants, as well as lights that signal waiters if assistance at your table is needed. For example, cards may ask for the bill, menu or specific silverware. Echoes Cafe has found that they have no need for individuals who can speak or hear, because their staff is perfectly capable of running the restaurant without hearing individuals. The staff at Echoes have been taught to believe in themselves and have gained self-confidence by successfully running a business all on their own.

3.6.2. Zabs Place

"How 1 Thrift Store Is Helping Young Adults with Disabilities" covers Zabs Place and how it is changing the lives of its workers. Zabs Place is a thrift store that was specifically created as a place to teach individuals with special needs job skills. The couple that started Zabs has a son with special needs and when they asked him what he would like to do after high school he said work. They realized there were no places to teach people like their son the necessary job skills needed to work after school, so they created one. After a four-month training period, workers specialize so that they are doing tasks that help them train skills needed for their future employment. Through working at Zabs the workers are taught skills like self-sufficiency, how to dress properly at a job, how to present yourself in the workplace and many more life skills for a person in the workforce. The thrift store is running solely on donations, so everything brought in

needs to be sorted. This means that games and puzzles need to be checked for missing pieces and this gives the individuals working at Zabs the opportunity to learn how to check the content of these items.

Places like Zabs create an environment where individuals that might have been put down or overlooked in the future can contribute and show their value to their community. Zabs shows its workers that they can succeed in life and teaches them confidence, while also giving them a comforting workplace and community. It is important for more places to encourage people with disabilities to contribute and allow them to feel safe in their workplace. Amazing places like Zabs exist to teach people these skills, but it should not be necessary to have a designated place like this. All sorts of businesses should welcome disabled workers into their space, not because they can't legally say no, but because we want everyone to feel like they are contributing to society. Having a disability should not deter someone from learning job skills or being a welcomed part of their community. Zabs Place should be an example to all businesses of how they can take part in pushing past societal norms and improving the lives of many differently abled individuals.

3.7. Detailed Space Program

A community center that achieves all these goals will need to include many different types of spaces. As stated previously, some individuals can get overwhelmed when going from calm, low energy spaces to busier environments, so for a successful community center it is important to remember to designate areas of the building to certain tasks. Keeping social situations and busier environments from classrooms and sensory rooms is important. By separating these spaces, we can start to form an idea of how a building like this would look and what spaces would be near each other.

In a calmer area of the building spaces for learning and reflection would be best to group together. Although, it is important to remember in a classroom setting some individuals may react strongly to failure or other stimuli in a class, so spaces like yoga rooms and sensory rooms, that we want to group together, may need some sort of separation from a classroom. Spaces for a calmer area of the building include:

- Multi-Sensory Rooms   - Yoga Studio

- Classrooms   - Small Scale Community Gathering Areas

- Bathrooms   - Office Space

- Private Workspaces   - Storage Space

- Rest areas for Childcare   - Art Studio

- Entrance and Lobby

In busier, more social areas of the building there is more to consider. Aspects of design that are money making may need to be slightly separated from community spaces. Areas like a restaurant or childcare shouldn't be right next to a gym or group activity space. Areas to include in high energy areas of the building include:

- Community Gathering Area   - Gym

- Gym Showers and Bathrooms   - Basketball Court

- Kitchen   - Pantry

- Restaurant   -Restaurant Kitchen

- Delivery Location   - Storage Space

- Child Care Center   - Childcare Drop Off Point

4. RESULTS AND CONCLUSIONS

Potential Point Community Center is a community center for individuals with disabilities in the Rochester, Minnesota area. The community center was designed with disability in mind and is designed to cater to differing abilities and lifestyles.

