



# **Neurodiversity in Architecture**

## **Confronting the Agency of Autism Within the Built Environment**

University of Detroit Mercy School of Architecture | Master of Science in Architecture

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**Author: Jonathan L. Turner**  
**Advisor: Wladek Fuchs**  
**External Advisor: Magda Mostafa**



## Acknowledgements

I would first like to thank my thesis advisor Wladyssal Fuchs, from the University of Detroit Mercy School of Architecture, without his excellent guidance this thesis would not have been possible. Wladek constantly provided feedback and allowed me to explore concepts as they developed. He kept me on track and inspired me to push the boundary of what I was capable of achieving. I would also like to thank my external advisor Magda Mostafa PhD. from the University of Cairo for agreeing to share her wealth of knowledge as an expert in autism-friendly design. She enabled me to dig deeper into a topic that I was completely unfamiliar with and encouraged me to research specific issues in this area of research. I would also like to acknowledge the incredible support of my family was paramount throughout this process. Their unwavering support and encouragement allowed me to immerse myself in this process and dedicate myself to my studies.



## Thesis Statement

To properly establish and adhere to a universal design language architects must incorporate accommodations for people with all types of disabilities. The Americans with Disabilities Act (ADA) has defined a set of codes that refine architectural spaces for people with many disabilities. However, there is little to no consideration paid to those who suffer from autism spectrum disorder (ASD). Statistics indicate that globally the number of people diagnosed with autism has been increasing over the past 50 years. Current numbers reveal that 1 in every 59 people are diagnosed with autism, that is 1.69% of the global population.<sup>38</sup> Considering the rising prevalence of people with ASD, priority should be placed on the development and implementation of appropriate accommodations.

Autism is categorized as a pervasive developmental disorder (PDD) impairing the developmental progress of children, including a wide range of symptoms. "the word 'pervasive' implies that someone is affected deep inside, throughout his entire being. That is the case for people with autism."<sup>32</sup> It is a life-long condition with a myriad of complex needs, some of which have the potential to be incorporated into architectural design. Architects are the vanguard for creating spaces that are perceived, inhabited, and interacted with. It is reasonable to expect environments that respond to occupant needs through evidence-based design practices allowing innovation to drive the way to informed spaces.

This thesis focuses on cultivating an architectural understanding of what it means to design for people with ASD. Developing research on concepts that -

- Establish an intimate connection between occupant and architectural form
- Review known concepts and approaches to designing for PWA
- Conceptualize new approaches and research methods
- Generate a synthesized conceptual framework
- And test all research through a design proposal

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FIGURE 1

## Abstract

This thesis establishes a foundational understanding of current autism-friendly design approaches and conceptualizes new methods in research and design. Early on in the research an intimate connection between architecture and occupant wellness is established. Which is then applied from the perspective of occupancy driven design tactics. Specifically focusing on people with Autism Spectrum Disorder (ASD), the research constructs an inclusive framework that can be used as a design instrument that guides architectural decision making or as an analytical tool for reviewing precedent studies. Lastly, this framework is implemented in a design proposal that tests and demonstrates applications. An autism-friendly design approach places emphasis on inclusive design practices, evidence-based architecture, intentional spatial construction, and occupant wellness allowing architecture to respond to the intimate needs of occupancy.

"To create, one must first question everything."

- Eileen Gray

01

# Typological Analysis

## Typological Analysis of Healthcare Environments

A typological analysis of different healthcare facilities will explore connections between space and healing through the application of two conceptual frameworks. The first will focus on the programmatic requirements of a facility using the Donabedian Model. This framework approaches the quality of care from three aspects: structure, process, and outcome. The second conceptual framework investigates the complex nature of understanding architectural works through the dissection of three forms: spatial, intellectual, and structural, with consideration to context and formative ideas. This architectural framework allows analysis of designed spaces from the conceptualized ideas and intentions to the physical elements and their performance with occupancy. The application of both frameworks will allow for an informed analysis of different healthcare typologies, with the intent of establishing a significant connection between architectural space and occupant wellness.

For proper use within this study, it is important to establish a clear understanding and definition of typology with regards to typological analysis. Merriam-Webster defines typology as “study of or analysis or classification based on types or categories.” Looking closer at the roots, the word ‘type’ relates to the Greek word *typos*. Originally meaning “to beat, to hit, to mark.” and eventually relating to an understanding that is suggested by a guiding model or pattern.<sup>01</sup> Applying this understanding to an architectural setting typology becomes viewed as a “...comparative study of physical or other characteristics of the built environment into distinct types.”<sup>02</sup> These types will fall into established models of categorization that are formed from the selection of a defined scope.

Typological categorization used in this study will stem from the functional characteristics that define spaces, allowing buildings that contain similar programmatic functions to be labeled and categorized into groups.<sup>03</sup> This methodology allows architectural characteristics to be abstracted from specific instances and the typologies become a representation of the essence of each grouping. Within each type the differentiations between structures will be evaluated through the abstraction, reduction, and schematization of architectural spaces. Allowing for the observations of important distinctions such as; the relationships between program/function, space/environment, and quality of care/effectiveness. Each typology is chosen to exemplify these connections within the unique programmatic function of healthcare. Although this analysis has the capacity to deeply analyze a large amount of building typologies, the intent is to use an established rigor to prove a connection between architecture and wellness.

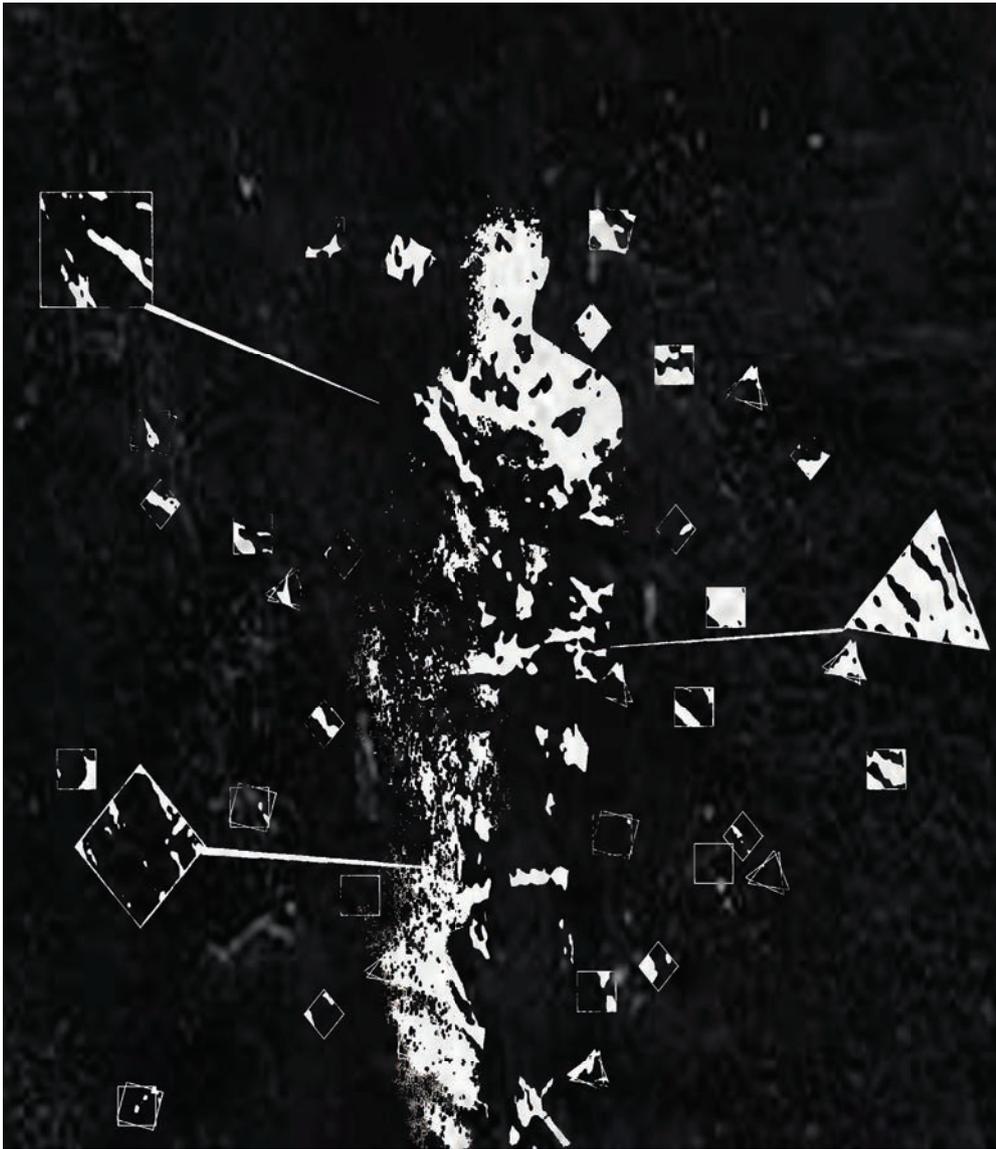


FIGURE 2

The rigor of analysis is approached through two conceptual frameworks; The Donabedian Model and The Architectural Model. The Donabedian model is used within the healthcare industry to evaluate the programmatic requirements and the quality of care that patients receive. This conceptual framework places quantifiable elements of health care organizations into three categories (i.e. structure elements, process elements, and outcomes), enabling an analysis of performance and effectiveness. Structural elements of a healthcare organization impact the capacity and workflow that each institution is capable of. In this metric, elements are analyzed to ground an understanding of the facilities' structural capability and inner-workings. Process measures relate to a facility's method of maintaining or improving health, placing the practice under an analytical microscope. This framework deconstructs the process which facilitates use to administer health services allowing individual parts to be evaluated. Outcome data assists this analysis and is used to review the efficiency/quality of healthcare services provided. Although this data is the easiest to quantify (e.g. morbidity rates), numerous factors are outside of the providers' control. The results from this model are reviewed as a qualitative assessment of the programmatic extents of different healthcare typologies, creating an informed understanding of programmatic systems that inhabit healthcare facilities. <sup>05 06 07</sup>

## Donabedian Model:

This conceptual framework places quantifiable elements of health care organizations into three categories (i.e. structure elements, process elements, and outcomes), enabling an analysis of the performance and effectiveness. For use in this thesis, the understanding of this conceptual framework will be used to structure an understanding of programmatic requirements found within different healthcare typologies.

### Structure:

Structural elements of a healthcare organization impact the capacity and workflow that each institution is capable of. In this metric elements are analyzed to ground an understanding of the facilities' structural capability and inner-workings.

- Capacity
- Systems
- Processes
- Staff
- Equipment
- Supplies
- Guidelines
- Facilities
- Organizational structure

### Process:

Process measures relate to a facility's method of maintaining or improving health, placing the practice under an analytical microscope. This dimension deconstructs the process and facilitates use to administer health services so that parts can be evaluated.

- Interaction
- Investigation
- Examination/treatment
- Counseling
- Technical quality
- Interpersonal quality

### Outcome:

Outcome data assists this analysis and is used to review the efficiency/quality of healthcare services provided. Although this data is the easiest to quantify (morbidity rates), numerous factors are outside of the providers' control.

- Morbidity
- Mortality
- Satisfaction
- Preventable comorbidities
- Quality of life
- Cost

## Results:

The application of this conceptual framework facilitates the analysis and discussion of programmatic systems that inhabit healthcare facilities. The results from this model are expressed as a qualitative assessment of programmatic extents within different healthcare typologies. Informing an understanding of healthcare services, workflows, and requirements.

The Architectural Model provides the bases for analysis and discussion of architectural forms. Deconstructing an architectural work into three categories: Intellectual Form, Structural Form, and Spatial Form. These three formative ideas are interrelated and exist within the unifying elements of Context and Formative Idea. Intellectual Form categorizes the principles of creation and design in an architectural work looking beyond material elements. This metric combines conceptual and perceptual form focusing on the underlying logic through the application of intelligence. Structural Form takes a material perspective on the analysis of architectural space relating to Vitruvius' structural sculptural and geometric forms. Relating technology and construction as a metric for analysis, organization, and expression of form. Spatial Form classifies the analysis of architectural form as it relates to the articulation of spaces and pertaining to sensory perception/experience. In this metric, form relates to utility and use of space as it is expressed within architecture. The Context under which architectural work is conceived and in which it exists cannot be separated from the building. The conditions of the surrounding environment (nature, physical, and socio-cultural) influence, constrain, and impact building operation and performance. The formative idea integrates spatial, structural, and intellectual form into a unified whole. Outlining a logical order that organizes material construction and expresses how a designer approached a design situation and includes elements added. An architectural building has an abstract and conceptual aspect that includes additional aims brought about by designers throughout the course of design. This conceptual framework structures a discussion and analysis of architectural form, in totality from the conceptual intents (Formative Idea) to the physical characteristics (Spatial, Structural, and Intellectual).<sup>08</sup>

## Architectural Model:

This conceptual framework provides the bases for analysis and discussion of architectural forms. De-constructing an architectural work into three categories: Intellectual Form, Structural Form, and Spatial Form. These three formative ideas are interrelated and exist within the unifying elements of context and formative idea. An understanding of this conceptual framework will be used to structure an understanding of architectural form of specific healthcare typologies.

### Intellectual:

Intellectual form categorizes the principles of creation and design in an architectural work looking beyond material elements. This metric combines conceptual and perceptual form focusing on the underlying logic through the application of intelligence.

- Design
- Intent
- Planning
- Organization

### Structural:

Structural form takes a material perspective on the analysis of architectural space relating to Vitruvius' structural sculptural and geometric forms. Relating technology and construction as a metric for analysis, organization, and expression of form.

- Materiality
- Construction
- Technology

### Spatial:

Spatial form classifies the analysis of architectural form as it relates to the articulation of spaces and pertaining to sensory perception/experience. In this metric, form relates to utility and use of space as it is expressed within architecture.

- Space
- Articulation
- Use and function

### Context:

The context under which architectural work is conceived and in which it exists cannot be separated from the building. The conditions of the surrounding environment (nature, physical, and socio-cultural) influence, constrain, and impact building operation and performance.

### Formative Idea:

An architectural building has an abstract and conceptual aspect that includes additional aims brought about by designers throughout the course of design. The formative idea integrates spatial, structural, and intellectual form into a unified whole. Outlining a logical order that organizes material construction and expresses how a designer approached a design situation and includes elements added. .

## Results:

This conceptual framework structures a discussion and analysis of architectural form in its totality, from conceptual intents (i.e. formative idea) to the physical characteristics (i.e. spatial, structural, and intellectual). An understanding of architectural form facilitates the review of healthcare typologies grounding the analysis within the physical environment.

## Asylum

“Most treatment aimed to alleviate the psychological causes of mental disease by radically changing the individuals environment and daily regimen.”

- Angels in the Architecture

Early asylum design and management was about creating an environment for patients to heal. One of the early major influences for Asylum design and management was Thomas Story Kirkbride (1809-1883). Kirkbride was a physician, advocate for the mentally ill, and founder of Medical Superintendents of American Institutions for the Insane. He also wrote a book on asylum design that was widely used and implemented as a standard for Asylum design and management. To use Kirkbride's words: “Given that insanity was characterized by irregularity in mental and physical functioning, its treatment logically should include the imposition of order, harmony, and balance, in terms of both visual stimuli and behavioral patterns. To counteract the overstimulation's and stresses of modern life thought to cause mental disease, the sufferer should be removed from the everyday world and immersed in a 'new kind of existence...'”<sup>12</sup> This idealistic approach was not as beneficial for the patients as Kirkbride imagined. The concept of “total institution” (a term coined by Erving Goffman, American sociologist) facilitated resocialization, the process of radically changing an inmate's personality by carefully controlling his or her environment. Over time mental asylums became known as places of unconventional medical treatment and abuse of patients. Commonly overcrowded and understaffed facilities struggled to treat or even understand mental illnesses.

These facilities became places of total isolation separated from society with their own internal organization and methods of treatment. It was common for asylums to have an authoritative hierarchy of positions with a top down approach, conventional positions such as medical directors to doctors, nurses, facility management personnel can be found within these facilities. Paper record keeping and file storage was the only way to keep accurate records at the time, requiring intensive precision and attention to maintain up-to-date and accurate patient charts. Additionally, asylums were filled with functions and programs that catered to the needs of the patients and supporting the staff, ranging from different types of therapies, medications, treatments, and services. Unfortunately, a lack of understanding of the mental illness and the incurable nature of many psychiatric conditions created an overload of patients and a deficiency of funding within asylums, required the prioritization of custodial care instead of treatment and recovery. The outcome for patients of these facilities was bleak, in many cases recovery was not possible through the care that was provided.

With the intent of creating a facility that would establish a new environment for patients to inhabit, site location was an important component. Although not always the case, many asylums were located in remote locations away from high density cities. Constructing large complexes with multiple buildings, some of which had over 100 buildings and others included their own fire department and farming services. Larger facilities commonly included patient



FIGURE 3

rooms, staff offices, nursing stations, dining rooms, kitchens, libraries, farms, and more. The Kirkbride style plan was used in a majority of asylums, it was common for buildings that treated patients to fan out and take advantage of natural light and ventilation. Long interior corridors sided with patient rooms, offices, and gathering spaces filled the low-rise buildings that were made of durable materials such as brick, concrete, and stone. There was an intentional connection to nature that was thought to help treat mental illness, and exercise (e.g. working in the farms) was viewed as a form of therapy. Some facilities included inspirational text on the walls and areas dedicated for group activities.

From this brief overview of asylum facilities clear intent behind the purpose of these buildings and programs can be seen. Intentions behind the design and planning process demanded structures that would facilitate the treatment and recovery of those with mental conditions. With clear insightful consideration a connection between planning, program, and occupancy was achieved. Asylums did not go without their trauma; overcrowding, unconventional medical treatment, abuse of patients, lack of understanding of mental illnesses, funding issues, and understaffing contributed to horrific events and outcomes that transpired within these facilities. Despite the checkered past of asylums, current psychiatric hospitals implement design strategies and concepts to aid in the treatment, recovery, and rehabilitation of those with mental illnesses. They include inpatient and outpatient services where assistive therapies, medications, and programs aid mental conditions that are better understood and diagnosed.

## Sanatorium

“The main purpose of the building is to function as a medical instrument... ”  
- Alvar Aalto

Sanatoriums originally operated as specialized types of medical facilities that prioritized the treatment of long-term or chronic illnesses. Sanatoriums were “...most typically associated with the treatment of tuberculosis (TB) in the late nineteenth and twentieth century before the discovery of antibiotics.”<sup>15</sup> Treatments administered within sanatoriums were rudimentary and stemmed from how doctors at that time understood disease. There were no x-rays, Computerized Axial Tomography (CAT) scans, ultrasounds, or Magnetic Resonance Images (MRIs) to help diagnose conditions and pharmaceutical pills, or intravenous treatments did not exist. Doctors relied on observations and their brief training, which was commonly a 2 years apprenticeship, to determine illnesses and treatments. The sanatoriums became tools used for administering treatments and promoting the health of occupants. Tuberculosis patients received scheduled times for sunbathing, open air treatments, physical rest, and mental rest. Treatments targeted the entire body and focused on promoting a healthy environment for the patient to heal in. These facilities were commonly located outside of dense urban centers in natural environments that were close to nature.

The structure within these facilities was based on a strict separation of functions with a model for hygienic architecture.<sup>14</sup> Operating with a conventional management structure divided up into departments such as doctors, nurses, janitorial staff, and more, which were all centered around serving the needs of each patient. Paper records were the only means of tracking patient status and maintaining an organizational hierarchy within the facilities. As result of medical understanding at the time “the clinician would have to make an attempt at prognosis with little available guidance” commonly resulting in homeopathic treatments targeting the entire body.<sup>13</sup> Tuberculosis wards were common throughout sanatoriums, for patients in these wards a group mentality reduced the stresses of the lengthy stay “...the idea was that we were all in it together. You got through it because you saw others getting through it”<sup>13</sup> After the introduction of the x-ray into medical practice tuberculosis became a curable illness no longer requiring lengthy treatments and making sanatoriums obsolete.

The hygienic approach to medical treatment at this time became the framework for structure and organization within these facilities. For the health of the patients, natural ventilation strategies were implemented to provide constant clean air that circulated around patients promoting improvements in health outcomes. A prescribed exposure to sunlight was used as treatment, which was integrated within the design by providing roof-terraces, attached outdoor balconies, and designated locations for sunbathing. Color was also an important aspect of the facility, which was commonly expressed with bright natural colors such as white, yellow, and blue. A great example of the essence of the sanatorium is embodied in the Alvar and Aino Aalto, Paimio Sanatorium (1929-1933). Alvar Aalto spoke about this project and

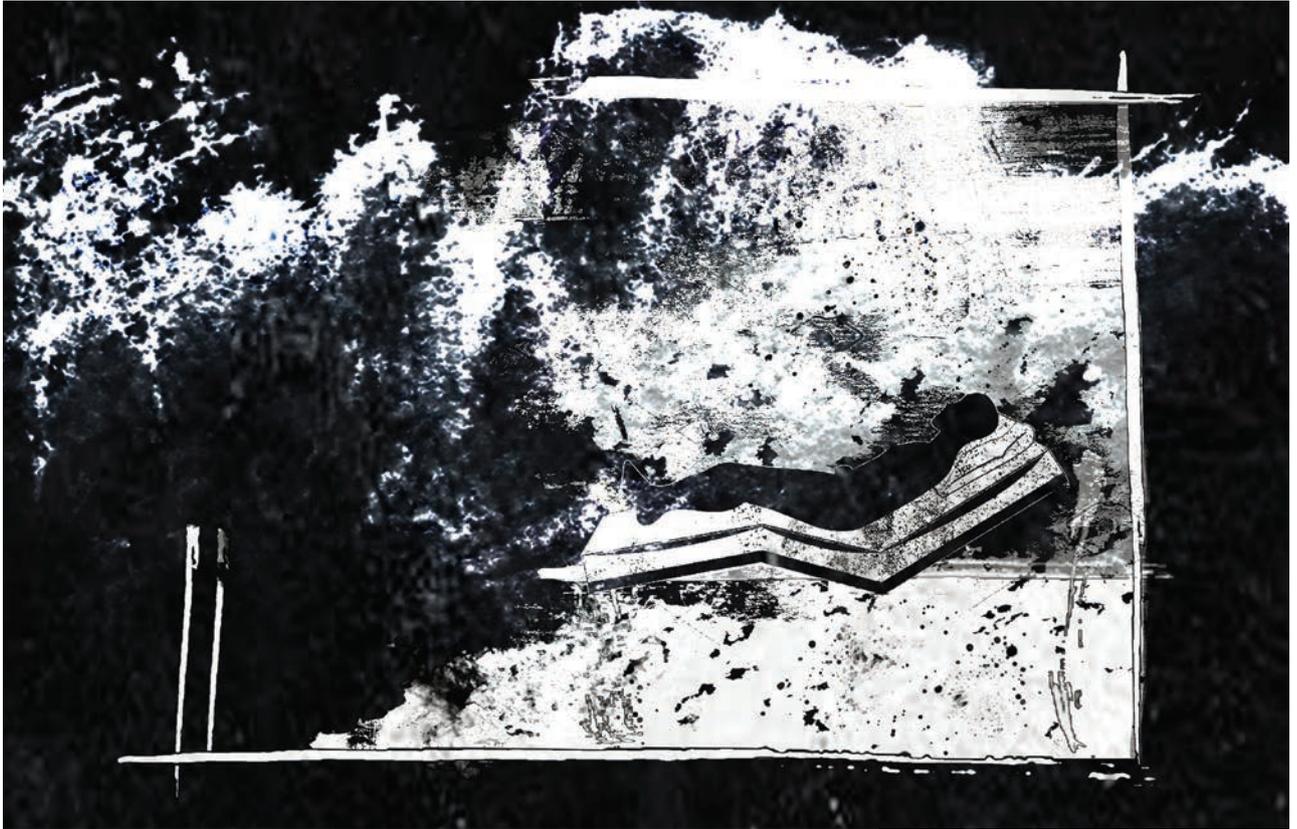


FIGURE 4

explained that “the main purpose of the building is to function as a medical instrument... the room design is determined by the strength of the patient, reclining on his bed. the color of the ceiling is chosen for quietness, the light sources are outside of the patient's field of vision, the heating is oriented towards the patient's feet, and the water runs soundlessly to make sure that no patient disturbs his neighbor.” Aalto.<sup>15</sup> This facility in particular was designed with the purpose of the patient maintaining a horizontal position and being confined to bed with careful consideration being given towards the patients' sensitivities.

These facilities embodied an approach to constructing an environment that would facilitate the health and healing of its occupants. Although an understanding of disease and medical treatment was limited compared to today's standards. The approaches and intentions that fueled the creation of these facilities was diversely complex and thoroughly intentional. “The sanatorium speaks of the heroic belief in architecture's capacity to contribute to the betterment of society.”<sup>14</sup> Sanatoriums incorporated selective site locations and architectural detailing as a tool for assisting medical professionals in administering treatment and managing the symptoms of tuberculosis. The history of these facilities encourages an approach to architecture that focuses on the quality of spaces that are designed and constructed.

## Hospital

“To the well-known saying that ‘dirt is only matter in the wrong place,’ may be added another, that disease, and itself, is but life in the wrong place.”

- American Architect and Building News, 1882

The design and architecture of the healing environment has evolved in many aspects throughout its history. First from healing in the home, to pavilion/ward style buildings, then to the modern high-rise facilities that we see today. “Before the development and adoption of germ theory, a majority of medical practitioners were certain the sickness was either spread or caused by ‘corrupted’ (dirty, odorous, confined, damp) physical surroundings.”<sup>21</sup> This early misunderstanding of how disease spread placed an emphasis on the design of the built environment. Practitioners ordered architectural alterations and hygienic overhauls of existing facilities. “Curing hospital disease required first curing the building.”<sup>21</sup> Today hospitals are even more intricate, specialized, and refined optimizing the healing profession and evolving the typology into high-rise factories for healing.

The organizational structure of these facilities is incredibly complex from management and operation to specific departments specialized in types of diagnosis or treatment. Constantly adapting to new technologies and medical practices, these facilities were quick to transition to digital record keeping. Digital record keeping increased the efficiency and accuracy of patient records as well as communication between professionals. With an ‘assembly-line’ methodology, the systematic compartmentalization of functions facilitated improvements in patient care and recovery. Hospitals operate under great scrutiny from both interior and exterior parties resulting in rigorous operation, organization, and management structures that allow them to operate with extreme efficiency and precision. Within this structure these facilities take full advantage of new technologies and are constantly redefining the practice to improve patient outcomes.

Hospitals, commonly large complexes consisting of many departments all working together for the betterment of the patient. These massive facilities have become known for a hygienic, sterile aesthetic with bright white lights and maze-like corridors. An early approach to this typology was the “Pavilion Plan” style later transitioning to a “High-rise” style as technology, demand, and scope of the facilities increased. “The ‘pavilion plan’ was both sanitary for the patient, and convenient for the nurse. It was dependent on the fact that there was a greater degree of separation and segregation, than was provided by earlier designs, together with greatly improved ‘ventilation’...”<sup>18</sup> The high-rise style allowed for “...medical clusters that bring together multi-disciplinary hospitals, ambulatory clinic, outpatient clinics, rehabilitation centers, and medical universities”<sup>18</sup> commonly found throughout the United States. Certain



FIGURE 5

design principles have begun to emerge in recent years such as futureproofing, evidence-based design, wayfinding approaches, biophilic design, and more in an attempt to improve occupant comfort and wellbeing. Additionally, some studies have proven effectiveness of these approaches.<sup>17 20</sup>

Within an architectural perspective a specific attention to hygienic environments can be utilized for the betterment of an occupant's health and healing. Hospitals serve as a place of medical practice, scientific breakthroughs, and treatment. These factories of healing take medical practice into a commercialized state where specialties are compartmentalized, efficiency is optimized, and outcomes are statistically analyzed. Buildings within this typology resonate with the essence of sterile spaces used for optimizing treatment, organization, and effectiveness. Under constant refinement these facilities have begun to implement design strategies to mirror the endlessly developing medical industry.

## Nursing Home

"The long term care facility becomes the residents total living environment it encompasses the park, the street, the home, the town, etc.. "

- Laszlo Aranyi and Larry L. Goldma

For persons without family or those families without means, almshouses for the aged became established locations to care for the disabled and/or elderly. Predating the industrial age by more than 300 years almshouses gave way to the international style of the Nursing Home after World War Two (WWII). Nursing Homes Initially started as government programs, but eventually transferred to private realm in 1935 because of the Social Security act. Caring for the ill-aged became a typology that evolved out of a social need where the care of the elderly could be left to an organization rather than fall upon the family. These long-term care facilities became the resident's total living environment encompassing the park, the street, the home, and the town.<sup>26</sup> This allowed for round the clock care of a community of elderly patients. "In the mid-1980s, the institutional paradigm of the nursing home began to shift. The nursing home was redefined as a provider of both health and social services."<sup>26</sup> With this additional facet, the typology grew to become more encompassing and to better serve the residents. Facilities became tailored to enable the independence of their occupants, paying special attention to accessibility, organization, and experience provided by these spaces.