4.1. Project Description

Potential Point Community Center is roughly 46,275 square feet, including the main community space, a restaurant, a childcare center, a workout space, and a gym with a full-size basketball court. The community center is split into two sections, one being the louder spaces and the other being the quieter spaces. The quieter spaces are separated from the rest of the building by a ramp that raises the back southwest corner of the building three feet off the ground level. This area includes a rentable studio area, a classroom, an art studio space, and a sensory room with a small seating area outside the room. The rest of the building falls into the louder
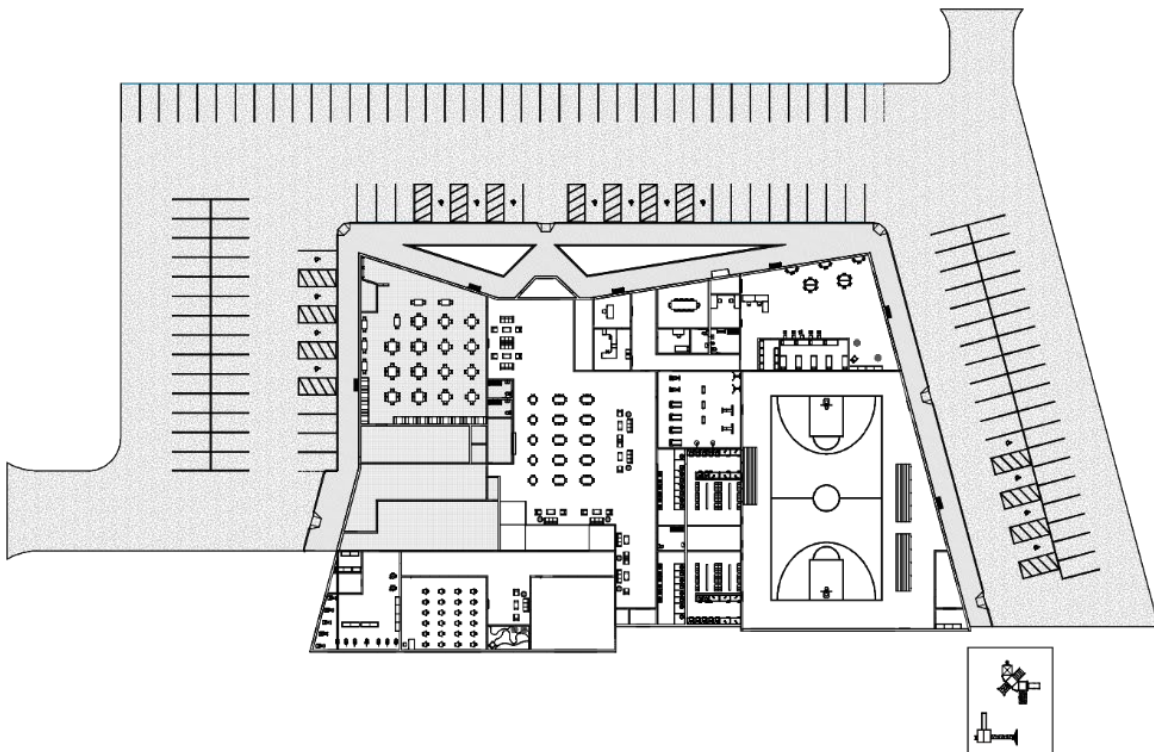

Figure 4 Floorplan

spaces section, which is home to the restaurant, workout/gym spaces, the childcare center, all

storage and mechanical space and the central community space with its attached kitchen.

4.2. How Potential Point Enables the Disabled

4.2.1. Physical Design

Potential Point is broken into two sections based on volume because, for certain

disabilities, overstimulation can be a major part of day-to-day life. The building has its separate,

raised section in the back to allow those individuals who might need a break from the action in

the main spaces to find peace and comfort in a separated area. There are spaces for art therapy on

the raised portion, as well as a sensory room which was specifically added to the building with