Looking at one of the current methods of programmatic organization, the Wellspring Model, this model "...holds promise for upgrading the quality of care for residents by combining clinical and cultural change."<sup>25</sup> Within this model a collaborative network of peer nursing homes share performance data, technical assistance, peer support, a set of training modules, and progressive strategies to solve common challenges. This model of operation establishes an ongoing learning collaborative where nursing facilities continuously reflect and refine their programmatic structure and efficiencies. These facilities operate within a typical corporation hierarchy while employing Licensed Practical Nurses (LPNs) as well as Registered Nurses (RNs) to deliver, direct, and manage care. Staffing was organized by shift and ward reflecting a similar typology of acute care facilities<sup>26</sup>. Different strategies are implemented based on the structural/programmatic style and geographic location of these facilities, always accommodating residents with personalized care and supportive environments.

Nursing homes as a typology are expressed with a wide range of forms and styles, from hospital/institution like representation to a more refined 'assisted living' expression. This range of expression is a reflection of shifting programmatic specifications that exist within the overarching ideology of long-term care facilities. "Despite the enormous diversity in American nursing homes, an ordinary nursing home looks and feels like a host of other institutions"<sup>26</sup> Within recent years this progressive typology has adopted ideals of designing for occupant comfort and accessibility. Implementing design strategies for the betterment of occupant wellness and employee efficiency. Strategies such as designing for a sense of home, aging-in-



FIGURE 7

place, reality orientation, and specific spatial considerations allow nursing homes to embody accommodation of resident care and experience. When defining spatial considerations, the approach to space is one where environments should have an easily identifiable use and unambiguous form compensating for a lessened occupant sensory acuity.<sup>24</sup>

Evolving out of social need nursing homes embody an approach to the long-term care of individuals. Responding to evolving requirements and considerations, this typology has begun to incorporate design strategies to better reflect occupant needs. The evolution of the nursing home reflects a shift in programmatic function from an institutional care facility to a long-term residential environment that provides assisted-living accommodations. It is apparent that the unique aspects of long-term care facilities are expressed in various programmatic and architectural approaches and representations. Signifying an evolving understanding of the relationship between occupant and environment, as well as adjusted expectations from these facilities. Laszlo Aranyi and Larry L. Goldman state that, "These services fail with the dehumanization of individuals"<sup>27</sup> This typology advocates for extensive design and planning practices that create an appropriately serve its occupancy.

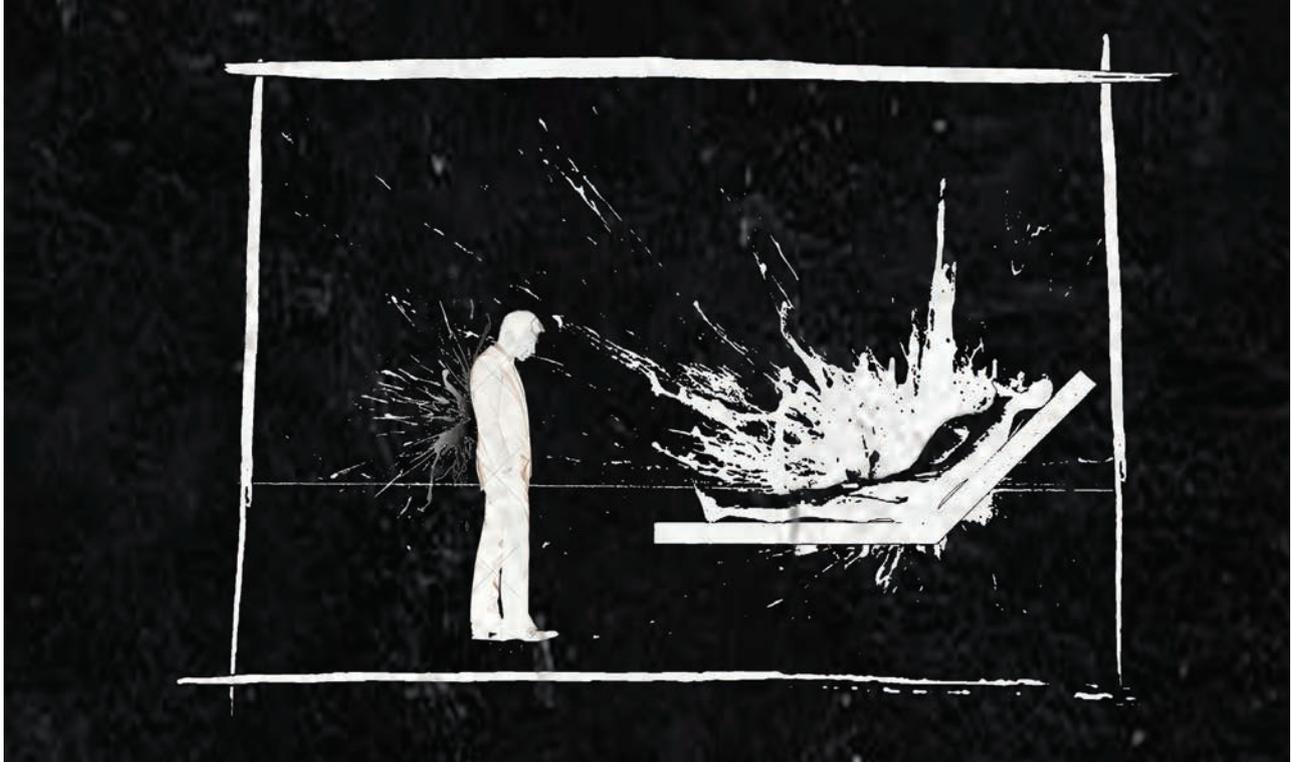
## Hospice

The concept of “total pain” (a major dimension in Cicely Saunders work) “This concept argued for embracing the social, emotional, and spiritual dimensions of suffering…”

- Stephen Verderber & Ben J. Refuerzo

Through the passage of time the act of mourning shifted from a community-based setting to the private realm, becoming the primary responsibility of the family. Eventually advancing to the point where the immediate community could no longer be “either held responsible for or even directly knowledgeable of its deceased members.” This sparked a new discourse on terminal end-of-life care, which fostered new concepts of dignity and meaning in death. Dying was marked by achievement and resolution.<sup>29</sup> Hospice facilities provide palliative care for patients with chronic as well as life-threatening or life-limiting conditions. This typology embodies “the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial and spiritual.”<sup>28</sup>

FIGURE 7



## Prison

"People in custody need to be provided with a level of dignity, stability and support to make stronger, positive transformations from custody to community."

- (page195-196)

The prison system has three core objectives: to protect the public, to punish, and to rehabilitate. The notion of rehabilitation is complex and the role that prison plays in this is only partial. The justice system also includes sentencing, probation, and other forms of non-custodial punishment. An early influential model of prison form was the "Panoptican model."<sup>30</sup> In this model, the prison was designed so that prisoners did not know when and if they were being observed. The continual sense of surveillance was intended to motivate them to regulate their own behavior, effectively acting as agents of their own control.<sup>30</sup> This displayed the environments power to affect psychology through its configuration and removal of the autonomy of the prisoner.

FIGURE 8



## Findings

From this analysis of place and function, assumptions and correlations between the different typologies start to emerge. These results relate back to the initial area of interest, which focused on the environments, effects, and interactions with its occupants. through the analysis of different medical settings and other environments, it is apparent that the environments created hold power in affecting their occupants. The effects of these interactions evoked changes in architectural form and initiated different approaches to these typologies. Not only were design movements created to better facilitate the function of each facility, they were also driven with the intention of improving occupant experience and wellness. These conceptual approaches to facility planning and design symbolize a connection between occupant wellness and architectural design that is deeply rooted in each facilities mission to serve for the betterment of its occupants.

FIGURE 9

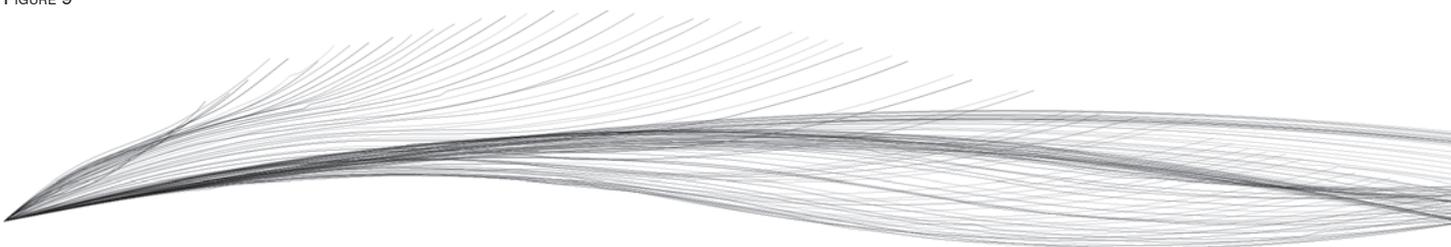


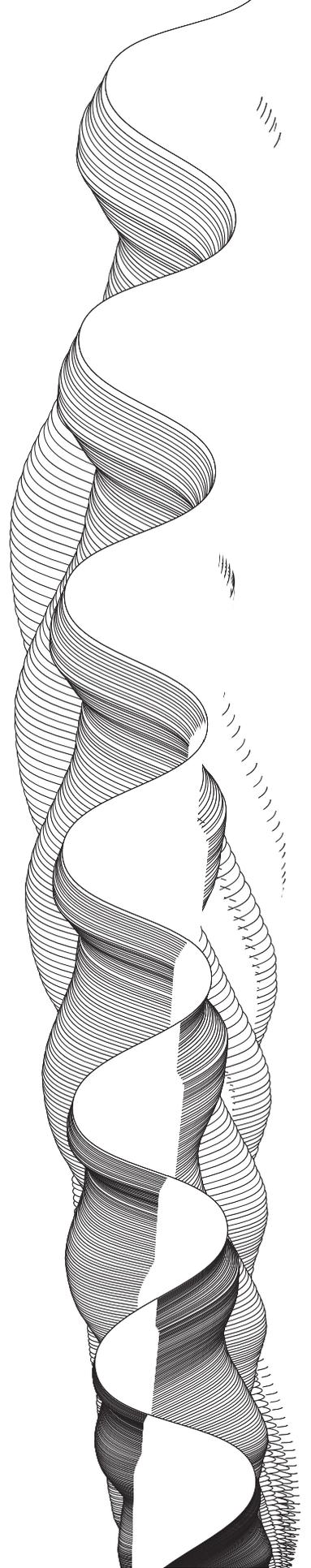
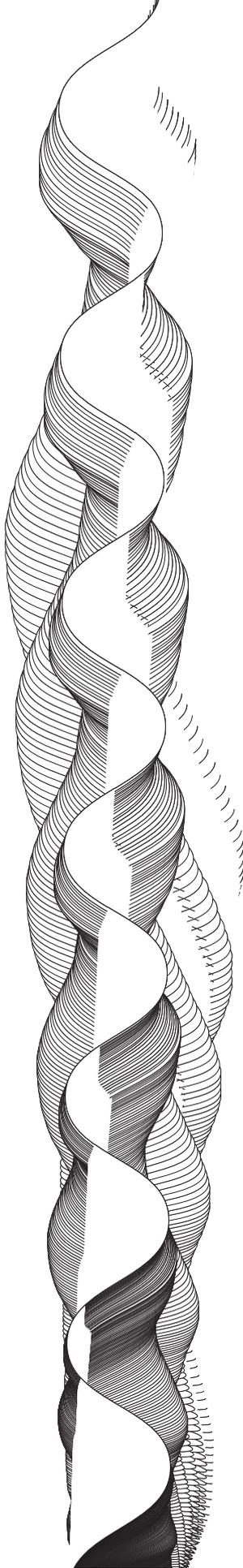
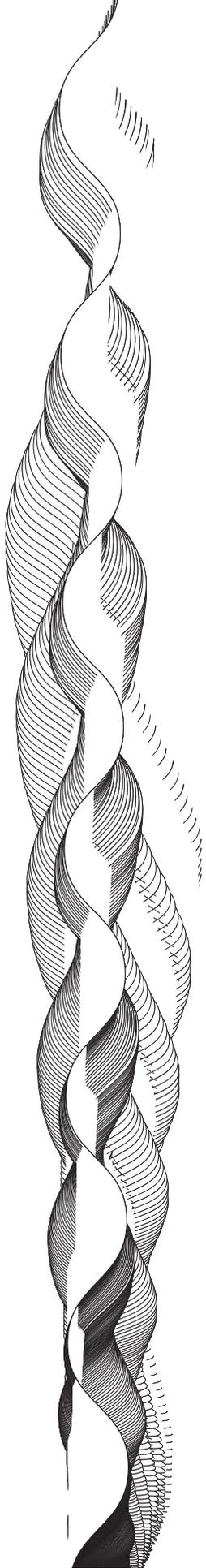
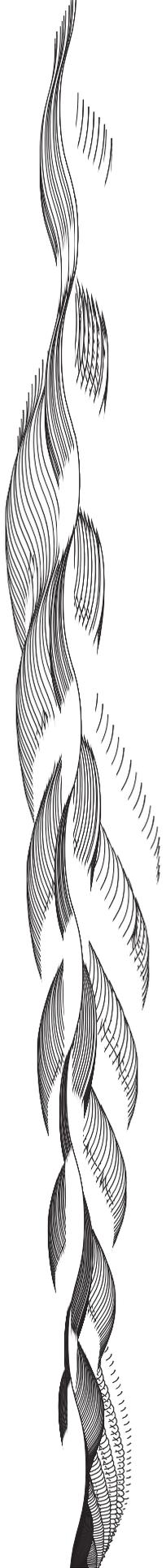
FIGURE 10



"Autism can't define me. I define autism."

Kerry Magro

# Understanding Occupancy



## A Shift to Occupancy

To see the connection between architecture and occupancy in greater detail, a specific occupant type was chosen as a research focus, for the reason that it would enable a critical review of architectural form and planning from a new perspective. Distinctive solutions shown from the review allowed for finalized designs to differ from typical design approaches and expression. Additionally, the programmatic and architectural aspects of spaces will be reviewed to assess how architectural space could be designed to accommodate this specific occupancy better.

The selected occupancy focuses on people with Autism Spectrum Disorder (ASD) as a distinctive group of individuals with a differing range of spatial requirements. Autism is a pervasive developmental disorder that has a direct effect on sensory perception. Creating a unique interaction with spatial design and construction that requires more than what conventional approaches accommodate. This shift in occupant sensory experience affords designers a new lens to perceive architecture through. Critical evaluation of occupant requirements and rigorous research on perceptual experience allow for a new dialect of architectural expression to be conceived.

## Architecture and Autism

For architects to design informed spaces, it is important to establish an intimate understanding of occupant needs and requirements. A familiarity with the occupant type and their specific needs are the first step for establishing criteria that will guide the design process. ASD includes a variety of complex accommodations and requirements on how individuals' function and interact with the world around them.

“Autism spectrum disorder (ASD) refers to a range of conditions characterized by some degree of impaired social behaviour, communication and language, and a narrow range of interests and activities that are both unique to the individual and carried out repetitively.

ASDs begin in childhood and tend to persist into adolescence and adulthood. In most cases the conditions are apparent during the first 5 years of life.

Individuals with ASD often present other co-occurring conditions, including epilepsy, depression, anxiety and attention deficit hyperactivity disorder (ADHD). The level of intellectual functioning in individuals with ASDs is extremely variable, extending from profound impairment to superior levels.”<sup>31</sup>

The depth and variation of this pervasive developmental disorder is staggering and understanding this condition is essential for creating informed spaces. Theo Peeters relates autism to the idea of cognition, elaborating that people with autism have a different cognitive style. Cognition is a method of obtaining an understanding through the process of interpreting information acquired through the senses. For people with ASD, the brain interprets sensory information differently, changing how someone learns how to understand.<sup>32</sup>

## A Lifetime With Autism

Autism spectrum disorder is a lifelong condition with no known cure. The Autism Society organization denotes three major transitions existing within a lifetime with autism.<sup>36</sup> These transitions are notable life phases where the available necessary supports and treatments change and new responsibilities are required from the individuals. Serving as an overview and generalization of a lifetime composed of challenges to overcome.

### Diagnosis and Intervention:

Autism can be diagnosed in children as early as 12 to 18 months, commonly diagnosed around the age of 3 years for the reason that many parents are not aware of the early signs of autism. Early diagnosis and intervention is known to have greatly improved outcomes.<sup>38</sup> This serves as a virtue and offsets the progressive nature of the pervasive developmental disorder.

### Building a Strong Foundation:

It is crucial to develop a strong foundation for individuals with autism to grow from. During the early developmental years (e.g. youth, adolescence, and into early adulthood) therapies and assistive programs are structured around each individual to maximize their quality of life and potential for independence.

### Transition into Adulthood:

At the point when a person with autism finishes educational and occupational programs and therapies. The transition into adulthood stands as one of the most challenging transitions that these individuals are faced with. New responsibilities are required from them and less supportive programs are structured for the aging population.

FIGURE 12



## Autism as a Spectrum

One of the most important aspects of autism is the fact that it is diagnosed as a spectrum. Although doctors might categorize individuals into three main categories (i.e. severe, moderate, and high-functioning). Additionally, no two individuals with ASD are the same and every diagnosis is as unique and complex as a person's personality. The spectrum functions as a tool for physicians to communicate severity within the common characteristics of autism. Individuals within level one (i.e. high-functioning) have the least severe autism diagnosis; they require some support and exhibit difficulties with social interaction. With proper support and methods of treatment, people within this level can achieve a high quality of life. Types of therapies (e.g. behavioral, sensory, speech, etc.) support the development of better social, behavioral and communication skills as well as increased ability to regulate overstimulation or sensory seeking behaviors. People within the level two range (i.e. moderate) require more substantial support than those in level one and suffer from significantly impaired social skills. Regardless of the support given, they may struggle to communicate effectively (i.e. verbal and non-verbal), and have difficulty adapting to change. These deficits often make daily activities and communication challenging, affecting daily life. The most severe diagnosis is level three, where individuals require very substantial support. Autism at this level is a significant impairment drastically impacting the individuals' quality of life. People within this level express repetitive or restrictive behaviors (e.g. stimming), severe difficulties adapting to change, limited interests on specific and preferred topics, along with severe impairments to social skills, verbal/non-verbal communication, and inability to maintain attention/focus. Intensive therapy, medication, and assistance from a caregiver are typical methods of support for people within level three.

FIGURE 13



Level 1:  
High Functioning Autism

Symptoms

- Decreased interest in social interactions or activities.
- Difficulty initiating and maintaining social interactions.
- Signs of communication difficulty.
- Trouble adapting to changes in routine or behavior.

Level 2:  
Autism

Symptoms -

- Difficulty coping with change in routine or surroundings.
- Significant lack of verbal and nonverbal communication skills.
- Behavioral issues significant enough to be visible to casual observers.
- Unusual or reduced response to social cues, communication, or interactions.
- Primarily communicates through overly simple sentences.
- Narrow, specific interests with difficulty changing focus or attention.

Level 3:  
Severe Autism

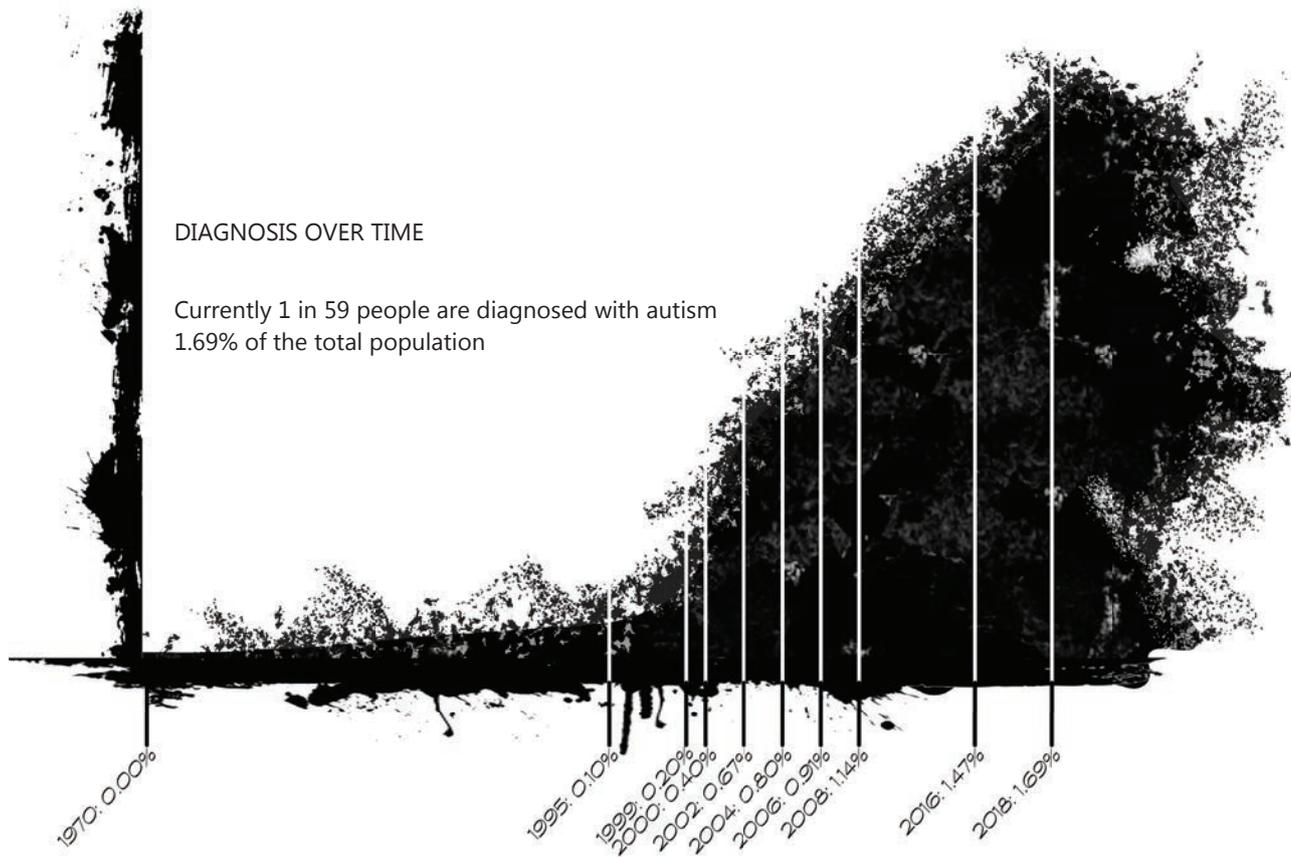
Symptoms -

- Highly visible lack of verbal and nonverbal communication skills.
- Significantly decreased motivation to engage socially or participate in social interactions.
- Difficulty coping with change to routine or surroundings.
- Extreme difficulty coping with unexpected change to routine or environment.
- Great distress or difficulty changing focus or attention.

## Statistics & Prevalence

Autism was first used by German psychiatrist Eugen Bleuler in 1911 as a description of “the subject’s symbolic ‘inner life’ and was not readily accessible to observers.”<sup>33</sup> Throughout years of refining the medical understanding of the human condition, the diagnostic practice and definition of autism has evolved, affecting diagnostic statistics through a growing capacity to understand and identify the condition. Although etiology for the disorder is currently unknown, available scientific evidence suggests a connection with genetic traits that are passed on and/or a result of environmental conditions. The diagnosis of autism also presents with increased likelihood of other co-occurring conditions such as depression, attention deficit hyperactivity disorder, epilepsy, anxiety, and several more.<sup>38</sup>

FIGURE 14



### DEPRESSION



7% of children with autism and 26% of adults with autism have depression compared to 2% of children and 7% of adults in the global population

### ADHD



Approximately 30 to 60% of people with autism have ADHD, compared with 6-7% of the general population.

### NON-VERBAL



80% of people with autism are nonverbal.

### EPILEPSY



One third of people with autism have epilepsy, compared to 2% of the global population.

### BOYS VS GIRLS

4X

Boys are four times more likely to have autism than girls.

### DIFFICULTY FEEDING



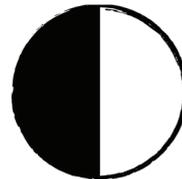
Seven out of ten children with autism have feeding issues.

### ANXIETY



42% of people with autism are also diagnosed with anxiety, compared to 15% of adults and 3% of children in the general population.

### CHRONIC SLEEP PROBLEMS



Over half of the children with autism have one or more chronic sleep problems.

“Kids have to be exposed to different things in order to develop. A child’s not going to find out he likes to play a musical instrument if you never exposed him to it…”

Dr. Temple Grandin

# Sensory Spaces

## Responding to Stimuli

One specific architectural response to implementing autism-friendly design aspects are creating environments that are structured to provide a sensorial experience. In order to create this experience, architects must take careful consideration of lighting, acoustics, materiality, and spatial configuration. Known as sensory spaces, these environments replicate aspects of affinity and sensory therapies to accommodate individuals with autism. Claiming occupants from overstimulation and allowing for educational opportunities in developing individuals. This typology is commonly included in autism centers, educational institutions, and homes.

People with autism are known to have acute sensory preferences involving both hypo-sensitivities (i.e. under-responsiveness) and hyper-sensitivities (i.e. over-responsiveness). Aspects of sight, sound, smell, taste, touch, balance, and bodily awareness directly affect the individual's comfort and experience. People with ASD have difficulty processing and filtering sensory information, which is directly influenced by the previously listed aspects. This was accurately described by the Interactive Autism Network when they stated "The streaks of light coming through the window blinds may be mesmerizing, while the low hum of the heater may be unbearably irritating."<sup>43</sup> Sensory therapies respond to this condition with an approach of using stimuli as an element in therapy to assist with individual development and growth.

Similarly an obsessive nature is associated with autism. This was further explained by J.C. Maleval when he stated "It is considerable in its capacity to base itself entirely on the passions, which sometimes impose themselves with such force upon the subject that they are often beyond his or her control."<sup>39</sup> The nature of this affinity can be disruptive in typical educational systems and developmental settings. Fortunately, affinity therapy focuses on the obsessive nature of ASD where the isolated competence (i.e. affinities) of individuals are used as tools for developmental purposes rather than an obstacle to overcome. Through utilizing aspects of affinity therapy, this approach shifts the paradigm of practices to one where the subject defines the form.

Through an understanding of these therapeutic approaches as well as the medical reasoning behind them, an architectural solution can be composed as a response to these conditions. Sensory spaces represent an application of principles where spaces begin to programmatically respond to the complex needs of people with autism. Additionally, the use of informed design practices allow for the architectural articulation of spaces to respond in a similar manner, established in a culture of research, observation, and implementation.



FIGURE 16

## Sensory Spaces Research

Sensory spaces find expression through the implementation of distinct strategies determined through programmatic expectations, occupant requirements, and design intentions. This allows for a spectrum of architectural representations that embody the characteristics of this typology. A short precedent study facilitated an investigation of assorted architectural methods used to articulate spatial environments and construct user experience. With lighting, acoustics, materiality, and spatial configuration as primary aspects of investigation, a representation of possible approaches to the design of sensory spaces is established.

### Clement Space in the City (2017) | Dawn-joy Leong



FIGURE 17

An art installation designed for those on the ASD spectrum, Clement Space in the City uses soft materials, a neutral color palette and visual connections to create a space that is both inviting and also a space to decompress.



Sensory Fabrics



Semi-Enclosed Space



Transparent Materials

## A Space for Being | Reddymade

This large scale installation created a series of varying spaces that explored the idea of "... how different aesthetic experiences have the potential to impact our biology and well-being." The spaces created were carefully orchestrated to subject the occupants to different types of physical and mental states.



Lighting Techniques



Tactile Elements



Textures

## The SensoryPLAYSCAPE | Sean Ahlquist

This sculptural structure functions as a form of therapy for developing children with ASD. The "SensoryPLAYSCAPE" responds to touch and triggers projected images and sound across the tensile fabrics surface. Using complex programs the playscape helps develop connections between sight, sound, and touch.



Interactive



Scaled to the User



Light Projections



FIGURE 18



FIGURE 19

## Experimental Instillation

The intent of this installation was to design spaces for the wellness of those with Autism Spectrum Disorder in a higher education environment. Many students with ASD reported that on campus they wanted more accommodations, such as increased awareness of what ASD is, more sensory spaces on campus to recharge, and more acceptance of self-stimulatory behavior. This also correlates with the research findings that architecture can improve the attention span, behavioral temperament, and response time of those with ASD. Sensory stimulation can calm them down when factors such as acoustics, lighting, and tactile aspects are considered. This installation engages with these factors to create a space for all people to enjoy, but is specifically designed with ASD students in mind to recharge their senses.