disability in mind as a place for breaks and to increase interaction with new experiences for
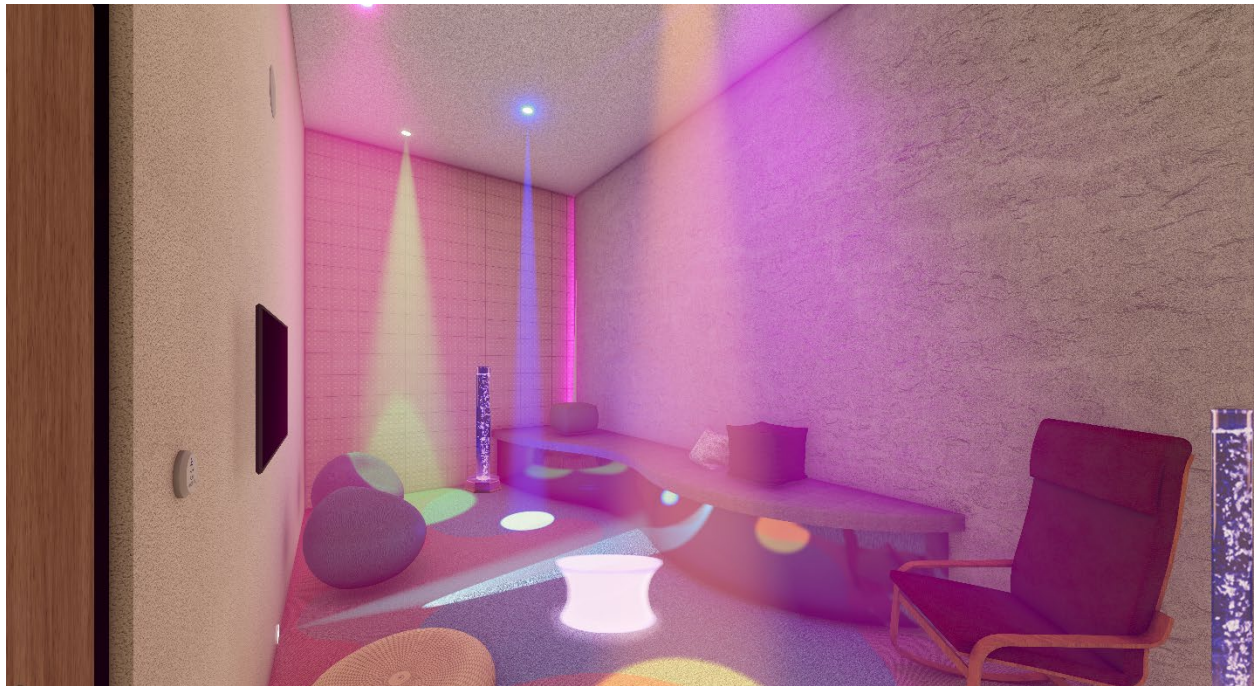
others.

Figure 5 Sensory Room

The building is designed with many disability friendly adaptations, including ensuring

that there are both speakers and readable screens in each room to convey accurate information to

individuals that may have vision or hearing disabilities. All information in Potential Point is conveyed in multiple ways to make sure that the building is accessible to all its users. All doors are labeled with plaques that state their uses in English as well as Braille for blind users. Other elements in Potential Point were also chosen or positioned with disability in mind. For individuals in wheelchairs, objects like cabinets, sinks, soap dispensers and automatic door buttons are positioned so that a seated person could easily use any of them. Adult sized changing tables are also included in any single stall bathroom throughout the entire building.

Figure 6 Back Exit with Braille and Speaker

Figure 7 Bathroom

For users that may have mobility limitations Potential Point is designed with no steps and multiple curb cuts to help users get onto the sidewalk in the closest location they can to promote safety. All curb cuts include directional paving for blind individuals, so that they can better

understand their surroundings and whether they are in a safe location and away from cars driving in the parking lot or if they are about to enter the parking lot and should be more alert to the noise of traffic moving around them. Benches are also placed outside the building throughout the sidewalks to provide a resting place for individuals who may struggle to travel long distances without breaks.

Figure 8 Exterior View of Front Door

All hallways and pathways around the building are designed especially wide to allow for multiple people to travel in the same space. For individuals in wheelchairs, it can be awkward to try to hold a conversation with another wheelchair user if the space they are traveling does not have enough room to allow for them to travel side by side. Similarly, for individuals who communicate using ASL it is important the other person can clearly see your hands as well as facial expressions for effective communication, so if they cannot walk side by side communication has to stop until they leave that specific area. When Potential Point was designed

these two situations were heavily considered and thus the walkways were widened to ensure there was enough room for two people, no matter their disability or assistive technology, to communicate easily.

Figure 10 Extra Wide Hallway

Figure 9 Widened Ramp

4.2.2. Lifestyle Adjustments

Disability can cause lifestyle issues as well, such as trouble finding employment or childcare, so Potential Point was designed considering these from the beginning. A childcare center was added on to the building to help parents combat the strain of finding effective childcare for a child with disabilities. Childcare can be hard to find for anyone, but when you have a child with disabilities it becomes even more limited as to who is capable of taking care of your child.