Some factors that are important to consider are:

- Acoustic impact
- Kinesthetic elements
- relief from sensory overload
- Increased autism awareness
- Tactile (haptic) elements
- self-stimulatory possibilities
- perforated threshold
- encouraging social interaction
- Interactive environment

Healthcare studies the underlying challenges of ASD, and finds many sensory solutions to these problems. Students with ASD in higher education have called out a lack of accommodations provided for them, many of which overlap with the healthcare findings. By designing a relaxing, sensory space, this installation attempts to fill in some of the gaps in accommodation for higher education students that can be applied anywhere on or off campus.



FIGURE 20

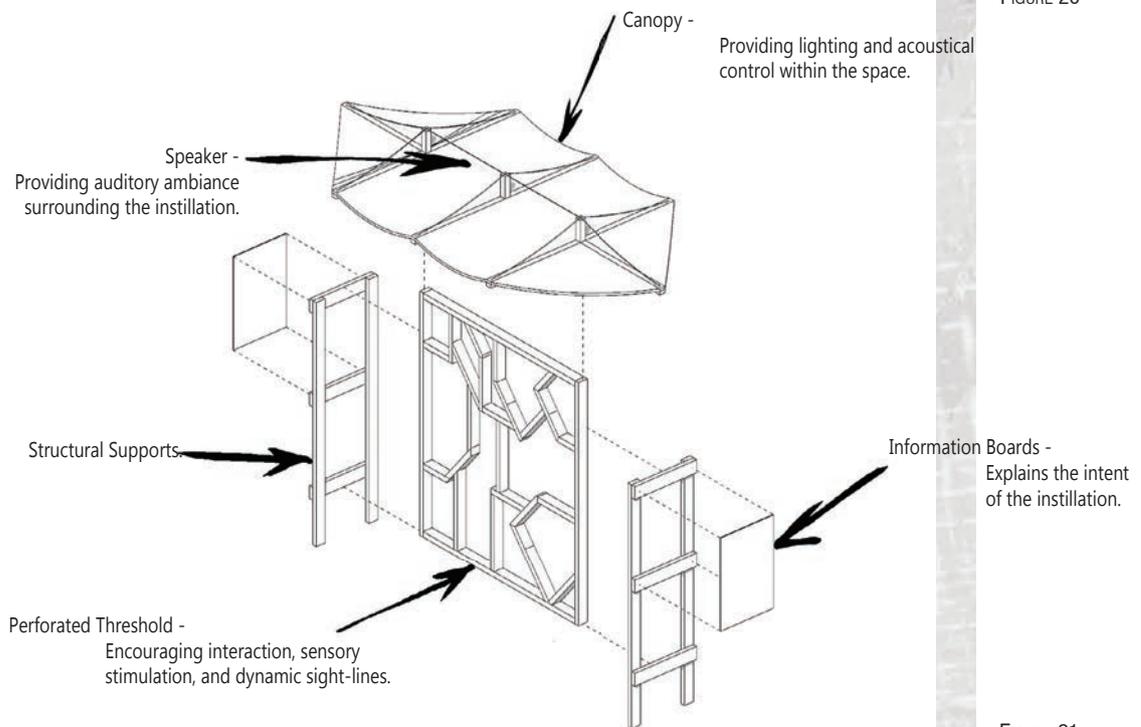


FIGURE 21



FIGURE 22

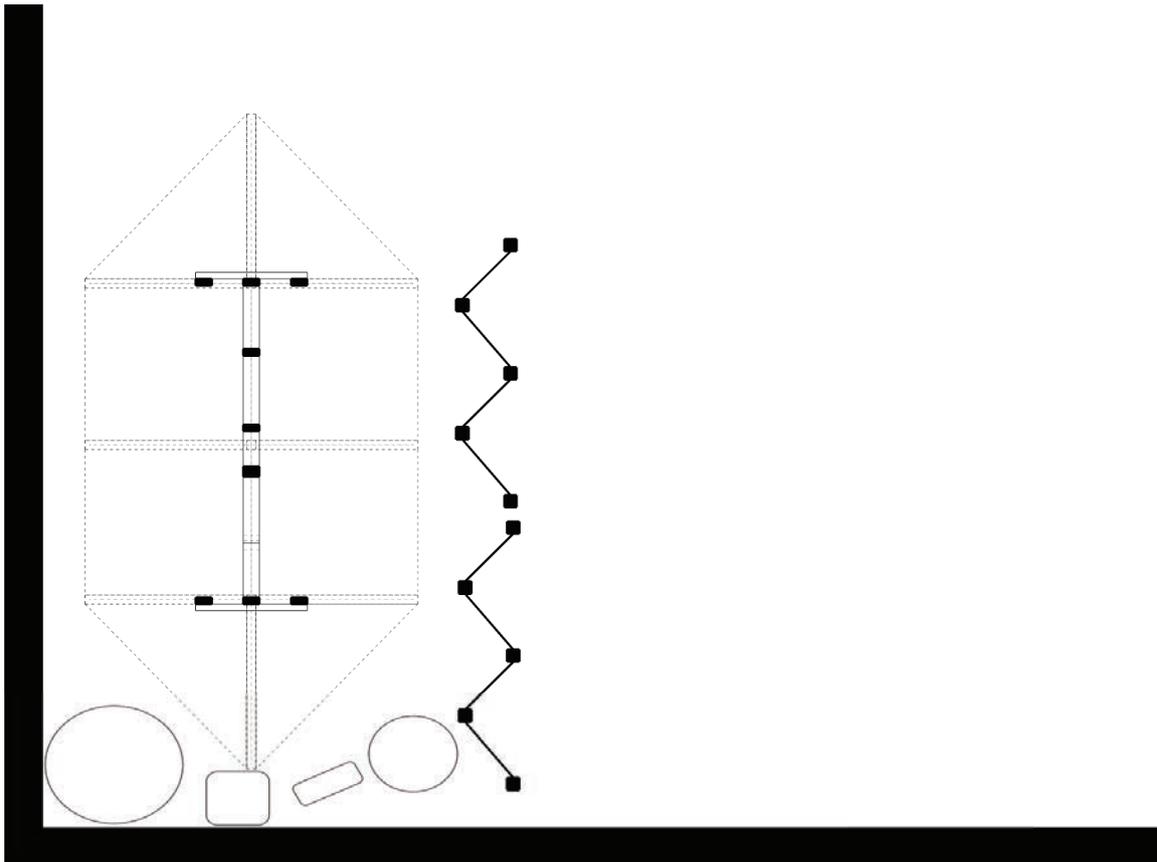


FIGURE 23



FIGURE 24

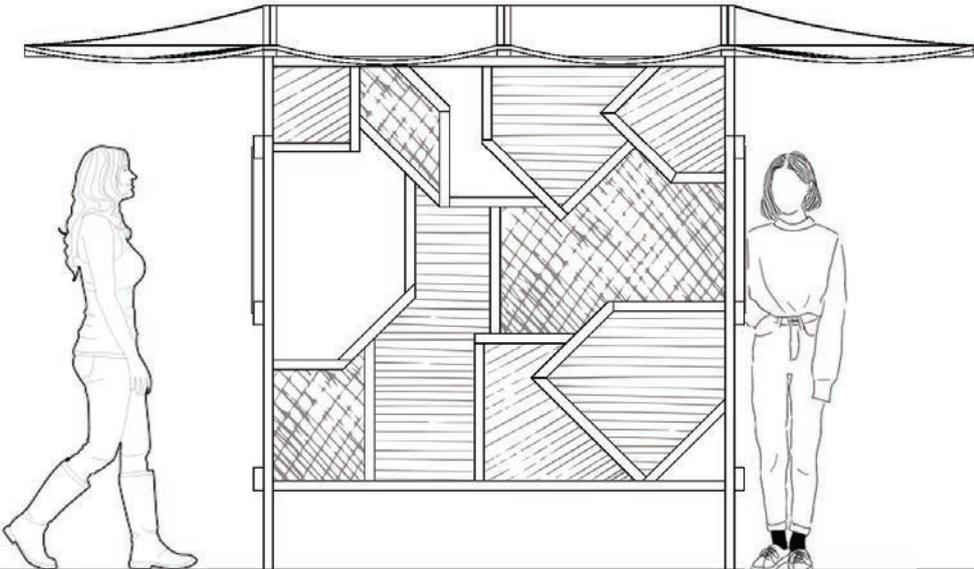


FIGURE 25



FIGURE 26



FIGURE 27

"It takes a village to raise a child. It takes a child with autism to raise the consciousness of the village."

Elaine Hall

# Meaning in Home

## Meaning in Home

For people with ASD, the home serves as a multifaceted tool used for administering care and structuring occupant comfort. The home allows for individual conditions to dictate a structure of approaches that can be used to alleviate minimize effects and reduce the responsibilities of caregivers.<sup>52</sup> Although the diverse nature of autism accounts for a wide range of conditions, similar ideologies can be maintained when theorizing modifications. These approaches harmonize to create a form of specialized environments that provide people with ASD the opportunity to live safer, more self-directed, and satisfying lives.<sup>50</sup> Success of these environments is only found in the personalization that can be implemented in this home setting.

When approaching the modification of a home, solutions for those with ASD fall within two primary criteria, invasive and non-invasive approaches. Invasive approaches are cost intensive and incorporate professional knowledge of strategies to create solutions within the home. Commonly encompassing large scale modifications such as; the removal or modification of interior walls to create unobstructed visual connection between spaces or the rounding of corners to reduce potential physical harm. Non-invasive approaches are minimally intensive and cost-effective, resulting in quick solutions to minor problems. Commonly expressed through minor modifications that increase safety and comfort such as covering electrical duplexes, adding gates around stairwells, or the use of specific colors on walls or furnishings. These primary criteria structure the beginning of a discussion and evaluation of options that caregivers have. To further facilitate this discussion, three conceptual practices appropriately outline core concepts of home modifications for people with ASD. (continued on next page)

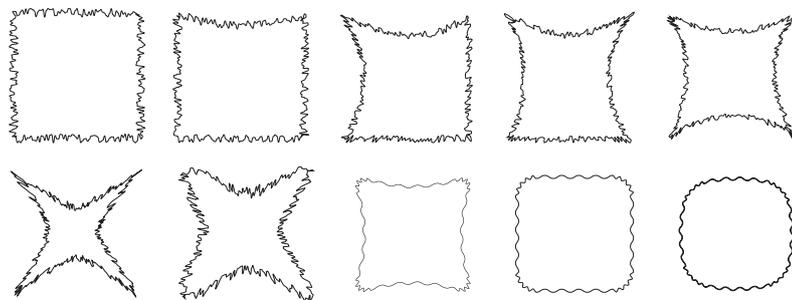


FIGURE 28



FIGURE 29

## Sensory Segmentation

Sensory segmentation enlists a response to stimuli to define spatial function, allowing for rooms within the home to be redefined. The reconfiguration of spatial planning in one of the first steps in implementing this metric. With non-invasive modifications to the structure itself, spaces begin to take a new form and occupancy based on their sensorial qualities and how the individual with autism responds to that stimuli. Similarly, the implementation of invasive approaches further develops a sensory compliant expression where spaces begin to intentionally stimulate or deprive specific stimuli. Regardless of methods used, the result is a variety of sensory experiences within the home, that allow for occupants to choose environments that they find most comfortable.

## Adaptability & Specificity

This metric brings to light the most pertinent aspect of a home for someone with ASD. A place of dwelling has the opportunity to be completely supportive of its occupants, any element can be added, altered, or removed to create a space that responds to the needs of individuals. In a non-invasive approach this relates to the selection and expression of furnishings and fixtures, from using a specific color to implementing a minimalistic style. With an invasive approach spatial expression can be redefined through finishes and structural changes, from installing resilient finishes to adding windows or soundproofing walls. Through recognition of the adaptability and specificity that the home allows for, occupants can define the environment to support wellbeing and comfort.

## Safety

Safety is the number one concern of parents and caregivers where minor modifications to the home have the potential to drastically improve the safety of occupants with ASD. This metric responds to common developmental difficulties associated with ASD, such as cognitive and motor-skill challenges. For example, certain individuals might be flight risks while others could have problems responding to pain. Non-invasive approaches incorporate aspects of childproofing, immediate hazards are given restricted access or removed from accessible locations. Invasive approaches utilize elements of architectural design and planning, allowing for layout and spatial form to be reconceived through a new perspective. This metric denotes the importance of safety from potential injury and the structuring of a safe environment for occupants to thrive in.



FIGURE 30

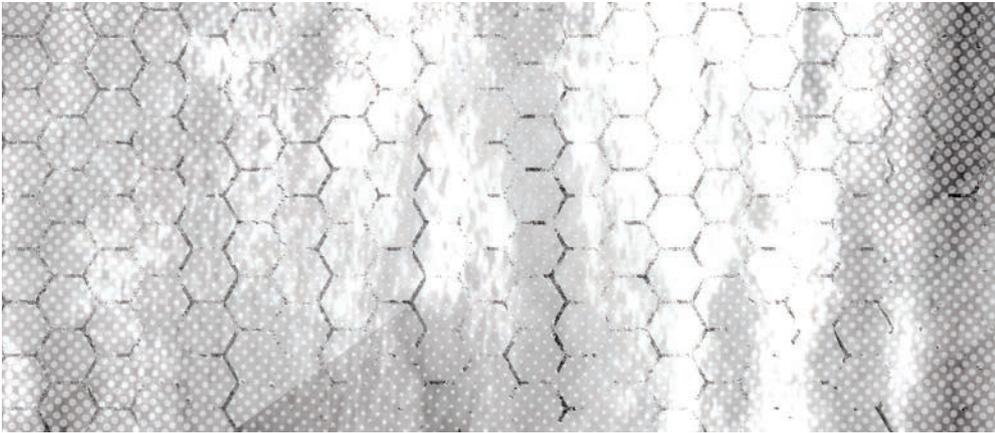


FIGURE 31

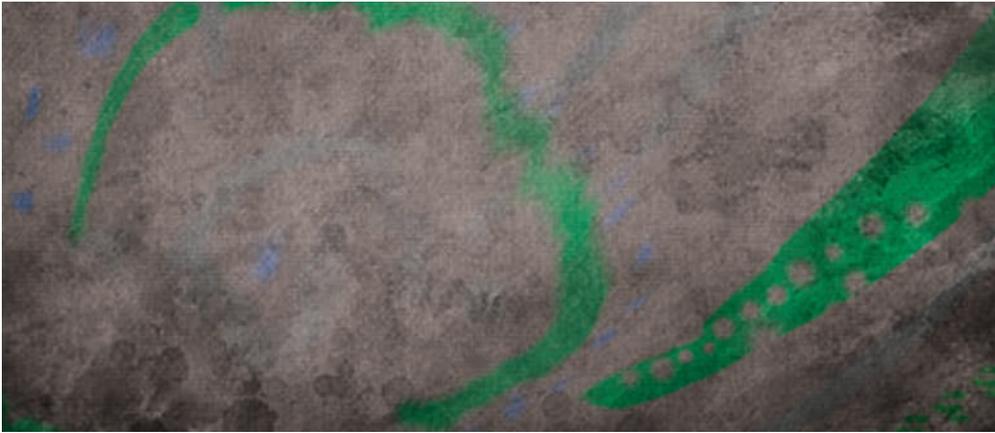


FIGURE 32

"It is never too late to expand the mind of a person on the autism spectrum."

Temple Grandin

# **Immersion Environments**

## Prompt/Introduction

To begin to explore architectural solutions to autism-friendly environments, a design charrette, was proposed. This charrette, would explore and represent possible methods of implementing autism-friendly design. The proposed solution will find success through the research and synthesis of ideas, allowing for research guided solutions to flourish. A critical element of this proposal will be the visualization of design strategies in the architectural articulation of space. The programming of the proposal will be dictated by the designer and used to justify the spatial form and layout. The intent of this design prompt is to investigate new approaches to autism-friendly design as an innovative form of investigative research.

## Response:

The proposed solution does not challenge individual autism-friendly design aspects rather it focuses on the intensity and use within a facility, drawing inspiration from immersion therapy and applying it to the designed environments within a building. With a programmatic setting of a multi-collaborative therapy practice that offers forms of social, motor, cognitive, applied behavior analysis, and affinity therapies. A primary focus within this facility are a series of three group therapy rooms that implement varying levels of autism-friendly design principles. This allows for a dynamic developmental environment that can challenge patient comfort and environmental relationships. The series of rooms transition from an autism-friendly environment to a neuro-typical space, allowing occupants to start therapies in controllable conditions with minimal distractions and progress to more distracting/less specialized spaces.



FIGURE 33

## Phase One

The first room in this sequence is staged as a controllable environment that adheres to autism-friendly design strategies. Through the use of adjustable lighting, an adaptable layout, and moveable furniture. A dynamic nature within this space creates an adaptable environment that responds to occupancy. Additionally, simple unambiguous spatial expression allows for a sense of occupant comfort and expectation within the environment. Granting occupants a sense of order and consistency as they define use and ambiance within the room.

## Phase Two

The second group therapy room introduces daylighting through the form of a central skylight. This allows for natural light to enter the space with minimum visual distractions and creates a dynamic uncontrollable element within the room. An accent wall with decorative acoustical paneling serves as a defining feature, grounding a directional style of organization. Although the room still includes autism-friendly elements these adjustments in form and expression shift the power of spatial definition away from the occupants.

## Phase Three

The third room in this series primarily features a direct connection with exterior conditions through four windows to a busy street, this creates a visual and auditory distraction from interior therapy activities. The ability for interior subdivisions within the room has been removed and replaced with a central shared workstation. Changing the room dynamic to functioning as one shared space that encourages social interaction and self-awareness/management.

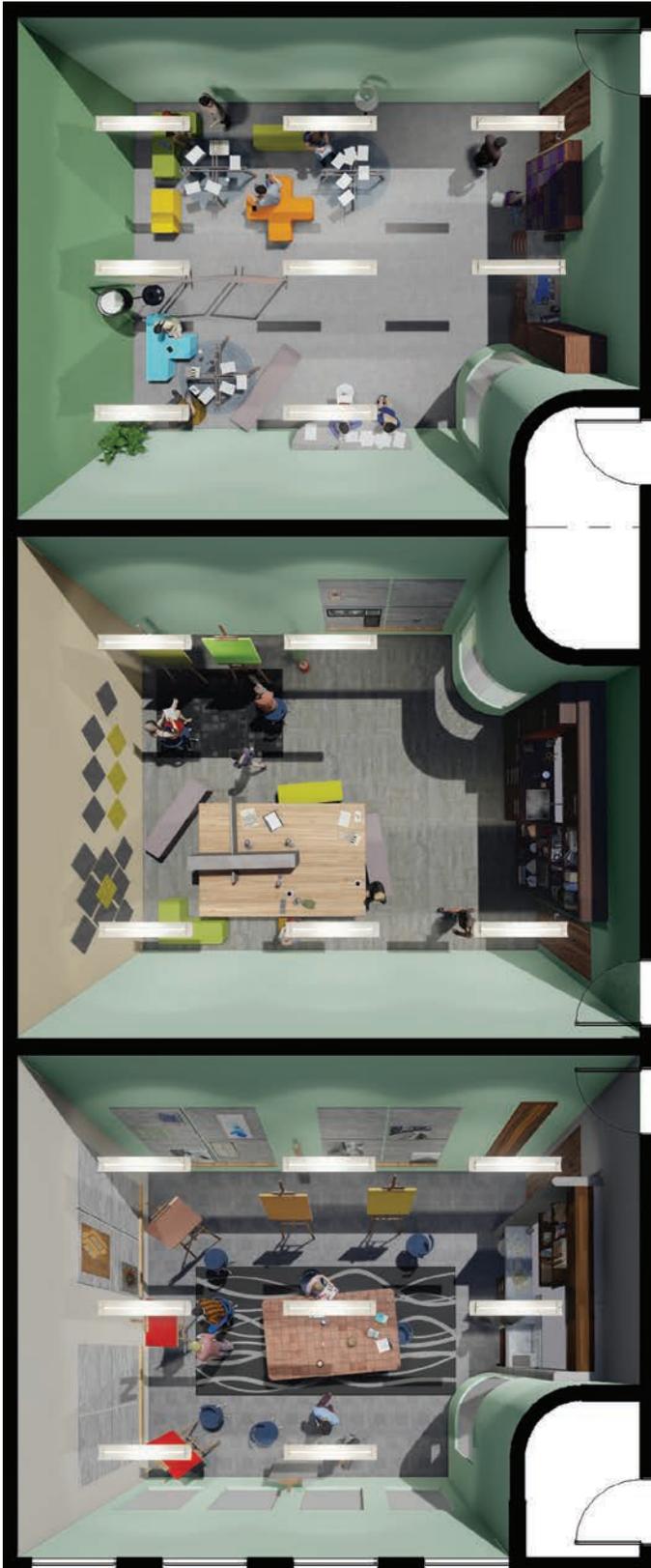


FIGURE 34



FIGURE 35 - 37

## Stereoscopic Panorama

Immersive technologies were investigated as an additional layer to this study requiring that each room include an immersive 360° rendering. This exploration allowed for aspects of spatial design and perception to be viewed through the lens of virtual reality technologies. Starting with one of the foundational aspects of virtual reality, the stereoscopic panorama grid [figure ##] structures a specific aspect ratio and layout allowing flat images to be mapped on a sphere. A variety of grid layouts allow for the creation of various environments and settings. Modern architectural modeling and rendering programs are capable of generating immersive imagery that can be viewed from any smartphone. Through immersive technologies conceptual spaces can be viewed and experienced, allowing for architects and clients to further develop and refine the built environment.



FIGURE 38

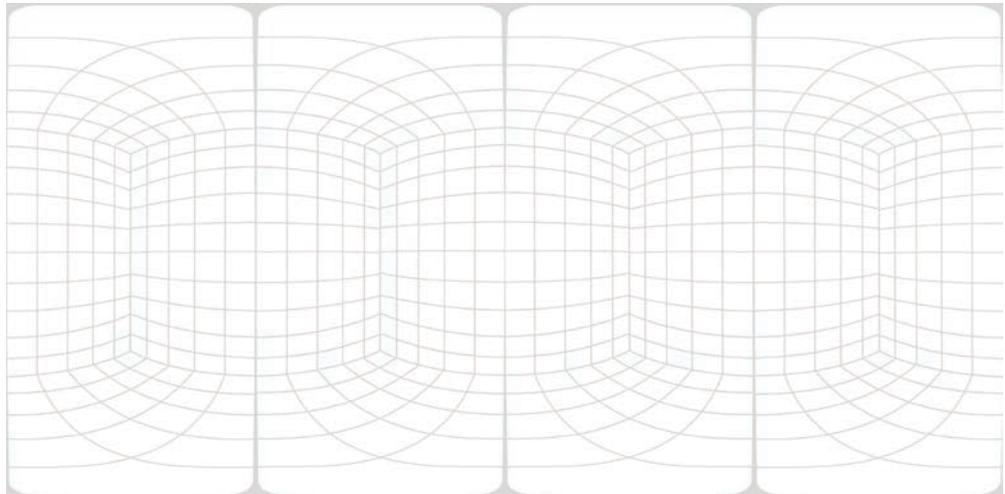




FIGURE 39



FIGURE 40



FIGURE 41

“What would happen if the autism gene was eliminated from the gene pool? You would have a bunch of people standing around in a cave, chatting and socializing and not getting anything done.”

Dr. Temple Grandin

## **Review of Expert Approaches**

## Christopher Beaver

-Designing Environments for Children and Adults with ASD

“Question everything and lead the way; once you give way to an inferior solution, you have lost.”



FIGURE 42

The performance occupancy and use of a building is strictly outlined in a project brief at the beginning of new projects. The architect is expected to foresee how a building will perform, who is going to use it, and how. When designing for PWA “the heart of the brief cannot be written down. It has to come from an understanding of the autistic mind...” Showing this profound knowledge and understanding Christopher Beaver starts to outline specific design issues that should be taken into consideration when designing buildings for people with autism. Listed below are the key aspects he has dealt with throughout his career. Mostly focusing on children with autism but are still relevant for adults.

### Acoustics –

- Influences the choice of materials and so the look and warmth of the building
- Noisy spaces are to be avoided
- Create a sense of calm (encouraging better behavior and a feeling of well-being)
- Bricks with raked joints - used sparingly (areas with no possibility of self-harm)
- Carpet – reduces impact of foot traffic, serves as acoustical support, provides opportunity for decorative treatments
- Ceiling – successfully used timber slats at 10mm apart with sound absorbing matt, timber provides warmth and can be left unfinished or stained.

### Ventilation –

- Open windows are an invitation for those with ‘escape’ tendencies
- High windows allow for cross ventilation, out of reach for escapees,
- Important to have access to fresh air
- Mechanical ventilation in bathrooms, should not allow for condensation on walls, go above the standards

### Heating –

- Avoid exposed radiators at all costs
- Underfloor heating is the preferred option. No sharp corners, provides comfort. Proper zoning is key. Care is required if furniture is to be fixed to the floor.

### Lighting –

- Ambience, flexibility, and overall quality is a main concern
- If budget allows a specialist lighting designer is an immense help
- Avoid flickering fluorescent lights
- Mood lighting encourages a ‘voluntary bedtime’

#### Color –

- Impacts the feel of the building
- There are neutral colors, calming colors, disturbing colors, and stimulating colors
- Find a good balance between common and private spaces
- Entertain the possibility of having occupants choose a color from an approved range

#### Planning and layout –

- Space and the 'sense of space' are critical factors
- Ceiling height has an important impact
- Sloped roofs and curved walls create a greater sense of space (also a more interesting space to move around in)
- Most difficult space is the corridor
- Redefine corridors as circulation space. Has to be an interesting space, should be multi-functional
- Turned into a social and activity space
- A simple layout with unfussy detailing and easily understood materials and colors is preferred
- Easy recognition of spaces and rooms is essential (through colors, materials, the form of the threshold)
- Curved walls help people move through the building

#### Maintenance –

- Two common approaches to this:
  - use materials that are virtually indestructible (tend to be unfriendly in appearance and costly to repair)
- Use friendly materials that are cheap to repair

#### Cleaning –

- FF%E has to be durable and easily cleaned

#### Outdoor spaces –

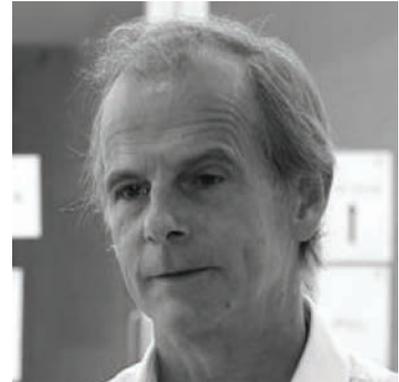
- An essential part of and individuals environmental awareness
- A secure space is a great asset
- Can provide PWA a sense of independence

## Simon Humphreys

-Creating Autism Friendly Spaces

“...alongside the prevailing architecture of the eye, there is the architecture of the muscle and skin.”

FIGURE 43



Simon Humphreys has developed a set of overarching concepts that can inform the design of autism-friendly spaces and environments. Quoting Juhani Pallasmaa “The ultimate meaning of any building is beyond architecture; it directs our consciousness back to the world and towards our own sense of self and being and makes us experience ourselves as complete embodied and spiritual beings.” Humphreys believes that this is specifically relevant to people on the autism spectrum considering that their sense of perception and experience of the environment is unique in a “multi-sensory” dimension.

### Calm and Order -

- Spaces should create low arousal and be calming in nature
- Serving as a backdrop for the introduction of stimuli assisting understanding

### Clarity and Simplicity -

- Clear simple solutions for spaces. Complexity can cause anxiety
- Spaces should have rhythm
- Fixed operation points can accommodate routine and structure

### Proportion -

- Proportional systems provide a sense of balance
- Beauty in harmony

### Restraint -

- PWA are sensitive to sensory stimuli and are capable of perceiving details unnoticed by others.
- Limit the number of materials, colors, and details in a space

### The senses -

- Address each sense on an equal basis
- Consider smell, touch, taste, and sound at the same level as sight
- Sight is the most dominant and fixed sense but this is not always the case with autism

#### Proxemics -

- The measure of personal spaces around the body
- Can be greater for those with autism
- Larger spaces that normal can accommodate this aspect

#### Movement -

- Design for easy non-confrontational movement
- Consider physical barriers (doors, thresholds) carefully

#### Flexibility -

- Allow for spaces to be defined by the occupants
- Adaptability

#### Materials -

- A limited pallet of natural materials
- Tranquility
- Robust, durable, and seamless
- Gentle stimulus

#### Observation -

- In the setting of caregiving and observation of patients
- Allow for discrete observation and safe private spaces

## Magda Mostafa PhD.

-The Autism ASPECTSS™ Design Index

“The concept of sensory environment is still central to the process of autism-friendly design. Discussion continues in autism literature about how sensory perception links to behavior. This feeds into the ongoing conversations around how to create environments for people with autism in the design world.”



FIGURE 44

Dr. Magda Mostafa PhD developed the first ever evidence-based guidelines in 2014 encompassing over a decade of research addressing built environments for autism. This framework is recognized worldwide and utilizes groundbreaking principles. “The index is based on the Sensory Design Theory, which hypothesizes that by altering the sensory environment using specific design interventions, as manifested through input from the built environment, autistic behavior can be altered positively” (Mostafa, M.).

### Acoustics -

- Background noise, echo and reverberation can be controlled with the acoustical environment.
- The range of control should vary based on use, function, and individual occupant needs.
- Should allow for a progression through levels of acoustical control (avoid the “greenhouse effect”)

### SPatial sequencing -

- Planning should respond to the preferred tendency of routine and predictability
- Coupled with the criterion of Sensory Zoning
- Seamless flow throughout a series of spaces
- Use of one-way circulation while minimizing distractions

### Escape space -

- A space of relief from overstimulation
- Sensory environment should be neutral and customizable

### Compartmentalization -

- Organize spaces of a building into compartments
- Clearly define functionality and sensory quality
- The threshold between compartments can be soft or subtle
- The sensory qualities of each compartment should be well established and clearly defined
- Allow for “sensory cues” to establish expectations for occupants (minimal ambiguity)

### Transitions -

- Serves as a form of palate cleanser between spaces
- Allowing users to recalibrate
- from one set of stimuli to the next
- Spaces can range from a sensory room to a distinct node

Sensory zoning -

- Organize spaces according to their sensory quality
- Allowable stimulus level, 'high-stimulus' and 'low- stimulus' areas

Safety -

- PWA may have an altered sense of environment or have a tendency to escape
- Proper considerations and preparations should be taken into account
- Examples: "hot water safety fittings and avoiding sharp edges and corners"

## Teresa Whitehurst

-Evaluation of Features Specific to an ASD  
Designated Living Accommodation

"Environments designed and created specially for children with ASD clearly have a beneficial impact not only on the children themselves but also upon those who care for them. This intricate interplay and delicate balance between environmental factors and human factors converge to create a space where children can be children – not just children with a disability."

FIGURE 45



Sunfield Research Institute was looking specifically at evidence-based design during the conception of a living environment for children with profound autism. Requiring GA Architects to incorporate a list of specific features that would impact occupant's wellness and comfort. After construction and occupancy Sunfield conducted an evaluation assessing the relationship between design and its impact on children and staff. Listed are the required criteria and compiled results from the evaluation:

### Curvilinear design -

- Curved walls facilitate movement

### Specific colors -

- Dr. Di Pauli's color research (Sunfield)
- Shades of pink and purple have positive impact
- Grey – neutral and non-reflective (neither positive nor negative impact)
- Facilitates a calmness throughout the facility

### Noise reduction -

- Ceilings incorporated sound-absorbent backings
- Brickwork with raked joints in some locations
- A variety of reverberation within the facility

### Non-fluorescent lighting -

- Soft non-flickering lighting
- Ample natural light

### Sensory Suite -

- Flexibility for individual preference (a sensory room or suite)
- Room is completely white
- Use of sensory equipment
- Space adapts for occupant

### Courtyard & Outdoor canopies -

- Safe outdoor environment
- Visual connection to interior spaces

Specific Floor Coverings -

- Durable and contributes noise reduction
- Custom flooring was selected for this center

Specific Bedroom Design -

- Color was selected by occupants from an approved list
- Rooms were designed to be womb-like
- Natural light from clearstory windows (operated for ventilation)

Under floor heating -

- Creates a "warm" environment
- Eliminates radiators
- Proper zoning optimizes performance allowing for ease of use

Circulation Space -

- Low level seating that double as storage
- Incorporates natural lighting and ventilation strategies
- Serves as a flexible space doubling as an activity and circulation space

## National Autistic Society

-Environment and Surroundings - Autism and Sensory Differences



FIGURE 46

Hypersensitive and hyposensitive sensory issues are common among those with autism impacting how they process and interact with the environment around them. "For example, autistic people may find certain background sounds, which other people ignore or block out, unbearably loud or distracting. This can cause anxiety or even physical pain." By thinking about the physical structure of a specific space furniture, fixtures, finishes, and equipment can be tailored to construct a calm responsive space.

### Color and patterns -

- Selection of specific colors can decrease anxiety
- Patterned finishes can be distracting or "cause people to become fixated"
- Calming colors such as cream and soft furnishings without patterns tend to yield better results

### Lighting -

- Avoid fluorescent or harsh lighting
- Use soft lighting whenever possible
- Adjustable lighting is also beneficial

### Curtains and blinds -

- Avoid using slatted blinds (can be distracting)
- Curtains are a better option (blackout curtains for hypersensitivity to light)

### Noise -

- Some PWA have difficulty filtering out noises
- Carpet or other acoustical support furnishings are recommended
- Can help create a feeling of warmth

### Smells -

- Respond to a hypersensitivity to smell
- The use of a "background fragrance" can block unwanted smells.

Safety -

- PWA have little of no awareness of danger
- Incorporate design concepts the respond to this
- Locks on doors, restricted access to electrical sockets, etc..

Sensory rooms -

- Create a calm and relaxing environment
- A budget option is a sensory bag or basket
- Can be a screened off portion of a larger room

Providing structure and routine -

- Visual supports for communication and establishing structure
- Educational facilities use the principles of SPELL and TEACH

**Dr. Christopher N. Henry**  
-Designing for Autism: Spatial Considerations

“...most architects base their spatial design decisions on anecdotal evidence or observational studies that lack the methodological rigor needed to be considered reliable.”

FIGURE 47



Christopher Henry has found conflicting recommendations among nearly every aspect of designing for individuals with autism from lighting, acoustics, tactile, or olfactory design to spatial considerations. “...individuals with autism struggle with understanding their body in relation to itself, the greater environment, and planning their movements through it.” It is a reasonable assumption to believe that architects, as space makers, have the responsibility and potential to help those with autism. Within the scope of spatial planning, should spatial proportions be intimate or do larger areas and higher ceiling height promote occupant comfort. Both approaches make justified assumptions and documented studies exist supporting each claim (although the studies lack a certain rigor). Flexibility between spaces appears to be a common solution to this dilemma “...but how much flexibility and diversity is too much?” Spaces that accommodate many functions tend to not serve any one function well. Similarly, the treatment of thresholds is a complex concept and similar considerations need to be addressed.

Spatial considerations -

Concepts of spatial planning -



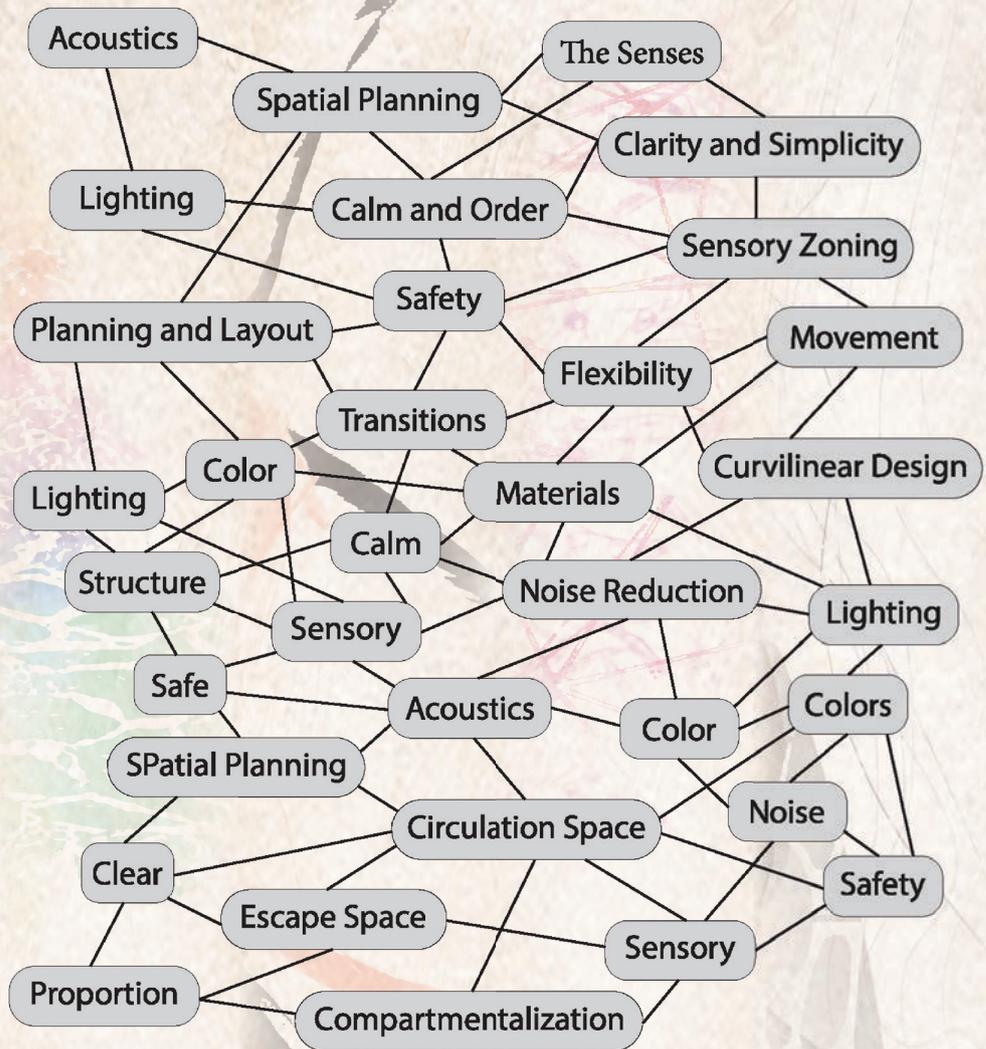


FIGURE 48

Composition

Threshold

Essence

Safety

## **Synthesis into Framework**

## Composition of Space and Form

Early in the planning and design process of a building. Preliminary layouts and schematic planning diagrams begin to shape the form of the structure. This process is guided by design prompts and requirements that stipulate organizational layout and spatial planning. To supplement this process, the composition of space and form serves as a design metric. This adds another layer of complexity that advocates for autism-friendly design ideology. By using these design metrics, prompts, and requirements a shift priorities begins, which allows for the building to respond to a new set of criteria. Through this metric, more considerations are taken into account than solely the relationship between programmatic functions throughout a building. Additional components such as minimal distractions between spaces, transition spaces, and zoning spaces based on stimulation. Structure important criteria that can further define spatial organization. Occupant experience in relation to the program of a space should inform the planning process by stringing together a sequential series of spaces that compose the building. This can incorporate the sequence of entry onto the site, as well as the progression into the building. Through this metric, the composition and planning of a facility begins to reflect an informed approach. This serves as the first step in creating a foundation that enables the implementation of autism-friendly design.

This metric is informed from:

Dr. Magda Mostafa - Spatial Sequencing

Christopher Beaver - Planning and Layout, Sense of Space

Simon Humphreys - Calm and Order

Dr. Christopher N. Henry - Spatial Planning

Kyle Ezell - Clear

NAS - Structure and Routine

FIGURE 49



## Threshold

Because of the nature of ASD, transitions between environments, routines and activities can be difficult. For architectural form to resonate with this facet of autism, an approach to create a gradient of thresholds will assist in transitions in activities and spaces. This metric evokes a new approach towards the thresholds between functions and spaces. Within this new approach, transition spaces will help occupants adjust while moving throughout a facility functioning as more than simple circulation and interstitial spaces. This metric incorporates methods such as calming elements and multi-functional spatial prescriptions, which results in the harmony of the building into a blending of spaces with seamless transitions. This new approach to thresholds advocates architects to design seamless transitions between programmatic nodes.

There are two styles of solutions advocated for within this metric. The first is the application of a multi-functional in-between space that doubles as circulation. In this tactic, seamless transitions weave spaces together moving occupants through a continual unfolding environment. The second solution allows for a moment of adjustment between larger programmatic nodes, creating a structured phasing of environments. This allows users to recalibrate themselves before entry into different spaces. Both solutions place emphasis on occupant comfort and mental preparation as they experience and move throughout a facility.

This metric is informed from:

Simon Humphreys – Proportion, Movement, Flexibility

Magda Mostafa – Compartmentalization, Transitions

Teresa Whitehurst – Curvilinear design Circulation Space

“Thresholds should be as elegant and elusive as the veil between life and death”  
Unknown

FIGURE 50



## Essence of Environment

The design of spatial form and articulation of spatial expression define occupancy and function, establishing the essence of the built environment. This could be perceived as dictations primarily deriving from interior designers and occupant use with little input from architects. This metric, places a significance on this aspect in the development and conceptualization of design approaches. The prioritization of components that contribute to physical environments and spaces can theoretically be intentionally utilized to implement autism-friendly design strategies. By approaching programmatic definitions in a project specific manner, stipulations on criteria guides decisions on the individual metrics of materiality, lighting, acoustics, rhythm, and configuration of spaces. These decisions are articulated through a sensory perspective, within the scope of a specified spatial volume. Utilizing organizational strategies to construct harmonized environments, this metric constructs the experience within artificial environments.

This metric is informed from:

Christopher Beaver – Acoustics, Lighting, Color

Simon Humphreys – Calm and Order, The Senses, Materials

Magda Mostafa – Acoustics

Teresa Whitehurst – Colors, Noise Reduction, Lighting, Sensory,

Kyle Ezell – Calm

NAS – Color, Lighting, Noise, Sensory

FIGURE 51



## Safety

Safety is a number one concern of parents and caregivers of people who live with autism. This metric reflects the significance of occupant safety and wellness as an essential component that is necessary in the conception and construction of any facility. It can be implemented through design strategies, allowing the form of the building to adhere to occupant needs. Specific design strategies inform the design process through diverse accessibility approaches and physical alterations to the fabric of spaces to minimize potential harm. Similarly, programmatic adaptations can adjust programmatic structure and specifications to respond to the diverse needs of occupancy. The prioritization of occupant safety empowers facilities to secure healthy environments for occupants to thrive in, lowering the risk of physical trauma and accommodating the diverse needs of people with autism.

This metric is informed from:

Magda Mostafa – Safety

Kyle Ezell – safe

NAS – Safety

FIGURE 52



"If they can't learn the way we teach, we teach the way they learn."

Dr. O. Ivar Lovaas

## **Case Study Analysis**

# Rubric for Subjective Analysis

## Composition



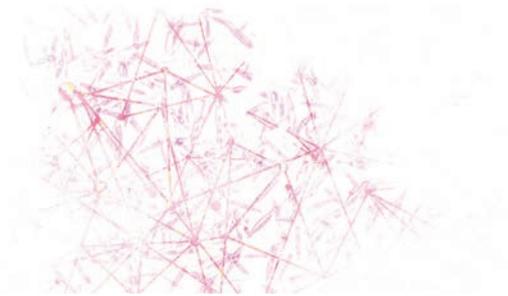
- 1 Spatial and programmatic planning of the facility adheres to typical standards. Architectural expression at a building scale reflects common practices.
- 2 Spatial and programmatic planning of the facility begins to implement a sensitive approach to occupant comfort, wellness, and experience.
- 3 Spatial and programmatic planning of the facility implements a minor inclusion of autism-friendly design practices and strategies.
- 4 Spatial and programmatic planning of the facility expresses specific strategies that address occupant wellness and comfort.
- 5 Spatial and programmatic planning of the facility clearly and successfully implements autism-friendly design practices and strategies.

## Threshold



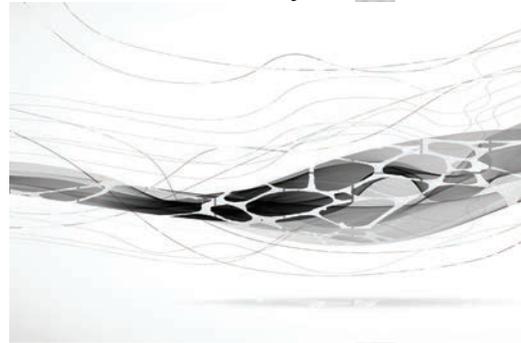
- 1 Interstitial space, circulation corridors and thresholds adhere to typical standards and reflect common practices.
- 2 Interstitial space, circulation corridors and thresholds begin to implement a sensitive approach to occupant comfort, wellness, and experience.
- 3 Interstitial space, circulation corridors and thresholds implement a minor inclusion of autism-friendly design practices and strategies.
- 4 Interstitial space, circulation corridors and thresholds express specific strategies that address occupant wellness and comfort.
- 5 Interstitial space, circulation corridors and thresholds clearly and successfully implement autism-friendly design practices and strategies.

## Essence



- 1 Materiality, lighting, and acoustics adhere to typical standards and reflect common practices.
- 2 Materiality, lighting, and acoustics begin to express a sensitive approach to occupant comfort, wellness, and experience.
- 3 Materiality, lighting, and acoustics expresses a minor inclusion of autism-friendly design practices and strategies.
- 4 Materiality, lighting, and acoustics express specific strategies that address occupant wellness and comfort.
- 5 Materiality, lighting, and acoustics clearly and successfully represent autism-friendly design practices and strategies.

## Safety



- 1 Occupant safety is expressed in typical standards and reflect common practices.
- 2 Occupant safety is expressed in a sensitive approach complying to ideas of comfort and wellness.
- 3 Occupant safety expresses a minor inclusion of autism-friendly design practices and strategies.
- 4 Occupant safety is expressed through specific strategies that address occupant wellness and comfort.
- 5 Occupant safety clearly and successfully represents autism-friendly design practices and strategies.

## Abu Dhabi Autism Centre Simon Humphreys

### Composition of space and form: 5

Facilitates occupancy through an uncomplicated layout and special consideration such as each classroom having an attached lavatory or the inclusion of therapeutic consultation rooms.

### Threshold: 5

A unique approach to circulation space where the shape of the building guides occupants seamlessly throughout the facility.

### Essence of Environment: 3

The selective materiality creates a calming sterile backdrop for a clean expression of spatial form accommodating occupant perception.

### Safety: 4

Occupant safety is primarily addressed through programmatic functions and a stark threshold that surrounds the building.



FIGURE 53

FIGURE 54

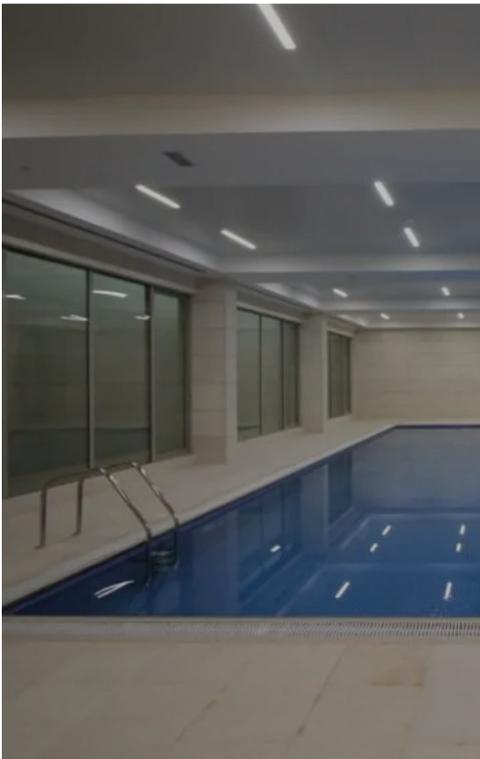


FIGURE 55

FIGURE 56

## Debra Ann November Wing, The Lerner School for Autism Westlake Reed Leskosky

### Composition of space and form: 4

Through an integrated approach of medical research and educational functions this facility weaves together highly specialized environments in a organized manor.

### Threshold: 2

Typical approaches towards circulation facilitate the need for progression through the facility but lack a innovative expression that responds to occupancy.

### Essence of Environment: 5

A highly refined selection of materiality, lighting, and acoustics creates a range of inhabitable spaces with clear programmatic designation.

### Safety: 4

With medical and educational practices woven into the fabric of this facility an intimate programmatic relationship provides structures occupant safety.



FIGURE 57



FIGURE 58



FIGURE 59



FIGURE 60



FIGURE 61



FIGURE 62

## The Pearns National Centre for Autism Education Penoyre & Prasad

### Composition of space and form: 5

The structure within this facility allows for a sequencing of spaces in a logical order with appropriate programmatic adjacencies and inclusions.

### Threshold: 5

Transition spaces serve a dual purpose and blend programmatic functions together while maintaining clear intended use. This is not only in plan but also in section allowing for the second level to interact with the first.

### Essence of Environment: 4

An interior expression of the roof allows for ample access to natural daylighting and acoustical support, while neutral material selection structures a calming environment.

### Safety: 3

Occupant safety is intertwined with programmatic divisions that are expressed within the facility.



FIGURE 63

FIGURE 64



FIGURE 65

FIGURE 66

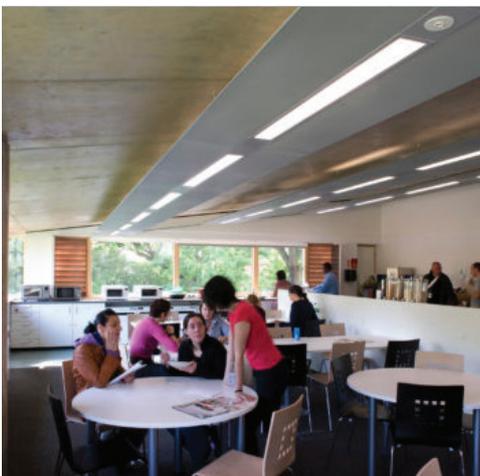


FIGURE 67

## Sunfields Rowan and Oak House

### GA Architects

Composition of space and form: 5

The programmatic approach establishes routine and an organized structure within the facility catalyzing the implementation of autism-friendly/sensory-sensitive solutions.

Threshold: 4

Interstitial spaces are broken up into transitional spaces that allow for adjustment and multifunction spaces that seamlessly transition occupants between nodes.

Essence of Environment: 5

A diverse range of materiality, lighting, and acoustical expression compliment spatial forms within this facility, utilizing a unique approach of allowing for occupants to define spatial expression.

Safety: 5

Architectural responses to safety such as visual connection between spaces and curvilinear elements support staff and caretakers.



FIGURE 68

FIGURE 69



FIGURE 70



FIGURE 71



FIGURE 72

## New Struan A Centre for Autism Aitken Turnbull Architects

Composition of space and form: 5

Clear programmatic organization with the incorporation of autism-friendly design strategies.

Threshold: 4

Visually connected corridor spaces integrate alcoves for in-between gatherings as well as higher volumetric expression.

Essence of Environment: 4

A signature roof organizes lighting strategies throughout the facility, while a neutral palette expresses pops of color to signify meaning.

Safety: 4

Occupant wellness is maintained through organizational strategies, autism-friendly design aspects, and programmatic definitions.



FIGURE 73



FIGURE 74

FIGURE 75



FIGURE 76

"Autism . . . offers a chance for us to glimpse an awe-filled vision of the world that might otherwise pass us by."

Dr. Colin Zimbleman, Ph.D.

# Universal Design Discussion

## Sensory Sensitive

Architectural approaches that respond to individuals with ASD manifest in both psychological and corporeal aspects. This duality creates a totality of considerations through the perspective of occupant relation with the built environment. Autism-specific architecture accommodates neuro-diverse individuals striving to minimize discomfort and allow for the individual development. The psychological approach engages design through sensory sensitive attributes, which are deeply related to an individual's sensory processing capacity. Sensory processing is the method by which the nervous system receives, processes, and responds to stimuli.<sup>76</sup> In this approach phenomenological aspects of space-making are engaged to facilitate the design of sensory sensitive environments where a planned sensory experience is fabricated. The corporeal approach is expressed through designed spaces and programmatic modifications, prioritizing occupant interaction through the built environment. This is guided by aspects of cognitive and motor skill ability, allowing the articulation of spaces to resonate with occupant difficulties and facilitating wellbeing.<sup>75</sup> Autism-specific architecture represents highly specialized environments that are custom-built to control the sensory environment providing comfort for people with ASD and enabling skill acquisition.

### The Seven Sensory Systems<sup>76</sup>

Vision - The faculty of seeing

Hearing - The faculty of perceiving sound

Vestibular system Olfaction (the sense of smell) - Refers to structures within the inner ear that detect movement and changes in the position of the head.

Gustation (the sense of taste) - Perceiving the sensation of a soluble sensation caused in the mouth and throat by contact with that substance

Tactile system - Perceiving touch, pressure, pain, temperature

Proprioceptive system - Perceiving stimuli produced within an organism, especially relating to the position and movement to the body

FIGURE 77



## Neuro-Typical

In the neuro-typical approach architects design spaces that emulate standard design practices, structuring real-world environments. This approach immerses individuals with ASD in conventional stimuli, allowing overstimulation and discomfort to affect occupant experience and interfere with development. This is done in the interest of encouraging the development of the ability to adjust to overstimulation that is prevalent in everyday life [henry]. The neuro-typical approach is grounded in a methodology of guided adaptation, fostering individual development.

Christopher N. Henry wrote -

“Those concerned with sensory issues are split on some issues. Some say we should limit daylight and exterior views, keep ceiling heights low and spatial volumes small, use restrained details, subdued colors, and reduce acoustical levels. Others advocate for high ceiling heights, large spatial volumes, and high levels of daylight with plenty of views to the outside. Still others disagree with catering to sensory needs altogether. They point out that individuals with autism struggle generalizing skills, and designing sensory heavens can do more harm than good. Thus they argue for autism classrooms, schools, and homes that mimic all the colors, sounds, lighting, and spatial volumes of “neuro-typical” environments.”

FIGURE 78



## Spectrum Spaces™

One proposed solution to these two very different approaches is Magda Mostafa's Spectrum Spaces™. This is currently unpublished research about an approach to designing for people with ASD within a universal language. Mostafa wrote "It looks at a diverse continuum of solutions moving across the autism-specific to the neuro-typical approach." In this approach, design strategies are applied along a spectrum, incorporating different levels of application based on occupant needs. Through linking both theories into one harmonized methodology, this metric guides design decisions towards a refined range of environments. This gradient of spaces provides an integrated opportunity for secure and sensitive individual development as well as an encouraged growth of sensory processing skills.