The addition of the childcare center, as well as the restaurant are Potential Point's way of increasing the number of jobs accessible to individuals with disabilities. The main community center building already offers jobs in administration, janitorial, and teaching, but even more jobs are added to the building with its extra additions. The restaurant attached to the community center can offer jobs in the kitchen, as a server, or as a host, while the childcare center will always need more staff to ensure the children that use the center are staying safe. The variety in jobs offered at the community center is purposeful as well. By having a variety of available jobs individuals can choose what type of learning experience fits best for them and what type of skills they feel would be most beneficial to future career opportunities they may have.
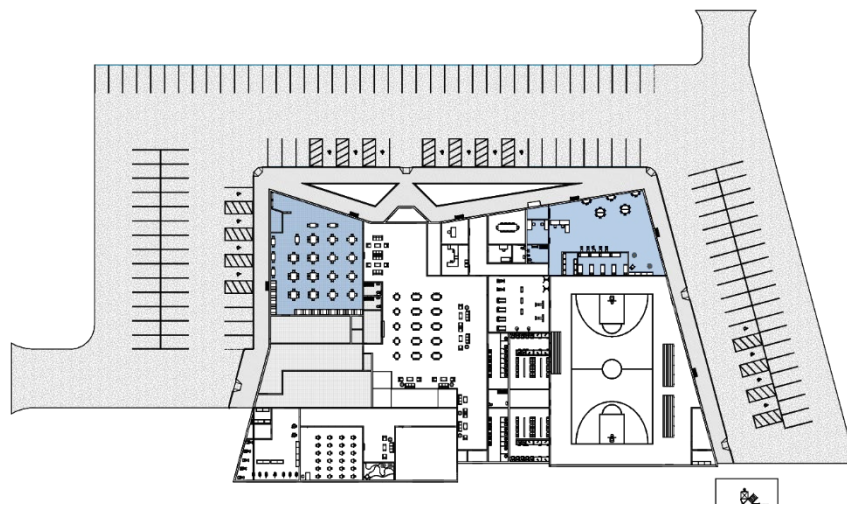

Figure 11 Floorplan with Restaurant and Childcare Highlighted

4.3. Project Design and Documentation

The project was primarily designed in Revit 2023 and was rendered in Lumion 2023 with adjustments being made in Adobe Photoshop.
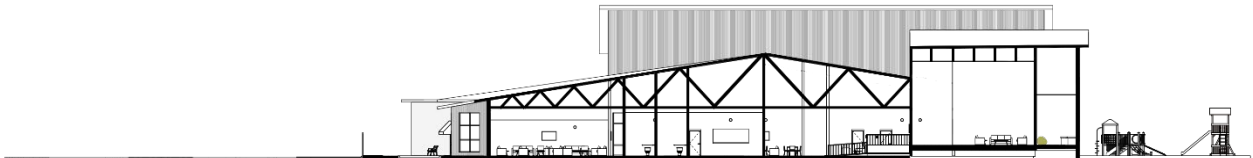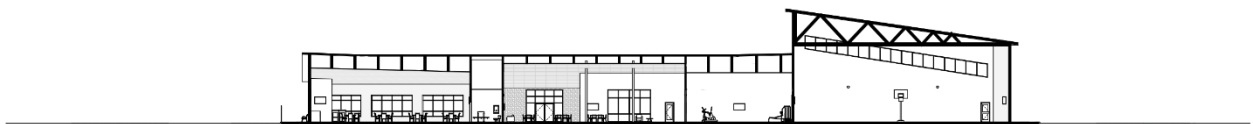

Figure 12 Exterior

Figure 13 East Elevation

Figure 14 North Elevation

Figure 15 Interior Looking at Entry

4.4. Conclusions

Overall, the project was successful in including a variety of disability design

considerations. The project considered as many disabilities as possible for its time constraint, but

that is where the project could go further. There is no shortage of the design considerations that

could be made for individuals with disabilities, and not all of them could be hit within this

project because of the time frame available. Specifically, studying the considerations that benefit

some individuals and hinder others is an important step that could've been explored further. For

example, when looking at directional paving for blind users, it is clear that the addition is useful

for navigation and safety, but when you consider directional paving and wheelchair users you

start to see the issues. For individuals using assistive technology it is best to have clear floors to

minimize tripping hazards, but when directional paving is important for navigation of blind

individuals you realize the challenge, as a designer, to what locations are best to have elements

like directional paving and what locations are unnecessary, if even dangerous for other users.

Having more time to study design considerations such as these would have exponentially

benefitted the project and assisted future designers in how to balance other situations such as this

that may come up in the future with the invention of even better assistive technologies.

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