FIGURE 79

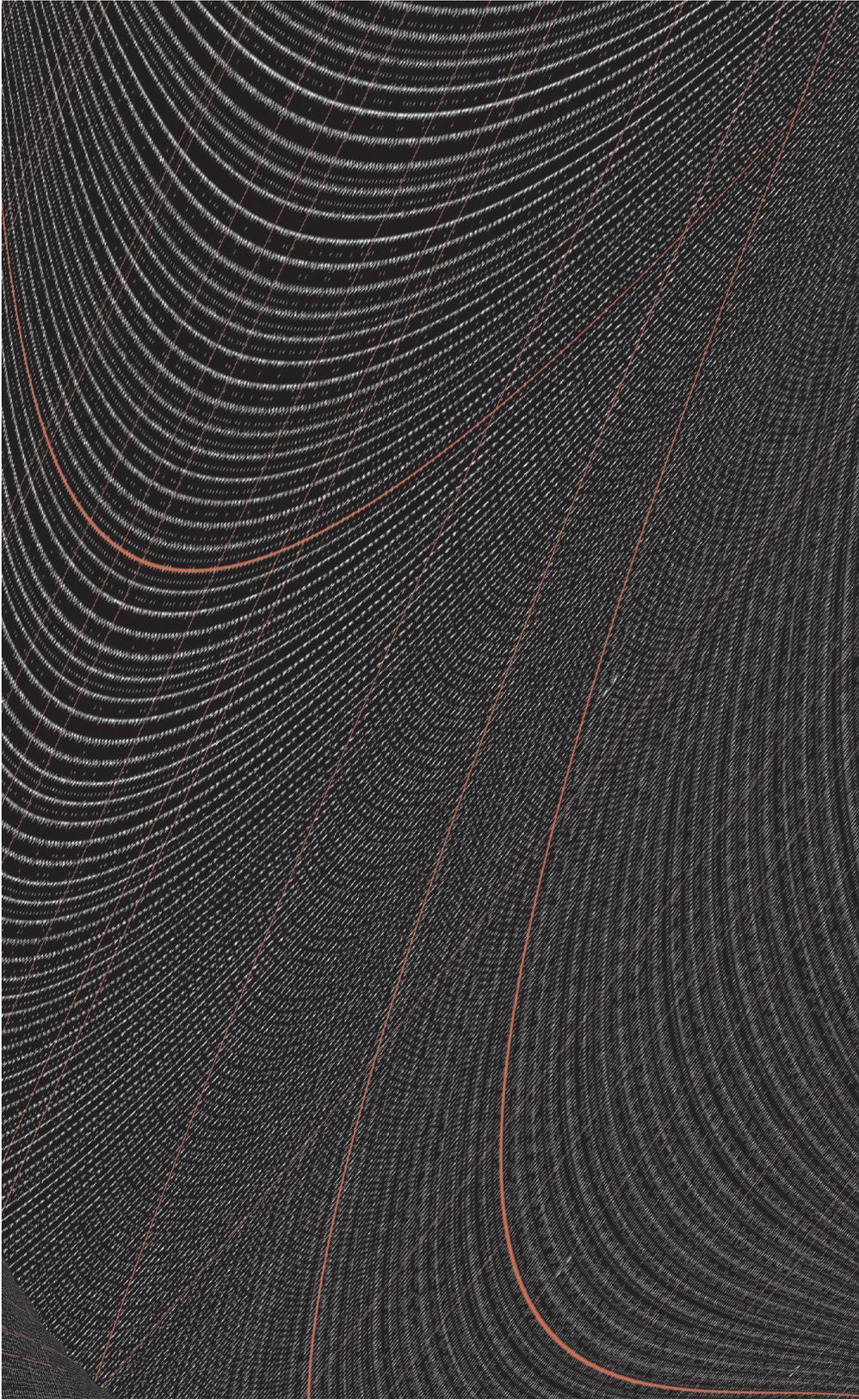


FIGURE 80

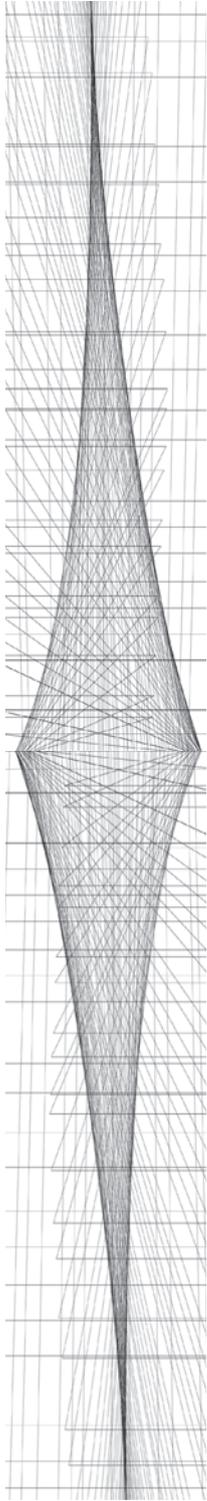


FIGURE 81

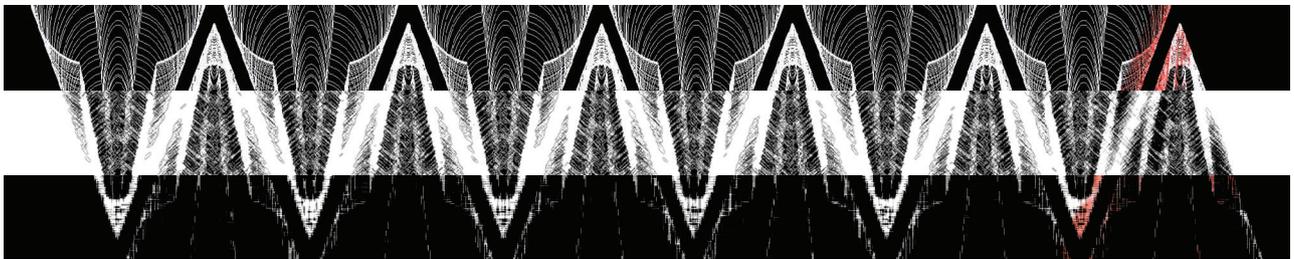
## Rigor Behind Research Methods

To connect architectural form to autism-friendly occupant requirements, strategic approaches and design strategies have been developed (sensory-sensitive + neuro-typical). However, the diversity found in case studies and established design frameworks creates a moment of uncertainty in the selection of a proper method. The existence of the variety found in these sources is either the result of a reflection of the diverse conditions found in people with ASD or a lack of methodological research informing correct solutions. Christopher N. Henry acknowledges the existence of a gap between ASD and informed design practices, claiming a lack of rigor used in research settings disallows informed spatial design.<sup>61</sup> To resolve this disconnect a collaboration of cross-disciplinary research will permit studies to investigate innovative solutions grounded in quantifiable data.

## The Black Box Research Environment - A Proposal

The establishment of a rigorous set of standards used for the research and analysis of occupant comfort within specific environments would allow for informed spaces backed by more than just observational studies. The Black-Box research environment is the proposal for a space that is purely designed to test research hypotheses integrating cross-disciplinary practices. This research environment would take the form of a moveable installation that travels to new locations to evaluate research participants, allowing for the same set of control standards to be utilized across a significant geographic region. A major component within this proposal is the integration of medical diagnostic tools as a means of obtaining quantifiable results that inform research observations. Within the space the configuration, acoustics, furnishings, lighting, and finishes would all be adaptable to suit research needs and test evolving assumptions. Additionally, a 'palette censer' room would be used by research participants before entry into the space as an attempt to eliminate outside factors. This proposal symbolizes a rigorous approach towards achieving informed architectural environments.

FIGURE 82



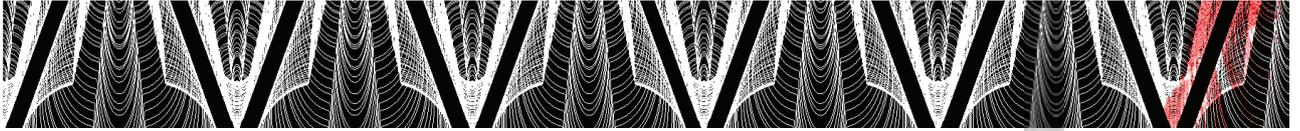


FIGURE 83

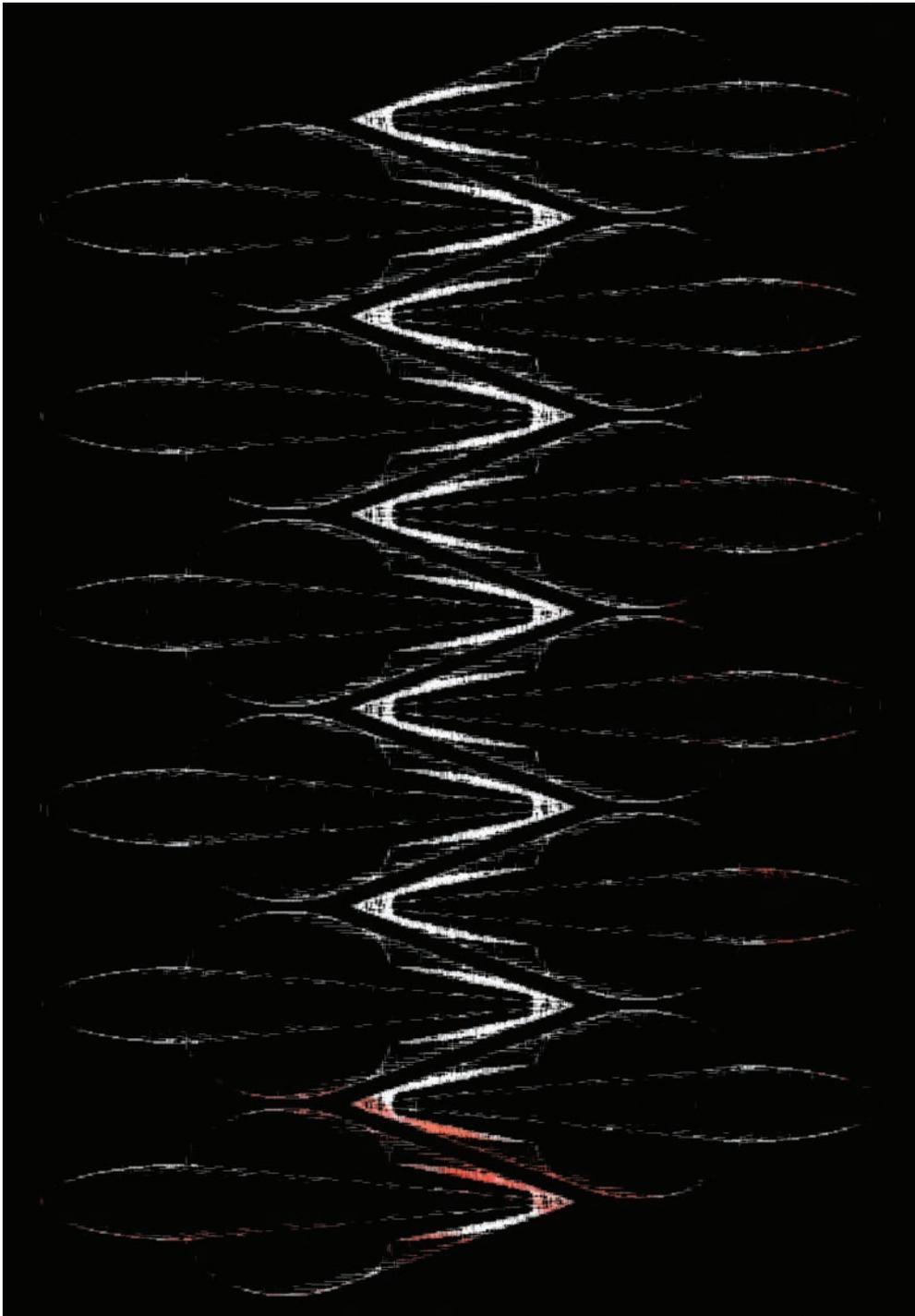


FIGURE 84

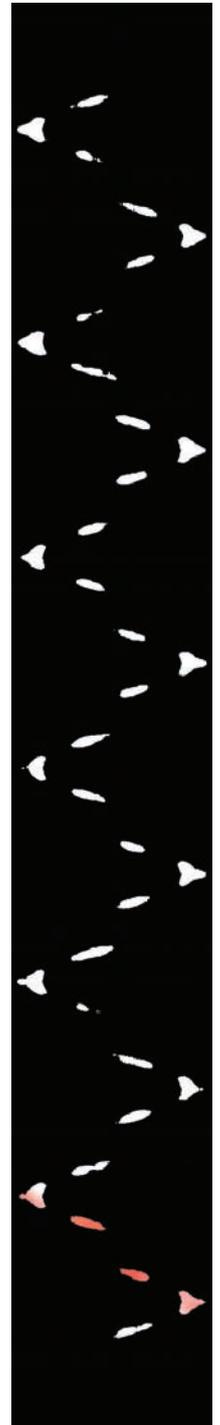
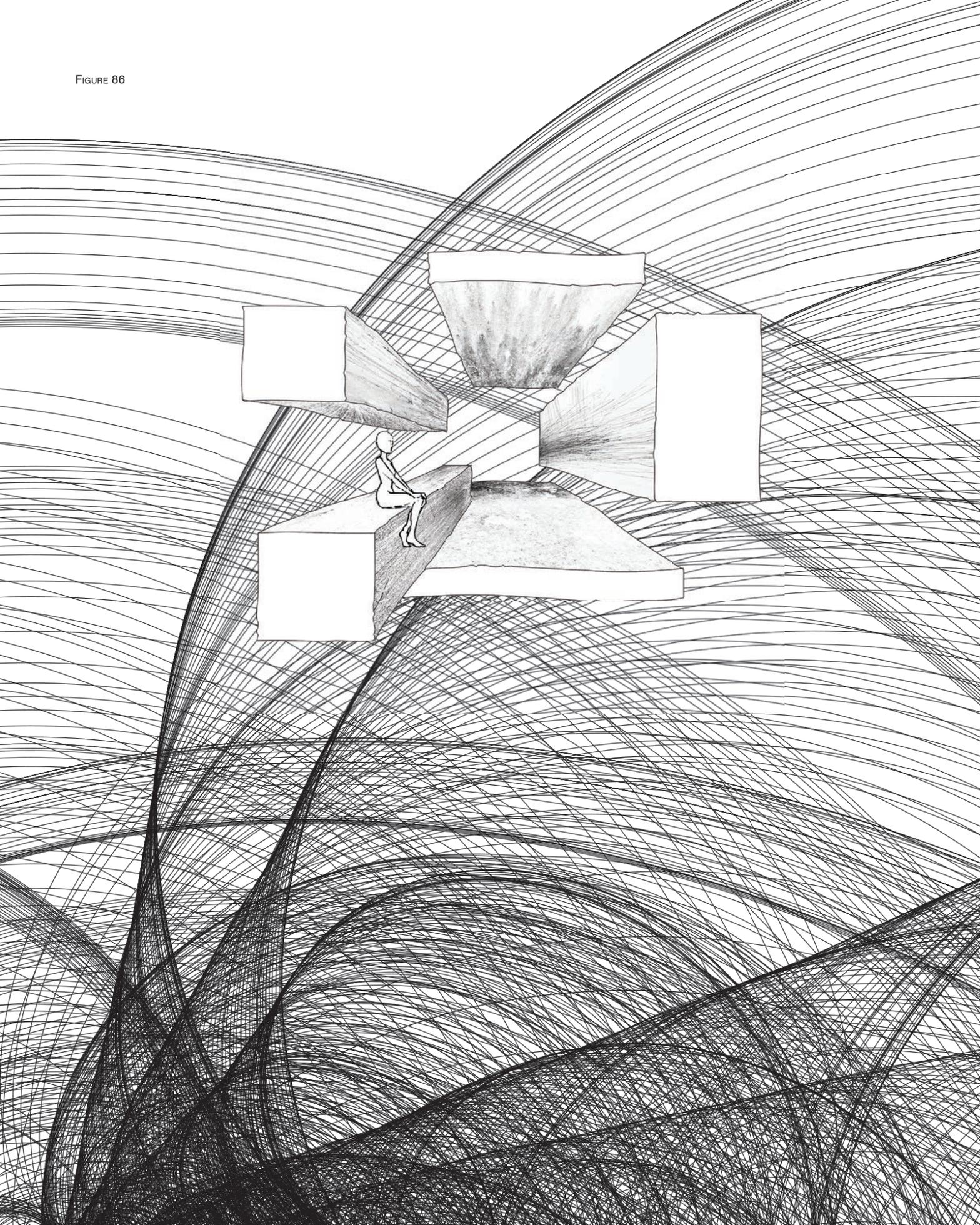


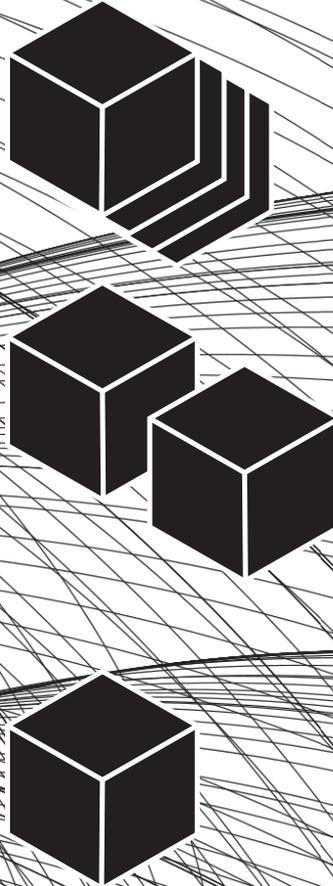
FIGURE 85

FIGURE 86



"The individual, finally, is decentred in a sense from himself. He has instruments that place him in constant contact with the remotest parts of the outside world... The individual can thus live rather oddly in an intellectual, musical or visual environment that is wholly independent of his immediate physical surroundings."

- Marc Augé



"I've learned that every human being, with or without disabilities, needs to strive to do their best, and by striving for happiness you will arrive at happiness. For us, you see, having autism is normal—so we can't know for sure what your 'normal' is even like. But so long as we can learn to love ourselves, I'm not sure how much it matters whether we're normal or autistic."

Naoki Higashida

# Conceptual Building

## Concept

The objective of the proposed building will be to structure an integrated experience through spatial design and programmatic functions. This facility fosters an approach to autism-friendly design that integrates people with ASD and the general population. In turn, this creates an environment that advocates for an educational awareness and understanding of ASD through programmatic prescriptions and specific design strategies. To achieve this integration of occupancy, the programmatic functions need to include a public attraction, occupational component for people with ASD, and educational elements. Additionally, the manifestation of autism-friendly design strategies will be interwoven with neuro-typical spaces as a reflection of the intended occupancy. This will test and demonstrate concepts found in the research, which will serve as an example of how these findings can be applied.

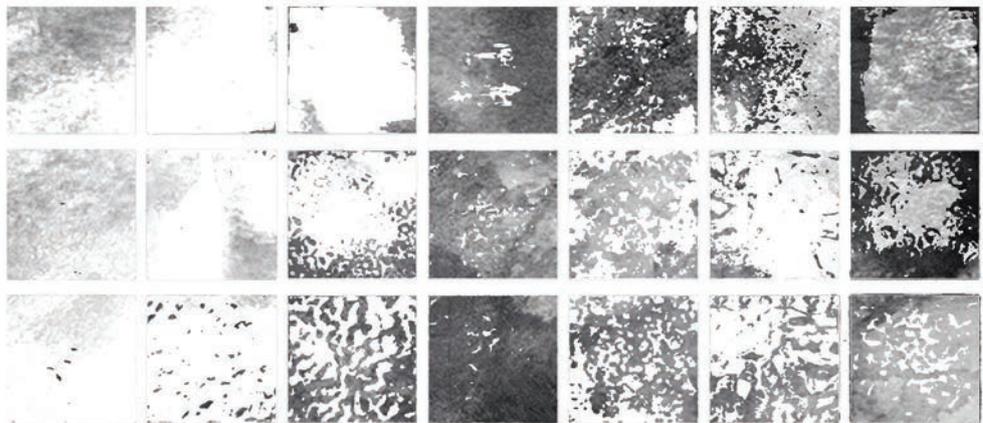


FIGURE 87

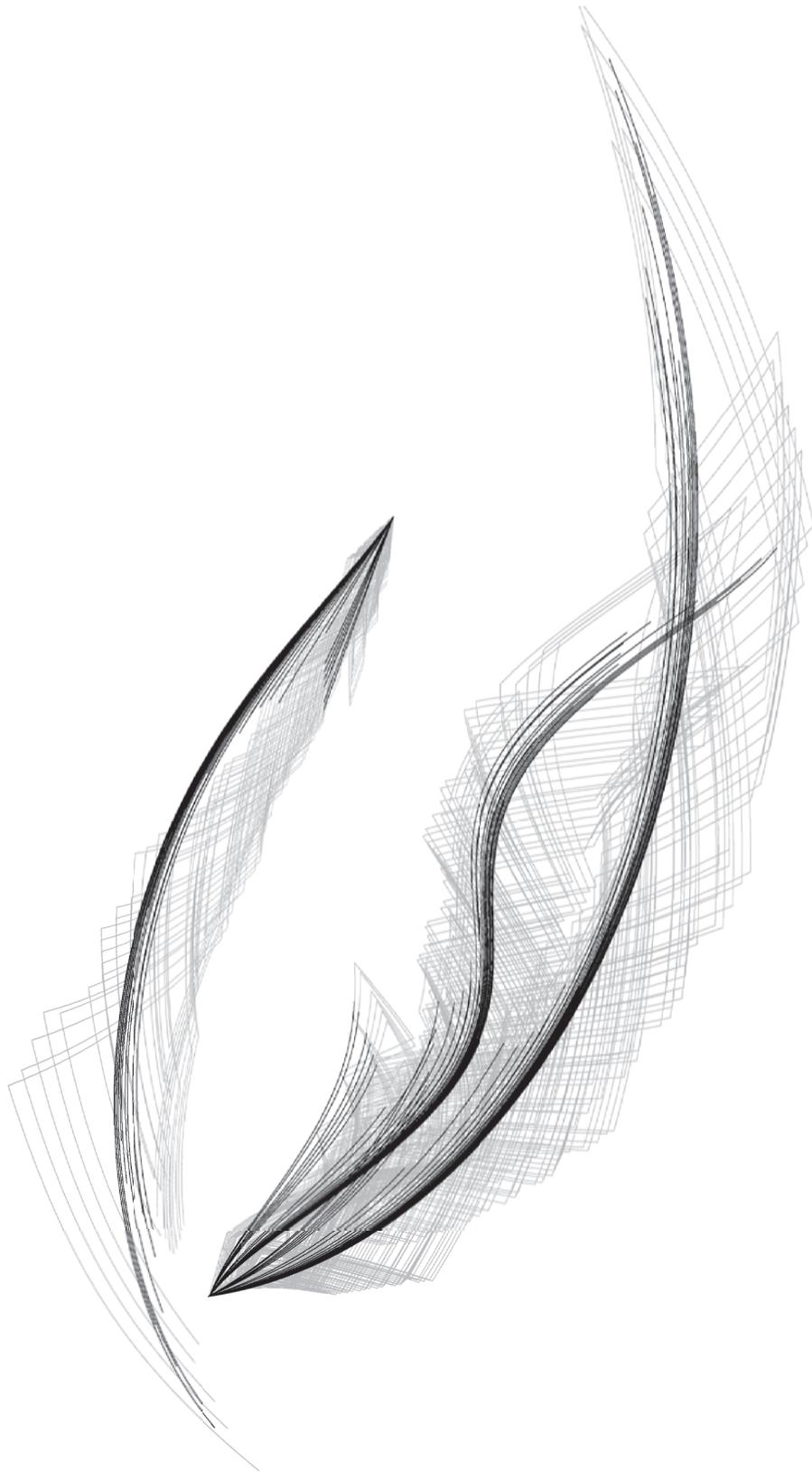
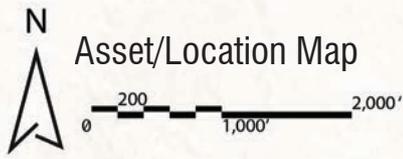


FIGURE 88



### Asset/Location Map

#### Legend

- 1) Bus stop & QLINE Access
- 2) Detroit Amtrack Transit Station
- 3) University Peditriaciands Autism Center
- 4) DMC Harper Hospital
- 5) Childrens Hospital of MI Specialty Center
- 6) Henry Ford Hospital
- 7) Henry Ford Autism Center

FIGURE 89





The selected site for this design proposal was chosen to take advantage of an existing network of assets in the surrounding area that are dedicated to educating, diagnosing, and treating children with ASD. Situated on the threshold between a dense urban center and the suburbs, this site provides an accessible geographic location.

FIGURE 90



## Site Location

The site includes a historically designated 8,000 sq ft Google Style building that was constructed in 1971 by African-American Detroit architect Nathan Johnson. Originally opening as Stanley Hong's Mannia Café, the existing building features a prominent façade along the south and west elevations and an expressive main entry, both of which are specified to be preserved. Located in the Milwaukee Junction Neighborhood, the site is zoned for mixed-use and surrounded by parking lots, small-scale industrial, and residential properties.

FIGURE 91

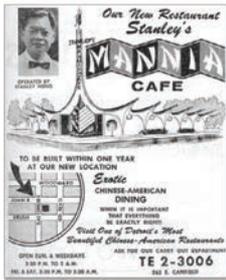


FIGURE 92

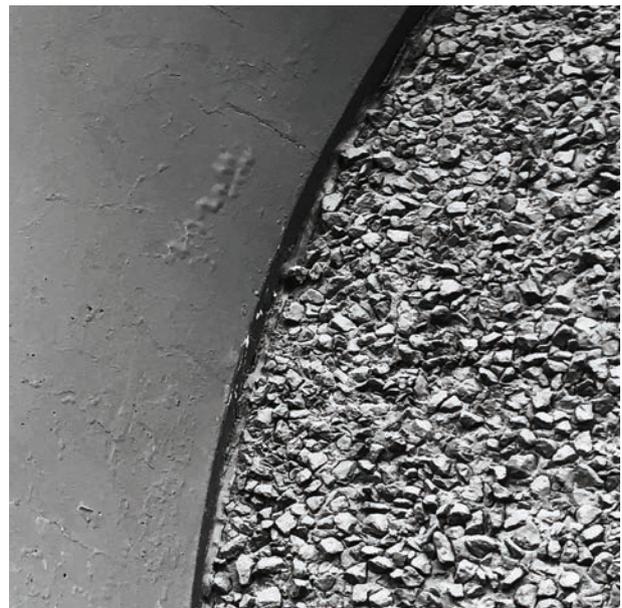


FIGURE 93



FIGURE 96



FIGURE 94



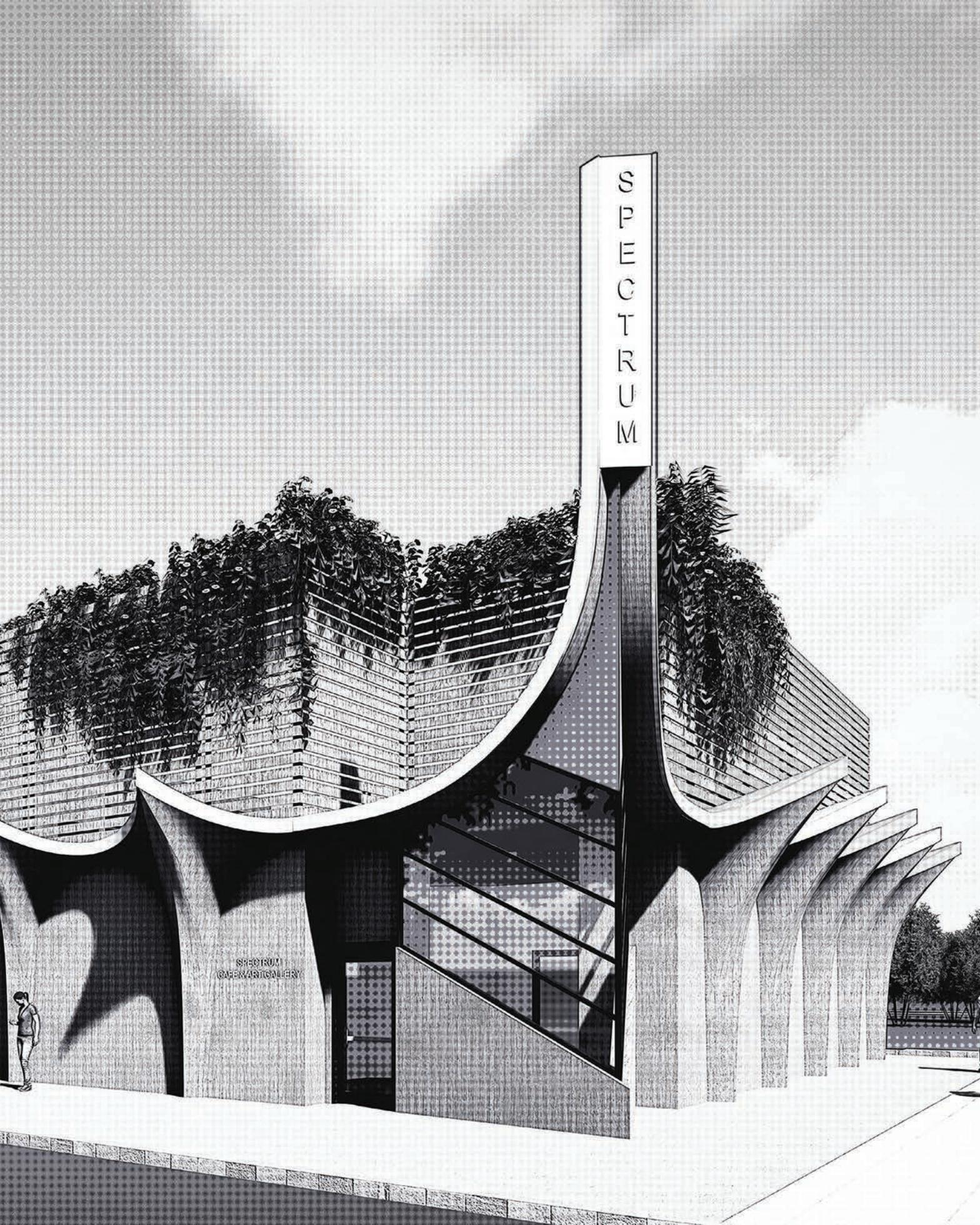
FIGURE 95

FIGURE 97



S  
P  
E  
C  
T  
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U  
M

SPECTRUM  
CAFÉ & ART GALLERY



## Program & Proposed Layout

The design solution incorporates an intimate connection with Wayne State which allows for a collaborative partnership that adds to the existing network of education, research, treatment, and outreach for people with ASD. This is embodied in the programming of the facility. Which is specified as -

- Sensory Café – Restaurant
- Public Gallery
- Fitness Center
- Community Resource Center
- Art Studios
- And a Roof-deck Sculpture Garden

These programmatic components respond to the design approach as well as research findings, placing emphasis on the interaction between programmatic articulation and architectural form.

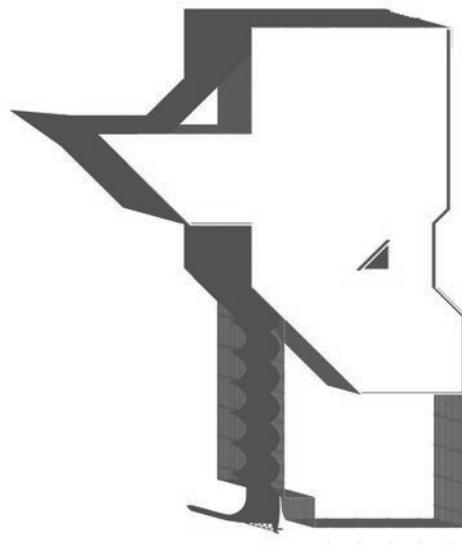
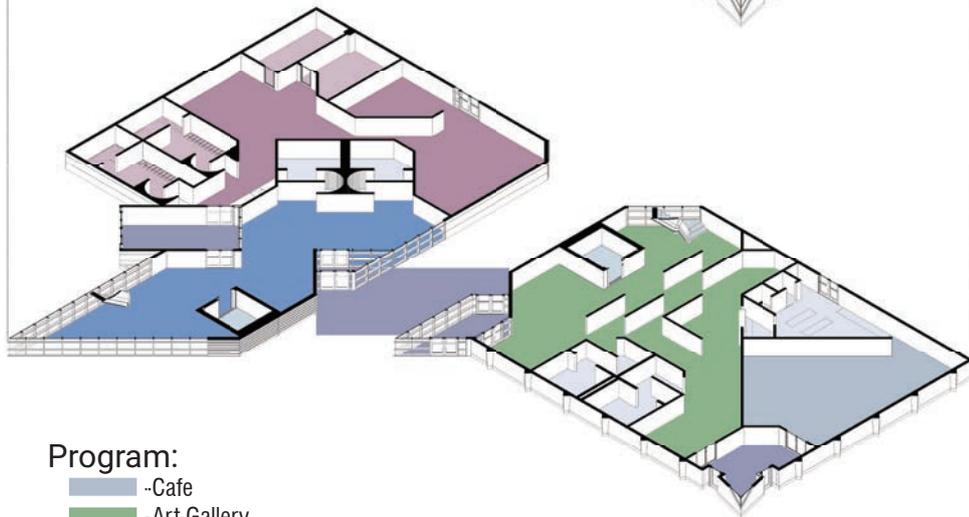
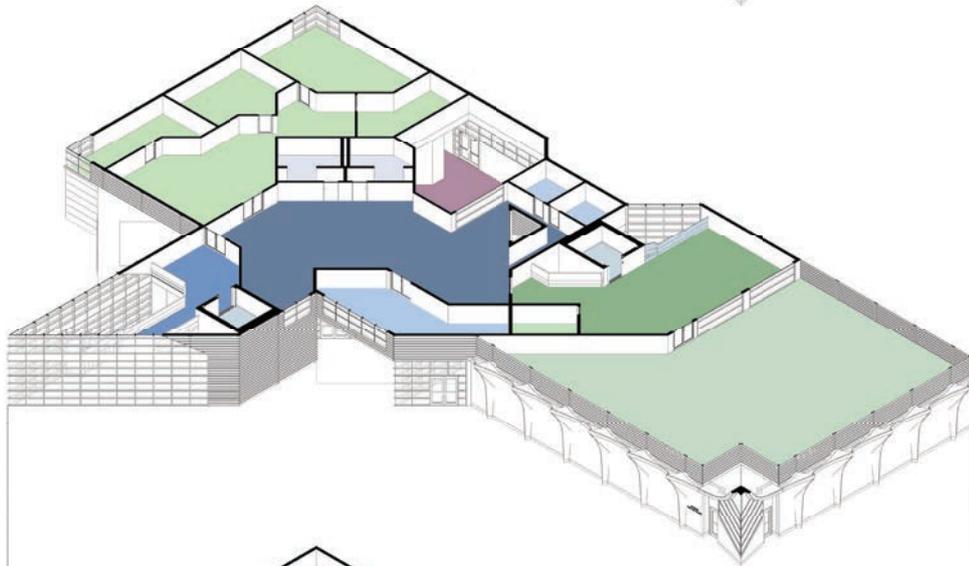
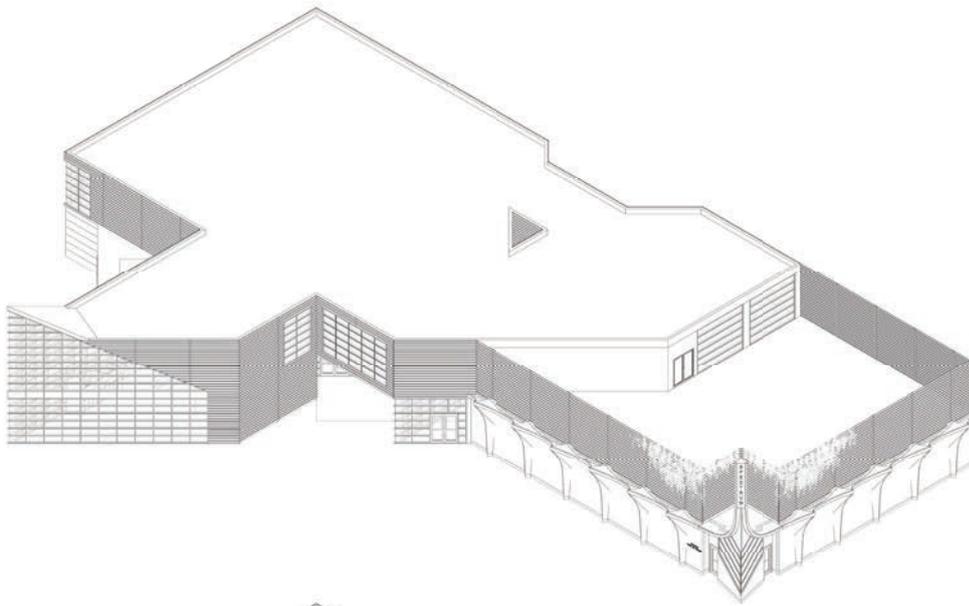


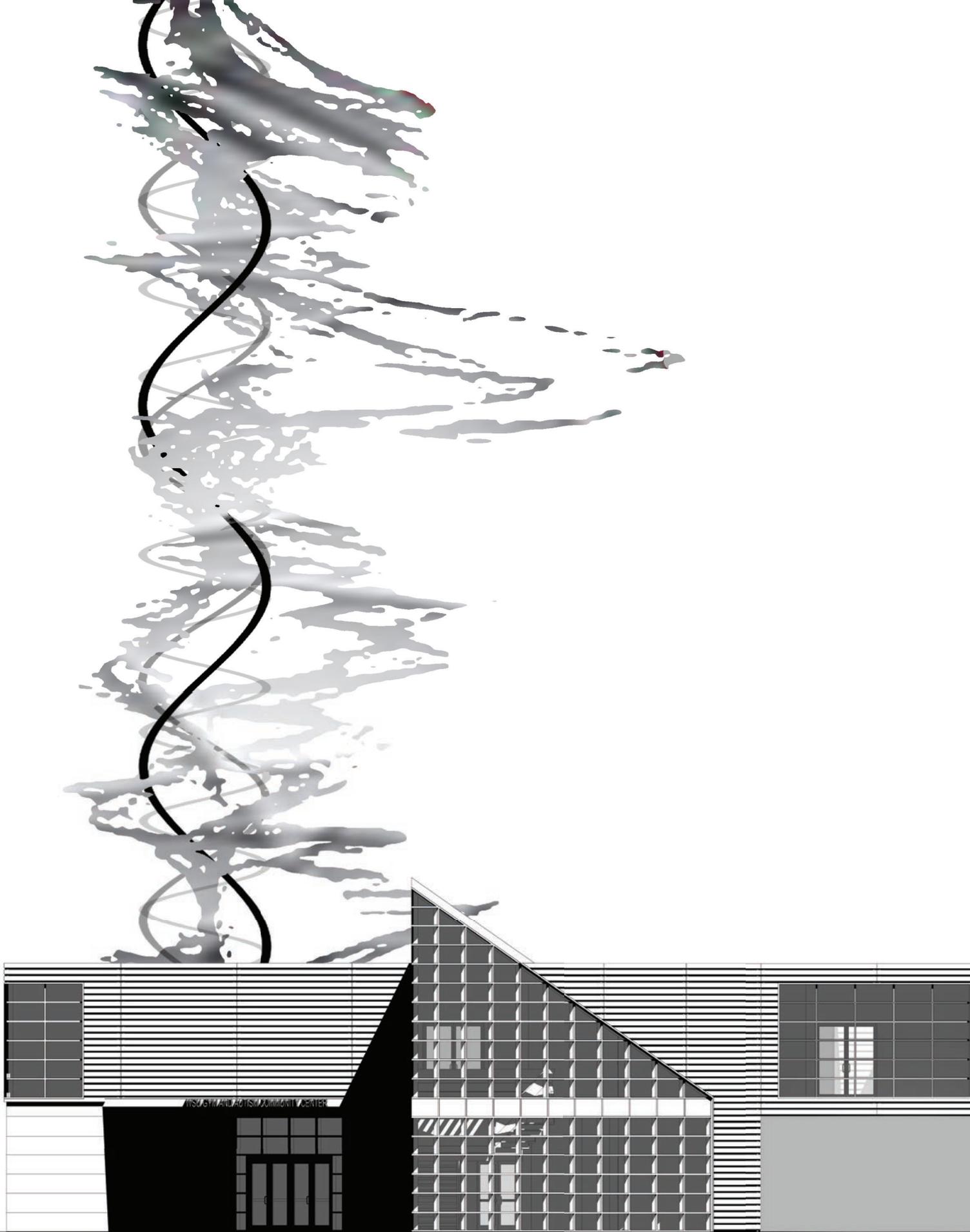
FIGURE 98



Program:

- Cafe
- Art Gallery
- Fitness Center
- Community Center
- Art Studio

FIGURE 99



NSU SVA AND ARTISTIC MANAGEMENT CENTER

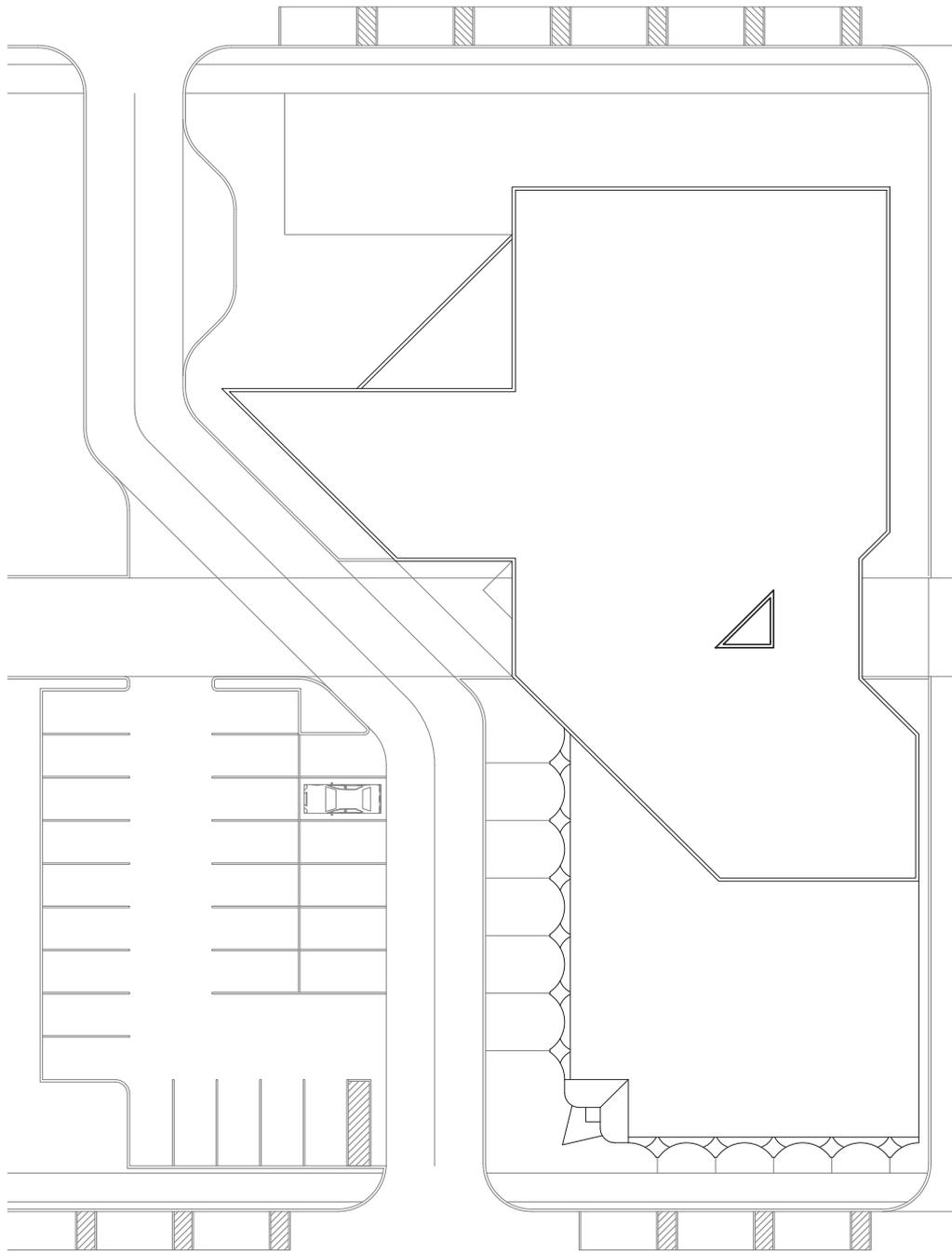
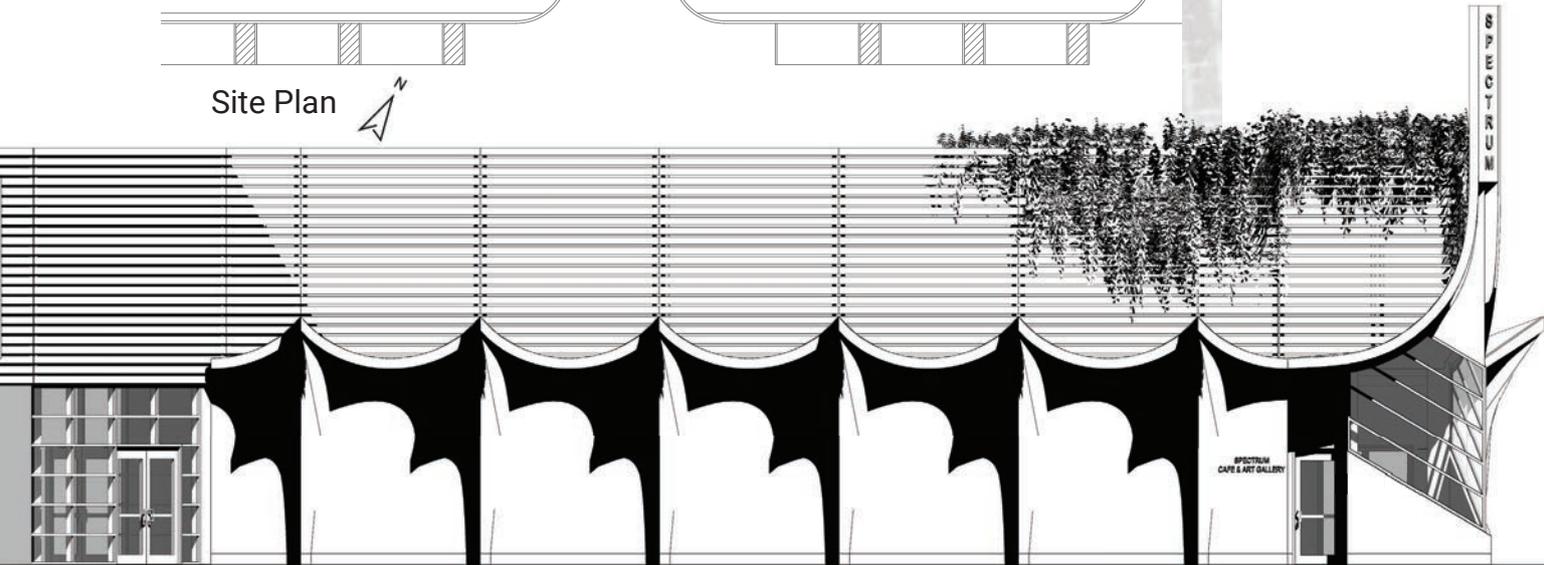


FIGURE 100

Site Plan 

FIGURE 101



SPECTRUM

SPECTRUM  
CAFE & ART GALLERY

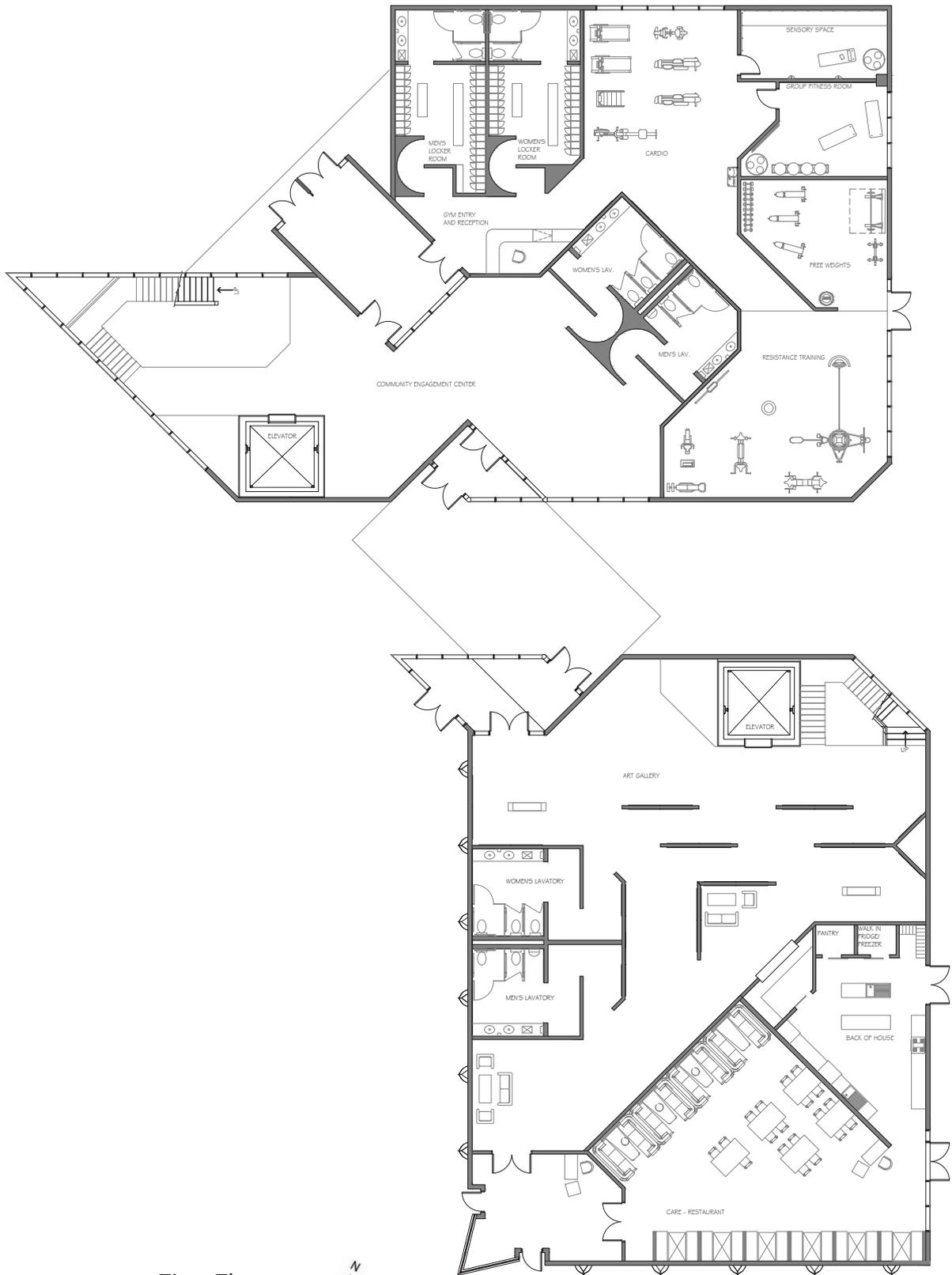
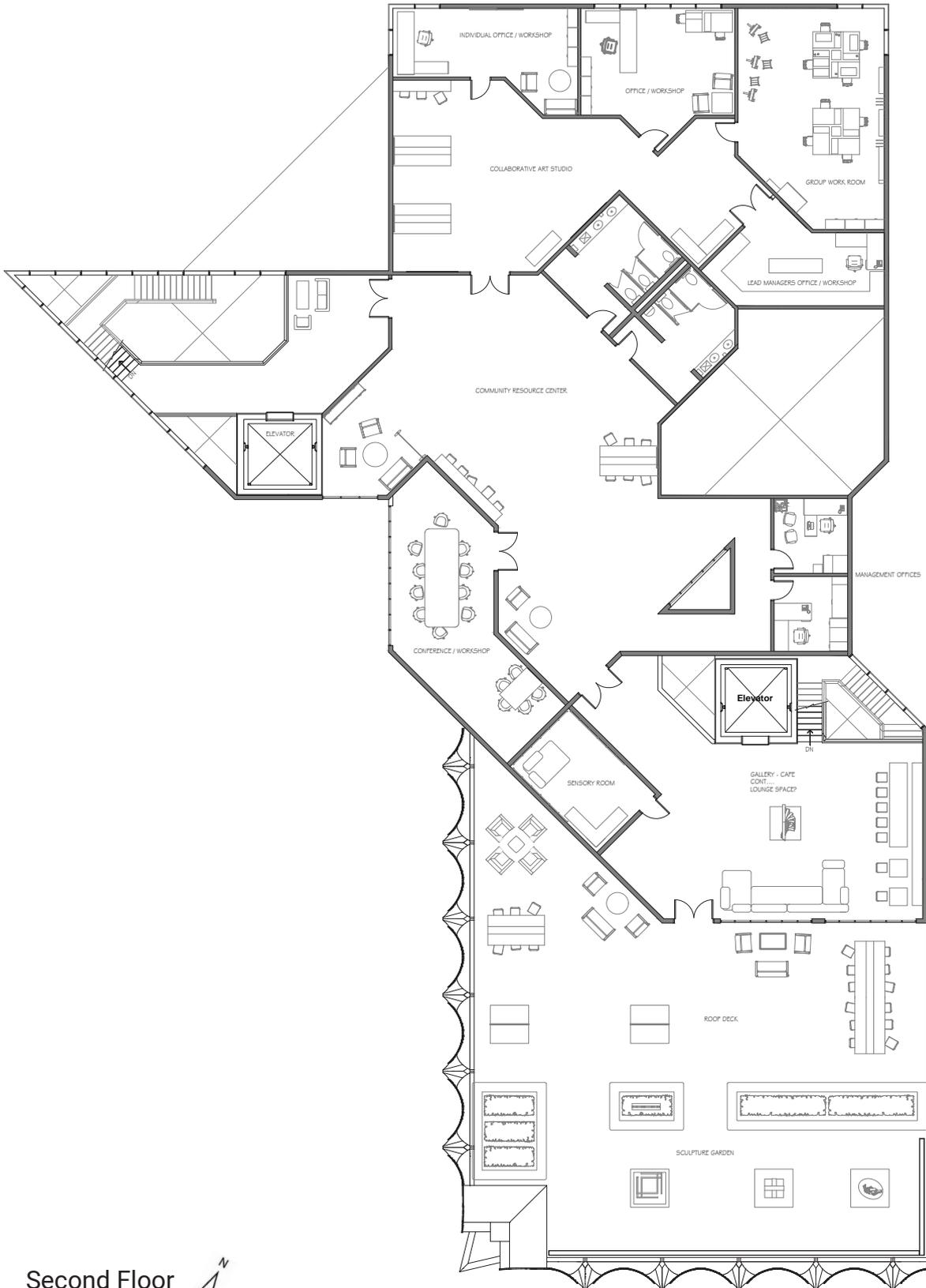


FIGURE 102

First Floor





Second Floor 

FIGURE 103



FIGURE 104

Booth



Cafe View 1

FIGURE 105

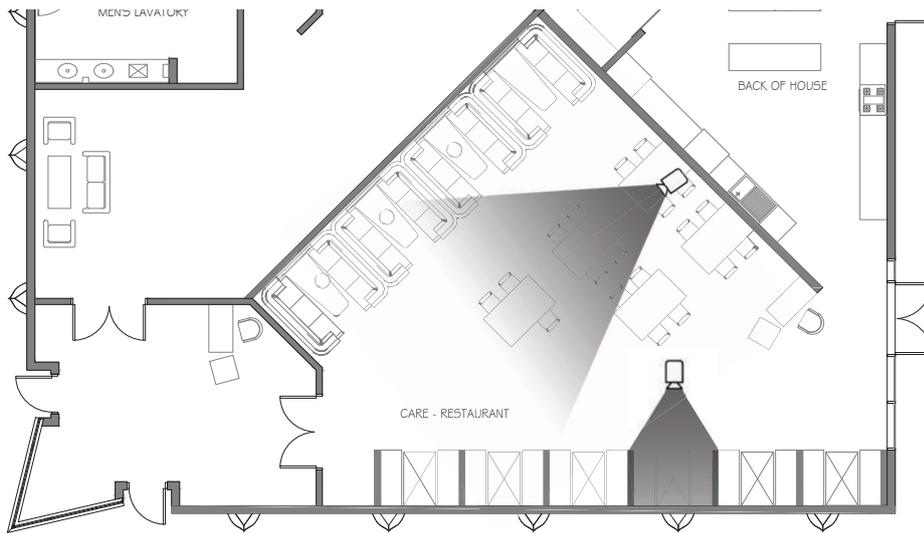


FIGURE 106

### Spectrum Cafe:

The Spectrum Cafe offers a variety of sensory sensitive seating, as well as an adaptive work environment for those with ASD. Digital ordering is implemented in a phased approach to allow workers to become comfortable taking orders.

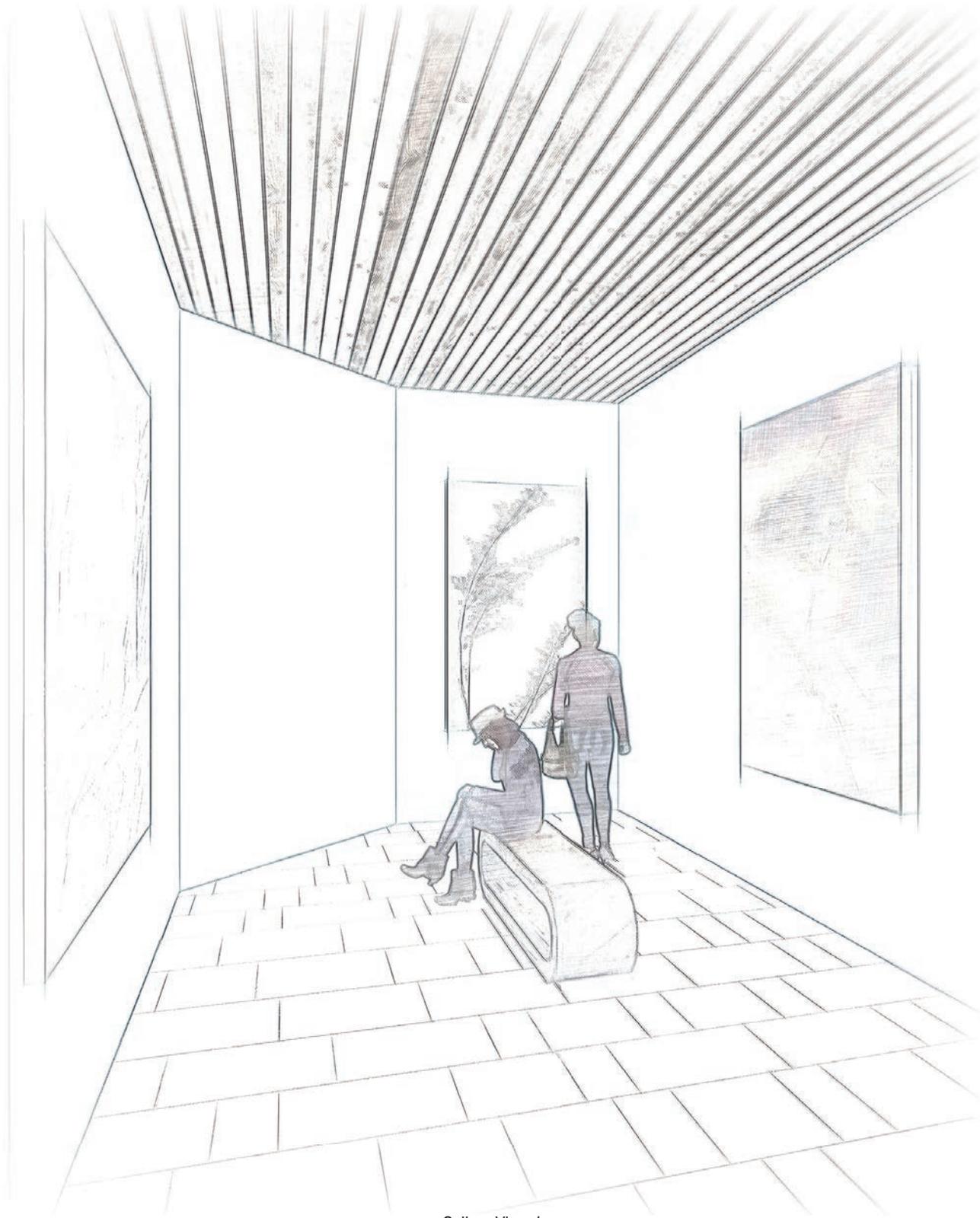


FIGURE 107

Gallery View 1



Gallery View 2

FIGURE 108

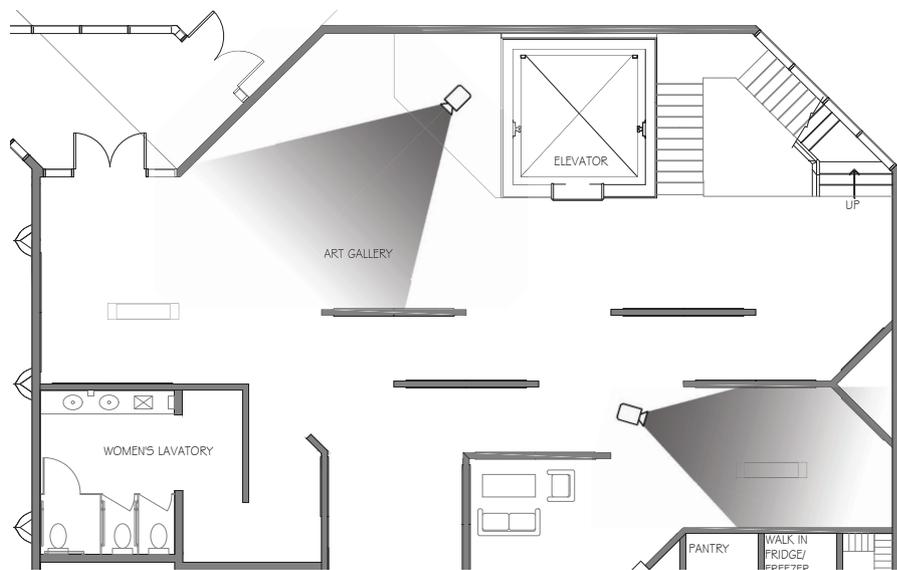
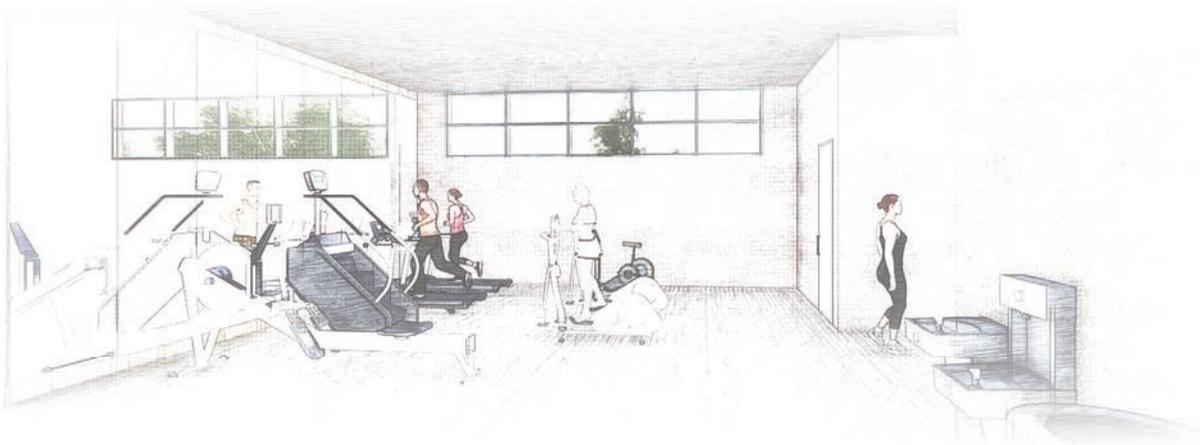


FIGURE 109

### Art Gallery:

The art gallery is part of the community resource center and offers free and open entry to exhibits for both occupants and visitors. This gallery displays art from the studio on the second floor, as well as features exhibits of other work produced by students at Wayne State.



Cardio Training

FIGURE 110

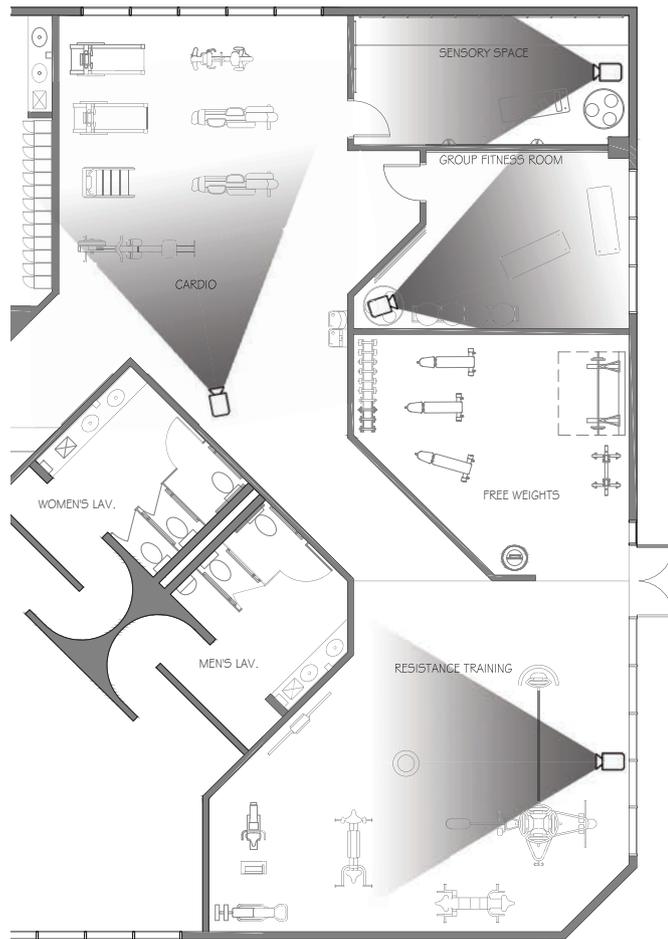


FIGURE 111

### Fitness Center:

This fitness center is open for all WSU students, employees, and the surrounding communities. It offers a range of spaces, diverse exercise options, and small group fitness classes.



Sensory Space

FIGURE 112



Group Fitness Room

FIGURE 113



Resistance Training

FIGURE 114

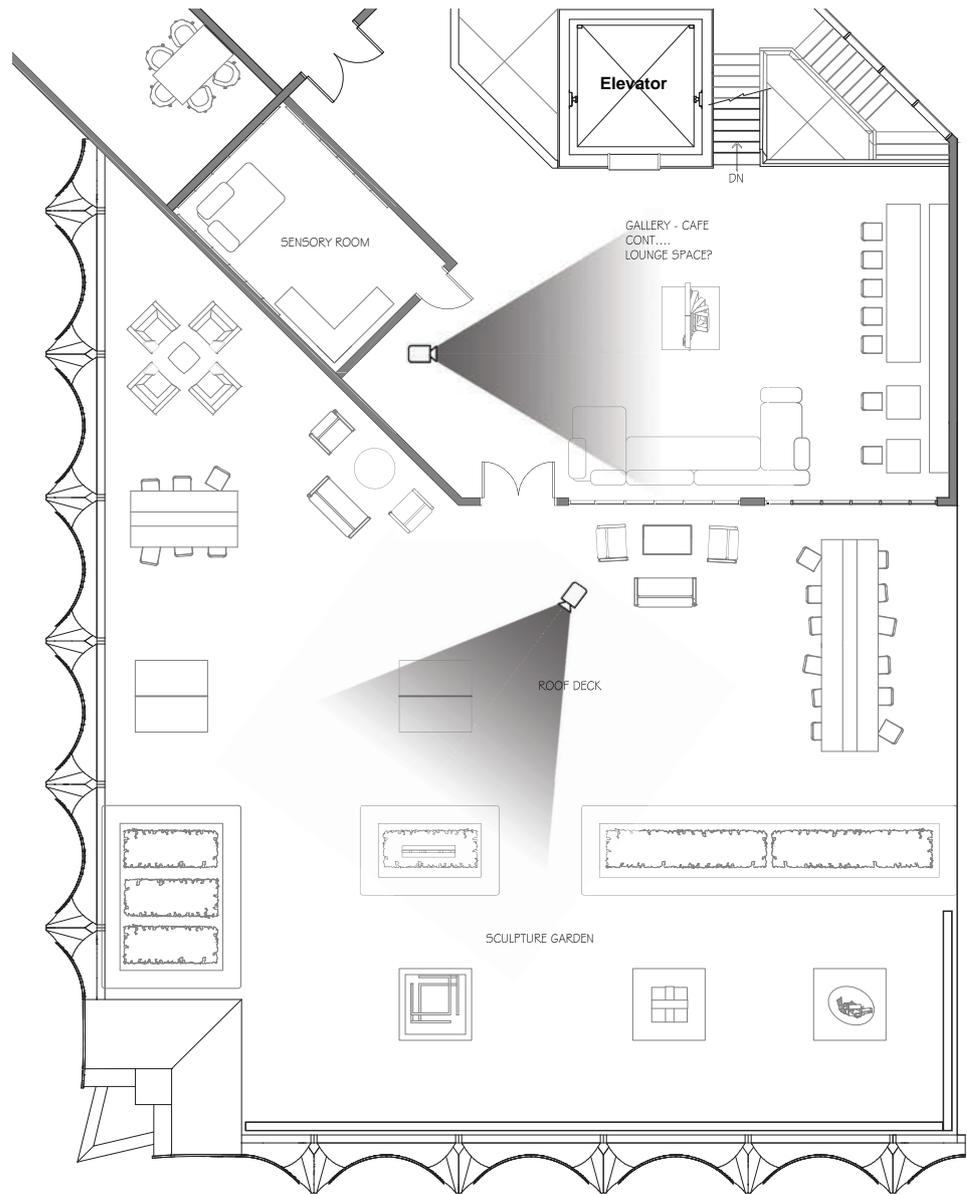
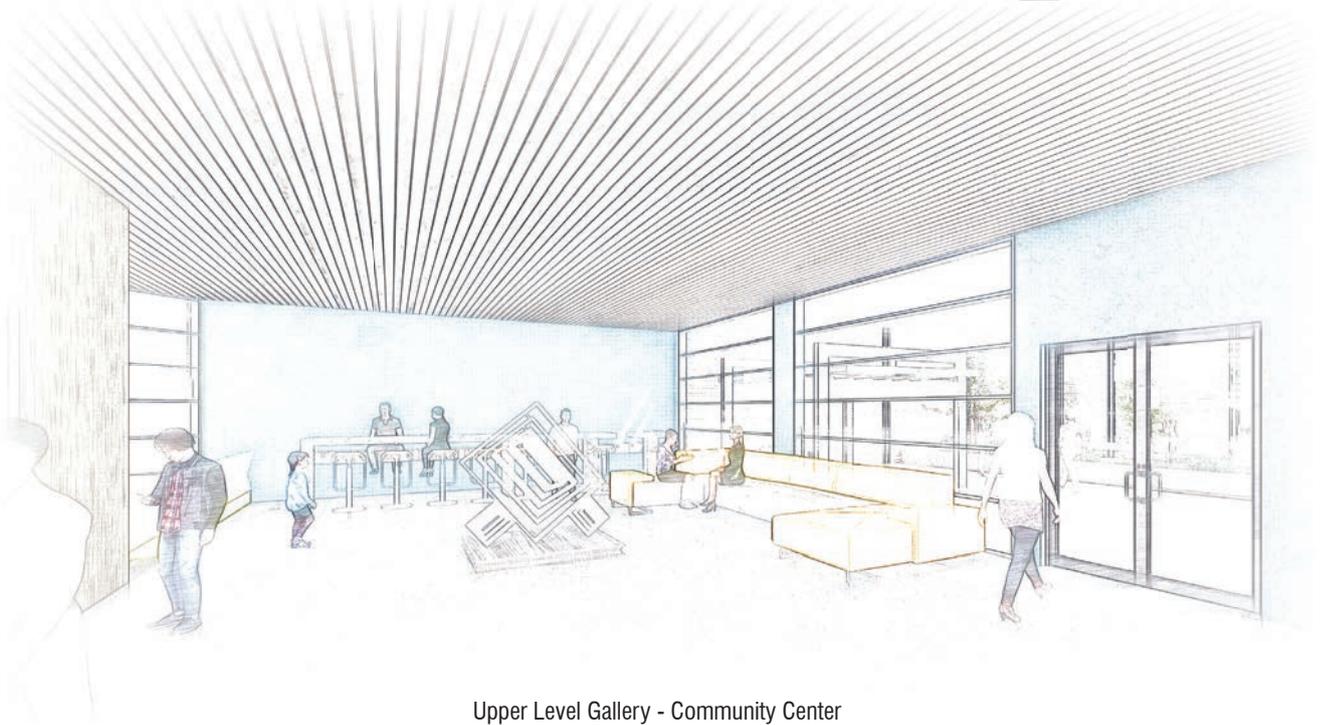


FIGURE 115

### Lounge & Roof Deck Sculpture Garden:

The upper-level lounge is a quiet space for occupants to work and relax in small groups. A sensory room is in close proximity for those who might need it. Attached, the roof deck sculpture garden allows for safe access to a calming outdoor environment.



Upper Level Gallery - Community Center

FIGURE 116



Roof Deck - Sculpture Garden

FIGURE 117



FIGURE 118

Community Resource Center



FIGURE 119

Workshop - Conference Room

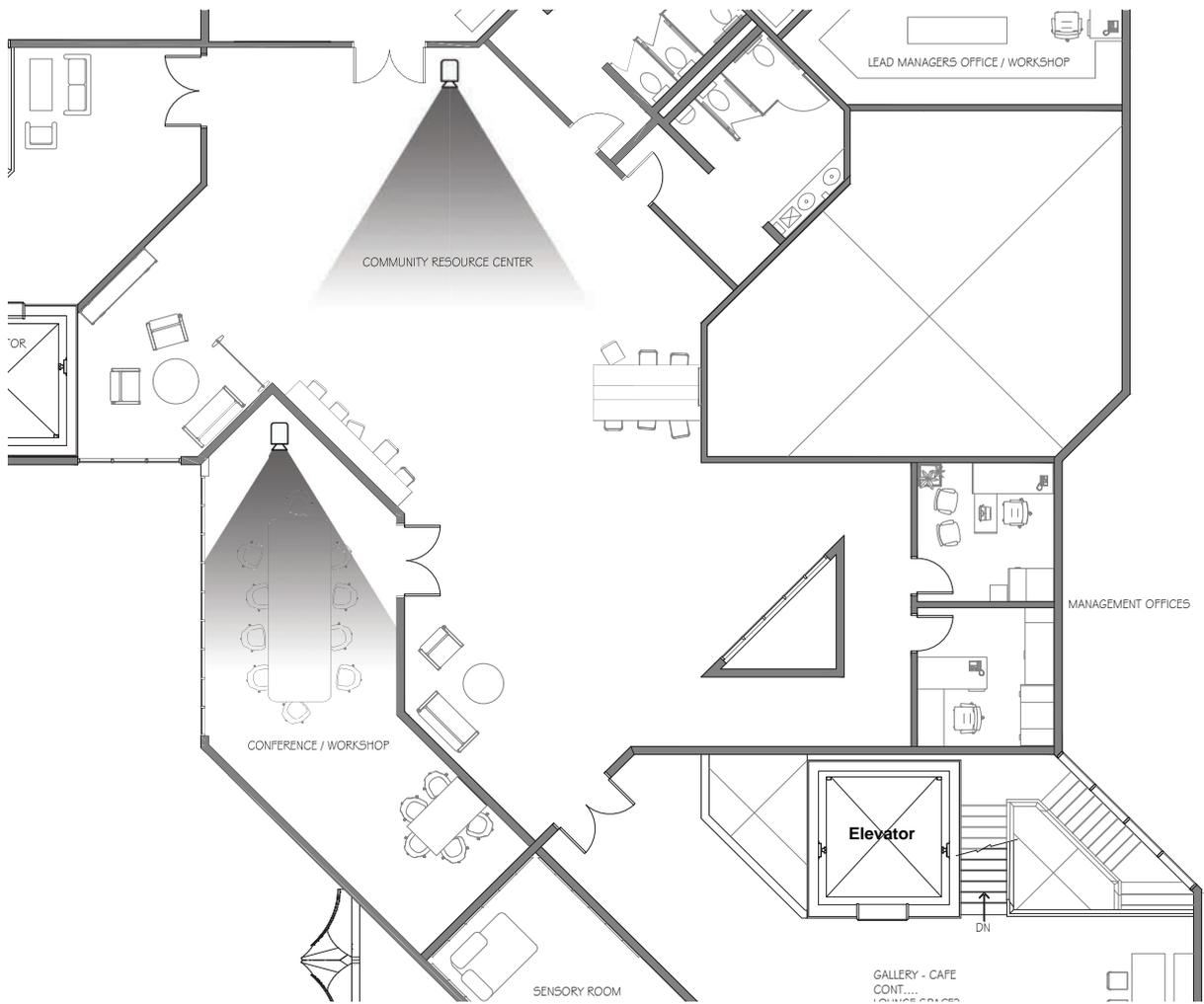


FIGURE 120

### Community Engagement & Workshop:

The upper-level community engagement space serves a similar function as the lounge, but without a noise restriction. Educational workshops take place in the conference room on a monthly basis with the mission of educating individuals about what autism spectrum disorder is.



FIGURE 121

Collaborative Art Studio

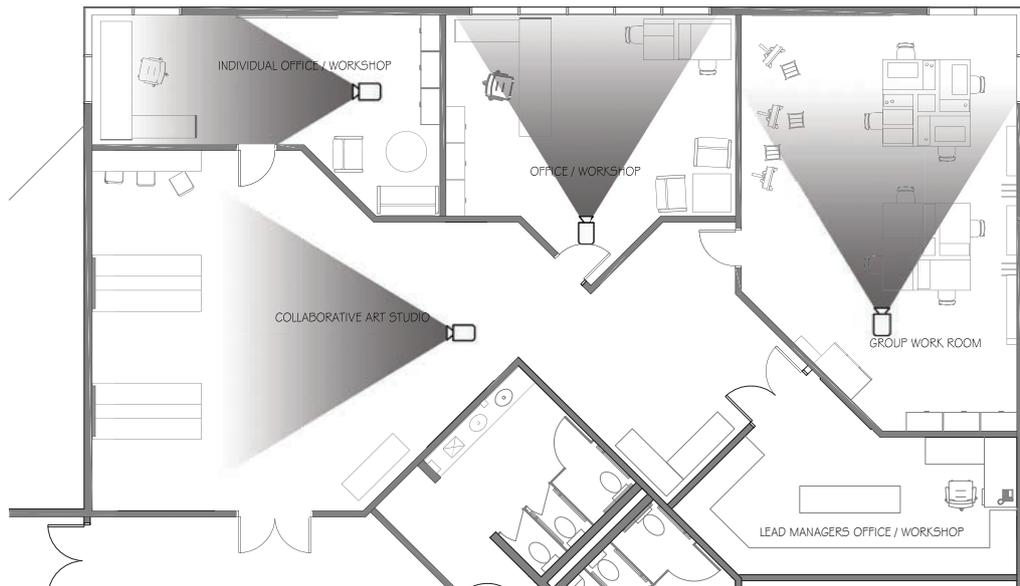


FIGURE 122

### Spectrum Art Studio:

This art studio allows those with autism to explore artistic expression with the intent of developing skills for future occupation. A variety of spatial configurations allows for individuals to work in environments that they find the most comfortable.



Office One

FIGURE 123



Office Two

FIGURE 124



Group Art Studio

FIGURE 125

## Bridging the Gap

This building prioritizes engagement with surrounding communities, students, and people with ASD. It additionally serves as a pillar for the community that advocates connection, communication, and education. Through the construction of a gradient of autism-friendly environments, a diverse range of spaces and programmatic functions create an inclusive environment where the general population and people with ASD can interact.

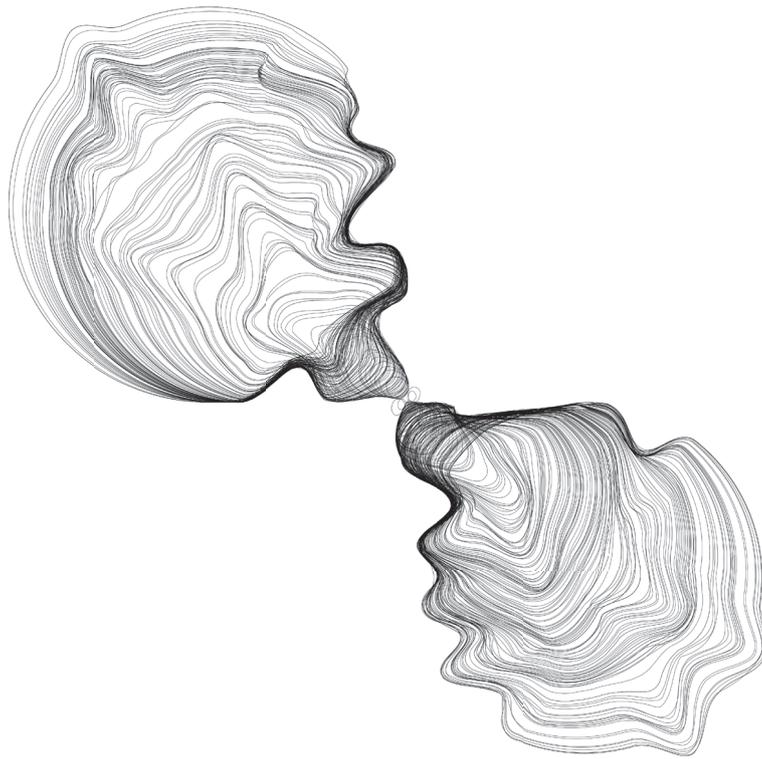


FIGURE 126

FIGURE 127

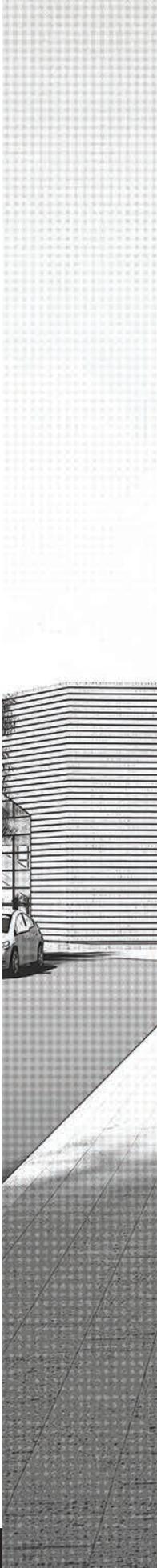
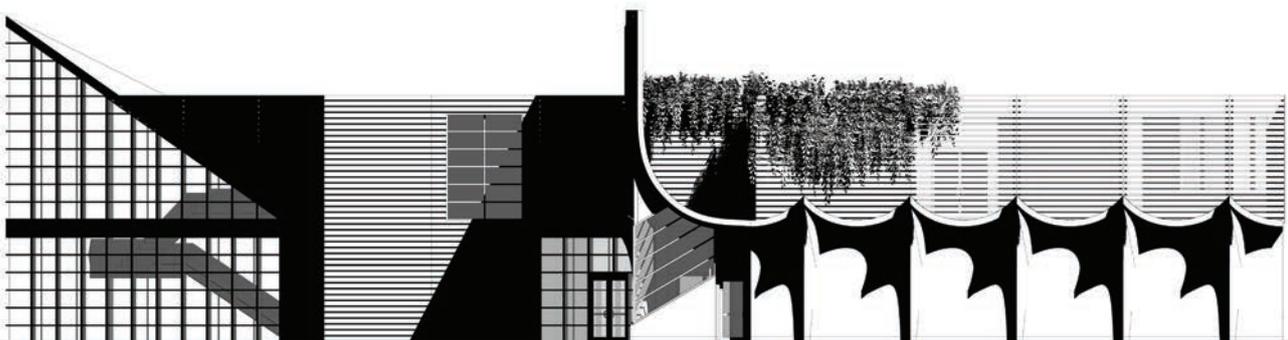
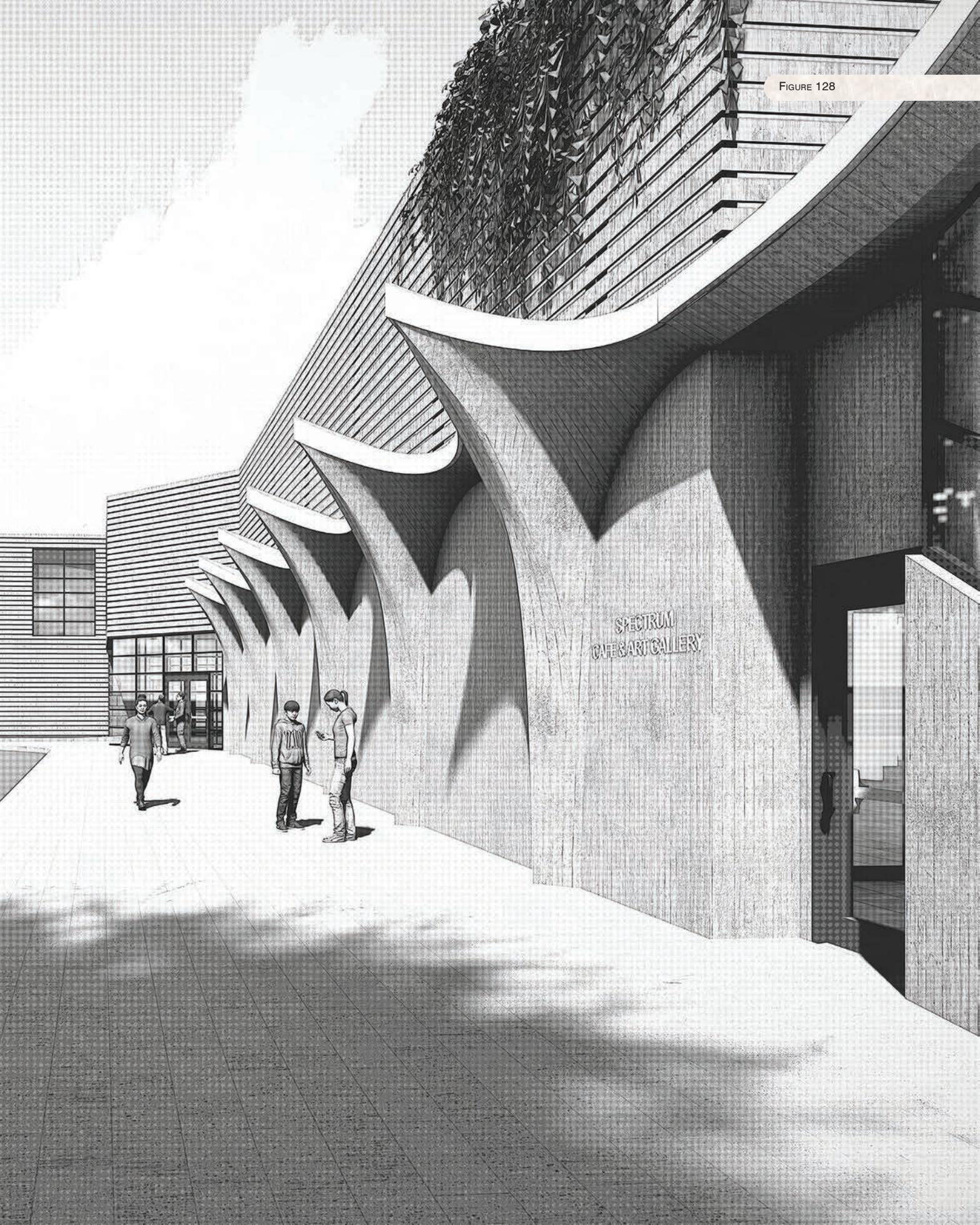
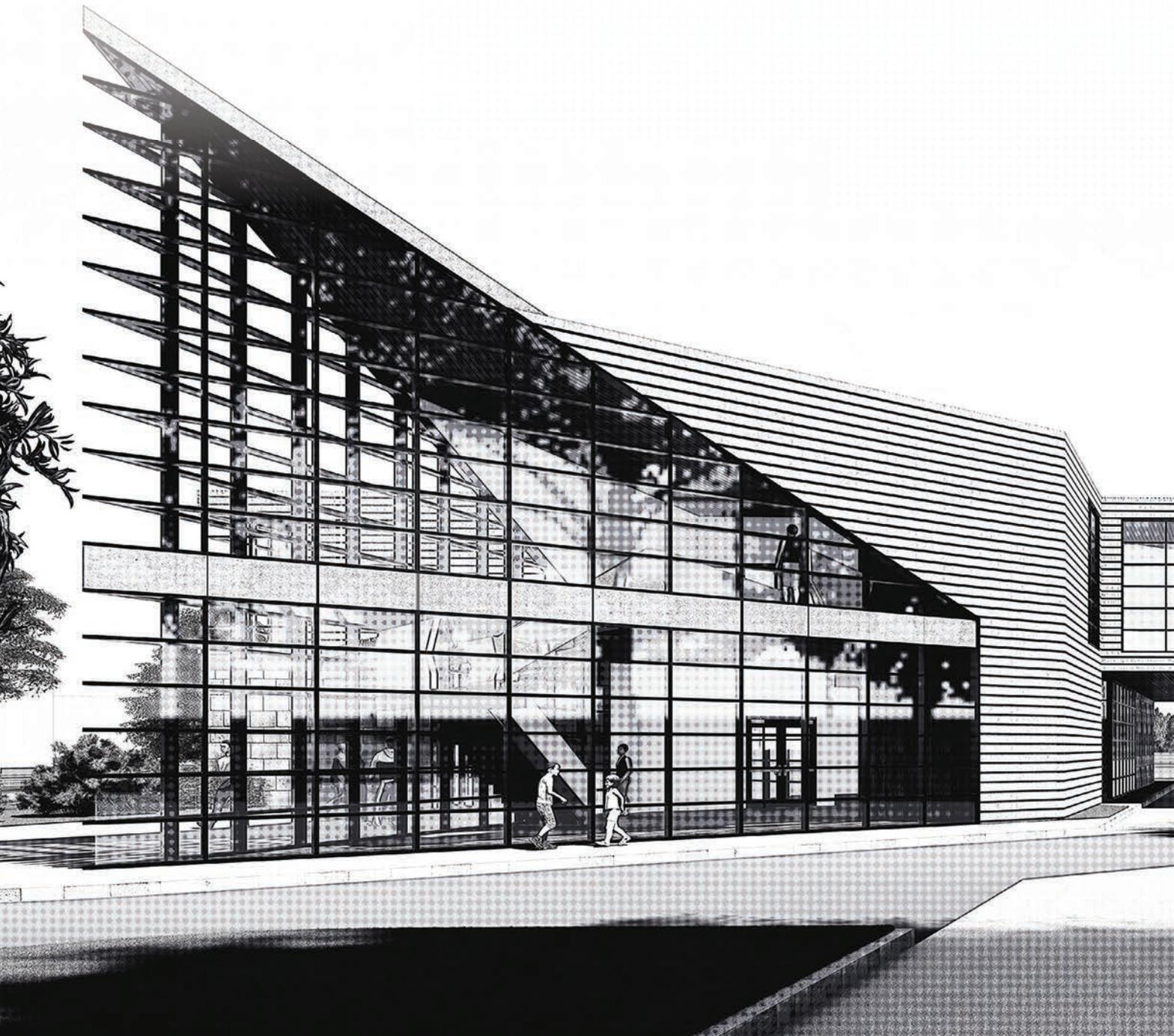


FIGURE 128





"I am different, not less."

Temple Grandin

FIGURE 129



“Behavior is communication. Change the environment and behaviors will change.”

Lana David

# Reflection

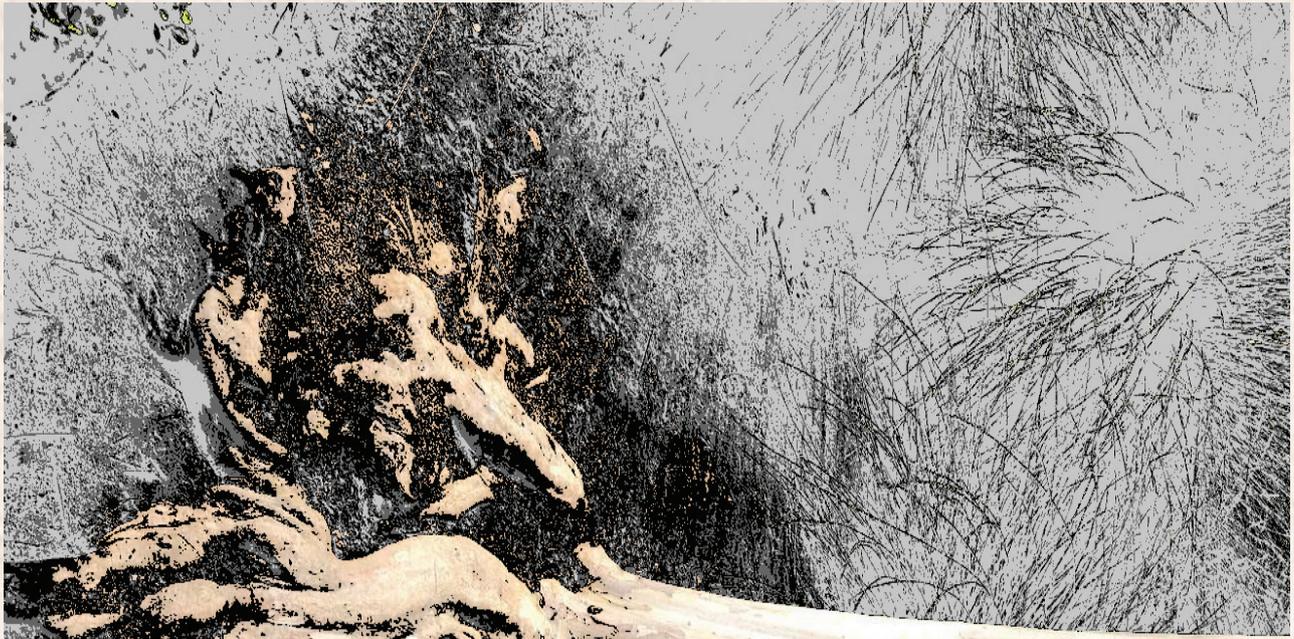


FIGURE 130

## Concluding Remarks

An inclusive approach to architectural form and expression structure a new set of standards to guide the design and planning process. By placing people with ASD as the primary occupancy, unique requirements begin to construct a distinctive perspective. Through this perspective new approaches towards occupant comfort and wellbeing are imagined. From this thesis, architectural approaches have been reimagined to accommodate a spectrum of individuals, taking another step forward towards a truly inclusive architectural environment.

FIGURE 131



## **References & Figures**

## Sources

- 1 "Dictionary by Merriam-Webster: America's most-trusted online dictionary," Merriam-Webster. [Online]. Available: <https://www.merriam-webster.com/>. [Accessed: 10-Sep-2019].
- 2 S. Ayyıldız, F. Ertürk, Ö. Durak, and A. Dülger, "Importance of Typological Analysis in Architecture for Cultural Continuity: An Example from Kocaeli (Turkey)," IOP Conference Series: Materials Science and Engineering, vol. 245, 2017.
- 3 M.J. Eppler, F. Hoffmann, R. Pfister, "Rigor and Relevance in Management Typologies: Assessing the Quality of Qualitative Classifications" MCM institute, University of St. Gallen. Available: [www.knowledge-communication.org](http://www.knowledge-communication.org)
- 4 Y. I. Guney, "Type and Typology in Architectural Discourse" Balıkesir University, 2007
- 5 "Types of Health Care Quality Measures," AHRQ. [Online]. Available: <https://www.ahrq.gov/talkingquality/measures/types.html>. [Accessed: Sep-2019].
- 6 "Driver Diagrams" ACT Academy [Online]. Available: <https://improvement.nhs.uk/documents/2109/driver-diagrams.pdf> [Accessed: Sep-2019].
- 7 "A Model For Measuring Quality Care" Act Academy [Online]. Available: <https://improvement.nhs.uk/resources/measuring-quality-care/> [Accessed: Sep-2019].
- 8 S. Dahadreh, R. Alshami, "The Four F's of Architecture" Thesis, University of Jordan, 2016
- 9 W. S. Chow and S. Priebe, "Understanding psychiatric institutionalization: a conceptual review," BMC psychiatry, 18-Jun-2013. [Online]. Available: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3702490/>. [Accessed: Oct-2019].
- 10 M. A. Hensley, "The consequence of the trend of decline: the life of the St. Louis Insane Asylum, ca. 1900," Missouri medicine, 2010. [Online]. Available: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6188234/>. [Accessed: Oct-2019].
- 11 "History of Psychiatric Hospitals," Nursing, History, and Health Care, Penn Nursing. [Online]. Available: <https://www.nursing.upenn.edu/nhhc/nurses-institutions-caring/history-of-psychiatric-hospitals/>. [Accessed: Oct-2019].

- 12 Angels in the Architecture A Photographic Elegy to an American Asylum. Wayne State Univ Pr, 2004.
- 13 "THE SANATORIUM," William G. Pomeroy Foundation, 03-Jan-2020. [Online]. Available: <https://www.wgpfoundation.org/historic-markers/the-sanatorium/>. [Accessed: Jan-2020].
- 14 "Paimio Sanatorium Conservation Management Plan" 2016 [Online]. Available: [http://www.getty.edu/foundation/pdfs/kim/paimio\\_alvar\\_aalto\\_foundation\\_cmp.pdf](http://www.getty.edu/foundation/pdfs/kim/paimio_alvar_aalto_foundation_cmp.pdf) [Accessed: Oct-2019]
- 15 B. Colomina, X-Ray Architecture. Zürich: Lars Müller Publishers, 2019.
- 16 "Sample HospitalLouisville, KY 11111," American Hospital Directory - Sample Hospital - Departments. [Online]. Available: [https://www.ahd.com/departments.php?hcfa\\_id=0e6ed911d02223fd12ca9d585a2c3af1&ek=175faa23b99dbec3f5b36954deb2e71d](https://www.ahd.com/departments.php?hcfa_id=0e6ed911d02223fd12ca9d585a2c3af1&ek=175faa23b99dbec3f5b36954deb2e71d). [Accessed: Oct-2019].
- 17 G. C. Cook, "Henry Currey FRIBA (1820-1900): leading Victorian hospital architect, and early exponent of the 'pavilion principle,'" Postgraduate medical journal, Jun-2002. [Online]. Available: <https://www.ncbi.nlm.nih.gov/pubmed/12151691>. [Accessed: Oct-2019].
- 18 N. Tesler, "Evolution of medical architecture," MATEC Web of Conferences, vol. 170, p. 03015, 2018.
- 19 Cook, "Henry Currey FRIBA (1820–1900): leading Victorian hospital architect, and early exponent of the 'pavilion principle,'" Postgraduate Medical Journal, 01-Jun-2002. [Online]. Available: <https://pmj.bmj.com/content/78/920/352.long>. [Accessed: Nov-2019].
- 20 R. Cama, Evidence-based healthcare design. Hoboken, NJ: John Wiley & Sons, 2009.
- 21 J. Willis, P. Goad, and C. Logan, Architecture and the modern hospital: Nosokomeion to Hygeia. London: Routledge, 2019.

- 22 J. B. Christianson, *Reinventing the patient experience: strategies for hospital leaders*. Chicago: Health Administration Press, 2007.
- 23 J. L. Bellot "A Descriptive Study of Nursing Home Organizational Culture, Work Environment and Culture Change From the Perspectives of Licensed Nurses" University of Pennsylvania Dissertations, [Online] Available: <https://repository.upenn.edu/cgi/viewcontent.cgi?article=2116&context=edissertations> [Accessed: Nov-2019]
- 24 "Design Guide for Long Term Care Homes" 2018 MMP Architects [Online] Available: [https://www.fgiguilines.org/wp-content/uploads/2018/03/MMP\\_DesignGuideLongTermCareHomes\\_2018.01.pdf](https://www.fgiguilines.org/wp-content/uploads/2018/03/MMP_DesignGuideLongTermCareHomes_2018.01.pdf) [Accessed: Nov-2019]
- 25 "Improving the Quality of Nursing Home Care: The Wellspring Model," Commonwealth Fund, 06-Aug-2004. [Online]. Available: <https://www.commonwealthfund.org/publications/publication/2004/aug/improving-quality-nursing-home-care-wellspring-model>. [Accessed: Nov-2019]
- 26 Schwarz, Benyamin, Brent, R. Schwarz, "The Architectural Metamorphosis of Long-Term Care Settings" *Journal of Architectural and Planning Research*, September 2001
- 27 L. Aranyi and L. L. Goldman, *Design of long-term care facilities*. New York: Van Nostrand Reinhold Co., 1980.
- 28 "Global Atlas of Palliative Care at the End of Life" World Health Organization [Online] Available: [https://www.who.int/nmh/Global\\_Atlas\\_of\\_Palliative\\_Care.pdf](https://www.who.int/nmh/Global_Atlas_of_Palliative_Care.pdf) [Accessed: Nov-2019]
- 28 S. Verderber and B. J. Refuerzo, *Innovations in hospice architecture*. Abingdon, Oxon ; New York, NY: Routledge, 2020.
- 30 R. Karthaus, "Redesigning prison: the architecture and ethics of rehabilitation," Taylor & Francis. [Online]. Available: <https://www.tandfonline.com/doi/full/10.1080/13602365.2019.1578072>. [Accessed: Dec-2020]
- 31 "Autism spectrum disorders," World Health Organization. [Online]. Available: <https://www.who.int/news-room/fact-sheets/detail/autism-spectrum-disorders>. [Accessed: Dec-2019].

- 32 T. Peeters, *Autism: from theoretical understanding to educational intervention*. London: Whurr, 2001
- 33 B. Evans, "How autism became autism: The radical transformation of a central concept of child development in Britain," *History of the human sciences*, Jul-2013. [Online]. Available: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3757918/>. [Accessed: Dec-2019]
- 34 "History of Autism Treatment," *Applied Behavior Analysis Programs Guide*. [Online]. Available: <https://www.appliedbehavioranalysisprograms.com/history-autism-treatment/>. [Accessed: Dec-2020].
- 35 "Understanding the 3 Levels of Autism" *Healthline Journal* [Online]. Available: "<https://www.healthline.com/health/levels-of-autism> [Accessed: Dec-2019]
- 36 "Autism through the Lifespan," *Autism Society*. [Online]. Available: <https://www.autism-society.org/living-with-autism/autism-through-the-lifespan/>. [Accessed: Dec-2020]
- 37 D. Fein, R. Hagerman, and E. Hollander, *Autism spectrum disorders*. Washington, DC: American Psychiatric Association Publishing, 2018.
- 38 "Data & Statistics on Autism Spectrum Disorder," *Centers for Disease Control and Prevention*, 25-Mar-2020. [Online]. Available: <https://www.cdc.gov/ncbddd/autism/data.html>. [Accessed: 20-Apr-2020].
- 39 "Affinity Therapy: The Return of a Psychodynamic Approach to the Treatment of Autism," *Affinity Therapy: The Return of a Psychodynamic Approach to the Treatment of Autism - Écouter les autistes*. [Online]. Available: <http://www.autistes-et-cliniciens.org/Affinity-Therapy-The-Return-of-a-Psychodynamic-Approach-to-the-Treatment-of>. [Accessed: Jan-2020].
- 40 "Sensory differences," *Autism support - leading UK charity - National Autistic Society*. [Online]. Available: <https://www.autism.org.uk/about/behaviour/sensory-world.aspx>. [Accessed: Jan-2020].

- 41 "Sensory Issues," Autism Speaks. [Online]. Available: <https://www.autismspeaks.org/sensory-issues>. [Accessed: Jan-2020].
- 42 L. J. Rudy, "Is Sensory Integration Therapy Helpful for Autism?," Verywell Health, 16-Apr-2020. [Online]. Available: <https://www.verywellhealth.com/sensory-integration-therapy-and-autism-260509>. [Accessed: 20-Apr-2020].
- 43 "Sensory-Based Therapies," Sensory-Based Therapies | Interactive Autism Network. [Online]. Available: [https://iancommunity.org/cs/what\\_do\\_we\\_know/sensory\\_based\\_therapies](https://iancommunity.org/cs/what_do_we_know/sensory_based_therapies). [Accessed: Jan-2020].
- 44 "A Space for Being: Portfolio," Reddymade. [Online]. Available: <https://rmdny.com/portfolio/a-space-for-being/>. [Accessed: Jan-2020].
- 45 "Introducing A Space For Being," muuto. [Online]. Available: <https://muuto.com/introducing-a-space-for-being>. [Accessed: Jan-2020].
- 46 M. Mostafa "An Architecture for Autism, The Autism ASPECTSS Design Index" Magda Mostafa, PhD. [Online]. Available: <https://www.autism.archi/aspectss>. [Accessed: Jan-2020].
- 47 Z. Mortice, "These Architectural Playscapes Provide Therapy for Children with Autism," ArchDaily, 17-Dec-2016. [Online]. Available: <https://www.archdaily.com/801690/these-architectural-playscapes-are-designed-to-provide-therapy-for-children-with-autism>. [Accessed: Jan-2020].
- 48 "Clement Space in the City (2017)," Dawn, 21-Sep-2017. [Online]. Available: <https://dawnjoyleong.com/performances-exhibitions/clement-space-in-the-city-2017/>. [Accessed: Jan- 2020].
- 49 "Social Sensory," lab for material architectures. [Online]. Available: <http://www.materialarchitectures.com/social-sensory>. [Accessed: Jan-2020].
- 50 G. Braddock and J. Rowell, Making homes that work: planning, design and construction of person-centered environments for families living with autism spectrum disorder. Toronto, Ontario, Canada: Inclusion Press, 2013.

- 51 "Safety in the Home," Autism Society. [Online]. Available: <https://www.autism-society.org/living-with-autism/how-the-autism-society-can-help/safe-and-sound/safety-in-the-home/>. [Accessed: Feb-2020].
- 52 M. Brake and Department of Education, "Transforming Home: parents' experiences of caring for children on the autism spectrum in Tasmania, Australia," Taylor & Francis. [Online]. Available: <https://www.tandfonline.com/doi/abs/10.1080/02673037.2017.1390075?src=recsys&journalCode=chos20>. [Accessed: Feb-2020].
- 53 "Panoform" Panoform. [Online]. Available: <https://panoform.com/>. [Accessed: Feb-2020].
- 54 C. Beaver, "Designing environments for children and adults on the autism spectrum" GAP Journal, January 2019
- 55 S. Humphreys, "Creating autism-friendly spaces" NAS, [online] Available: <https://www.autism.org.uk/professionals/others/architects/top-tips.aspx> [Accessed: Mar-2020]
- 56 S. Humphreys, "Autism & Architecture" presented at Creating an Autism Friendly World Research Autism Conference, July-2015
- 57 M. Mostafa PhD., "The ASPECTSS of Architecture for Autism" presented at TED, Cairo, Egypt, Nov-2016
- 58 M. Mostafa PhD., "The Autism ASPECTSS™ Design Index" [Online] available: <https://www.autism.archi/aspectss> [Accessed: Jan-2020]
- 59 T. Whitehurst, "Evaluation of Features specific to an ASD Designed Living Accommodation" Sunfield Research Institute, 2017
- 60 "Environment and surroundings," National Autistic Society. [Online]. Available: <https://www.autism.org.uk/about/family-life/in-the-home/environment.aspx>. [Accessed: Jan-2020].
- 61 C. N. Henry, "Designing for Autism: Spatial Considerations," ArchDaily, 26-Oct-2011. [Online]. Available: <https://www.archdaily.com/179359/designing-for-autism-spatial-considerations>. [Accessed: Feb-2020].

- 62 C. N. Henry, "Designing for Autism: Lighting," ArchDaily, 19-Oct-2011. [Online]. Available: [https://www.archdaily.com/177293/designing-for-autism-lighting?ad\\_medium=widget&ad\\_name=recommendation](https://www.archdaily.com/177293/designing-for-autism-lighting?ad_medium=widget&ad_name=recommendation). [Accessed: Feb-2020].
- 63 C. N. Henry, "Designing for Autism: The 'Neuro-Typical' Approach," ArchDaily, 03-Nov-2011. [Online]. Available: [https://www.archdaily.com/181402/designing-for-autism-the-neuro-typical-approach?ad\\_medium=widget&ad\\_name=recommendation](https://www.archdaily.com/181402/designing-for-autism-the-neuro-typical-approach?ad_medium=widget&ad_name=recommendation). [Accessed: Feb-2020].
- 64 "Simon Humphreys," Simon Humphreys. [Online]. Available: <https://www.simonhumphreys.co.uk/>. [Accessed: Mar-2020].
- 65 V. Nereim, "Architecture shapes way special-needs pupils learn," The National, 15-Feb-2012. [Online]. Available: <https://www.thenational.ae/uae/education/architecture-shapes-way-special-needs-pupils-learn-1.591476>. [Accessed: Mar-2020].
- 66 "Debra Ann November Wing, The Lerner School for Autism," Westlake Reed Leskosky. [Online]. Available: <https://www.wrldesign.com/projects/health-care/health-science/debra-ann-november-wing-the-lerner-school-for-autism>. [Accessed: Mar-2020].
- 67 "HCD Mag," HCD Magazine Formulating a Plan Comments. [Online]. Available: <https://www.healthcaredesignmagazine.com/architecture/formulating-plan/>. [Accessed: Mar-2020].
- 68 Prasad, "The Pears National Centre for Autism," Penoyre & Prasad. [Online]. Available: <https://www.penoyreprasad.com/project/national-centre-for-autism>. [Accessed: Mar-2020].
- 69 "Autism-Friendly-Design: ga architects: London: United Kindom," gaautismga. [Online]. Available: <https://www.autism-architects.com/>. [Accessed: Mar-2020].
- 70 "A Centre for Autism - New Struan - aitken-turnbull," aitken. [Online]. Available: <https://www.aitken-turnbull.co.uk/project/centre-autism-new-struan/>. [Accessed: 20-Apr-2020].
- 71 Detroiturbex.com - Stanley Hong's Mannia Cafe. [Online]. Available: <http://www.detroiturbex.com/content/downtown/hongs/index.html>. [Accessed: Feb-2020].

- 72 M. Jackman, "Still Standing: Stanley Hong's Mannia Café," Detroit Metro Times, 03-Jan-2020. [Online]. Available: <https://www.metrotimes.com/the-scene/archives/2015/11/21/still-standing-stanley-hongs-mannia-cafe>. [Accessed: Feb-2020].
- R. Runyan, "Rehab this historic Milwaukee Junction building, yours for \$975K,"
- 73 Curbed Detroit, 18-Jan-2019. [Online]. Available: <https://detroit.curbed.com/2019/1/18/18187680/milwaukee-junction-building-rehab-for-sale>. [Accessed: Feb-2020].
- 74 LoopNet.com, "249 E Baltimore St, Detroit, MI, 48202 - Lodge/Meeting Hall Property For Sale," LoopNet. [Online]. Available: <https://www.loopnet.com/Listing/249-E-Baltimore-St-Detroit-MI/14838958/>. [Accessed: Feb-2020].
- 75 R. Ghazali, S. R. Sakip, I. B. Samsuddin "The Effects of Sensory Design on Autistic Children" Asian Journal of Behavioural Studies, Dec 2018
- 76 C. Henshall, "Unusual Sensory Experiences in People on the Autism Spectrum" Thesis. The University of Warwick. [Online] Available: <http://webcat.warwick.ac.uk/record=b2247749~S1> [Accessed Feb-2020]

## List of Figures

1. Jonathan Turner
2. Jonathan Turner
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9. Jonathan Turner
10. Jonathan Turner
11. Jonathan Turner
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13. Jonathan Turner
14. Jonathan Turner
15. Jonathan Turner
16. Jonathan Turner
17. "Clement Space in the City (2017)," Dawn, 21-Sep-2017. [Online]. Available: <https://dawnjoyleong.com/performances-exhibitions/clement-space-in-the-city-2017/>. [Accessed: Jan- 2020].
18. "Introducing A Space For Being," muuto. [Online]. Available: <https://muuto.com/introducing-a-space-for-being>. [Accessed: Jan-2020].
19. Z. Mortice, "These Architectural Playscapes Provide Therapy for Children with Autism," ArchDaily, 17-Dec-2016. [Online]. Available: <https://www.archdaily.com/801690/these-architectural-playscapes-are-designed-to-provide-therapy-for-children-with-autism>. [Accessed: Jan-2020].
20. Jonathan Turner + Amanda Gatto
21. Jonathan Turner + Amanda Gatto
22. Jonathan Turner + Amanda Gatto
23. Jonathan Turner + Amanda Gatto
24. Jonathan Turner + Amanda Gatto
25. Jonathan Turner + Amanda Gatto
26. Jonathan Turner + Amanda Gatto
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28. Jonathan Turner
29. Jonathan Turner
30. Jonathan Turner
31. Jonathan Turner
32. Jonathan Turner
33. Jonathan Turner

34. Jonathan Turner
35. Jonathan Turner
36. Jonathan Turner
37. Jonathan Turner
38. "Panoform" Panoform. [Online]. Available: <https://panoform.com/>. [Accessed: Feb-2020].
39. Jonathan Turner
40. Jonathan Turner
41. Jonathan Turner
42. Google Images. [Online]. Available: <https://www.google.com/imghp?hl=en>. [Accessed: Feb-2020].
43. Google Images. [Online]. Available: <https://www.google.com/imghp?hl=en>. [Accessed: Feb-2020].
44. Google Images. [Online]. Available: <https://www.google.com/imghp?hl=en>. [Accessed: Feb-2020].
45. Google Images. [Online]. Available: <https://www.google.com/imghp?hl=en>. [Accessed: Feb-2020].
46. Google Images. [Online]. Available: <https://www.google.com/imghp?hl=en>. [Accessed: Feb-2020].
47. Google Images. [Online]. Available: <https://www.google.com/imghp?hl=en>. [Accessed: Feb-2020].
48. Jonathan Turner
49. Jonathan Turner
50. Jonathan Turner
51. Jonathan Turner
52. Jonathan Turner
53. "Simon Sumphreys," Simon Humphreys. [Online]. Available: <https://www.simonhumphreys.co.uk/>. [Accessed: Mar-2020].
54. "Simon Sumphreys," Simon Humphreys. [Online]. Available: <https://www.simonhumphreys.co.uk/>. [Accessed: Mar-2020].
55. "Simon Sumphreys," Simon Humphreys. [Online]. Available: <https://www.simonhumphreys.co.uk/>. [Accessed: Mar-2020].
56. "Simon Sumphreys," Simon Humphreys. [Online]. Available: <https://www.simonhumphreys.co.uk/>. [Accessed: Mar-2020].
57. "Debra Ann November Wing, The Lerner School for Autism," Westlake Reed Leskosky. [Online]. Available: <https://www.wrl.design.com/projects/health-care/health-science/debra-ann-november-wing-the-lerner-school-for-autism>. [Accessed: Mar-2020].
58. "Debra Ann November Wing, The Lerner School for Autism," Westlake Reed Leskosky. [Online]. Available: <https://www.wrl.design.com/projects/health-care/health-science/debra-ann-november-wing-the-lerner-school-for-autism>. [Accessed: Mar-2020].
59. "Debra Ann November Wing, The Lerner School for Autism," Westlake Reed Leskosky. [Online]. Available: <https://www.wrl.design.com/projects/health-care/health-science/debra-ann-november-wing-the-lerner-school-for-autism>. [Accessed: Mar-2020].

60. "Debra Ann November Wing, The Lerner School for Autism," Westlake Reed Leskosky. [Online]. Available: <https://www.wrl.design.com/projects/health-care/health-science/debra-ann-november-wing-the-lerner-school-for-autism>. [Accessed: Mar-2020].
61. "Debra Ann November Wing, The Lerner School for Autism," Westlake Reed Leskosky. [Online]. Available: <https://www.wrl.design.com/projects/health-care/health-science/debra-ann-november-wing-the-lerner-school-for-autism>. [Accessed: Mar-2020].
62. "Debra Ann November Wing, The Lerner School for Autism," Westlake Reed Leskosky. [Online]. Available: <https://www.wrl.design.com/projects/health-care/health-science/debra-ann-november-wing-the-lerner-school-for-autism>. [Accessed: Mar-2020].
63. Prasad, "The Pears National Centre for Autism," Penoyre & Prasad. [Online]. Available: <https://www.penoyreprasad.com/project/national-centre-for-autism>. [Accessed: Mar-2020].
64. Prasad, "The Pears National Centre for Autism," Penoyre & Prasad. [Online]. Available: <https://www.penoyreprasad.com/project/national-centre-for-autism>. [Accessed: Mar-2020].
65. Prasad, "The Pears National Centre for Autism," Penoyre & Prasad. [Online]. Available: <https://www.penoyreprasad.com/project/national-centre-for-autism>. [Accessed: Mar-2020].
66. Prasad, "The Pears National Centre for Autism," Penoyre & Prasad. [Online]. Available: <https://www.penoyreprasad.com/project/national-centre-for-autism>. [Accessed: Mar-2020].
67. Prasad, "The Pears National Centre for Autism," Penoyre & Prasad. [Online]. Available: <https://www.penoyreprasad.com/project/national-centre-for-autism>. [Accessed: Mar-2020].
68. "Autism-Friendly-Design: ga architects: London: United Kindom," gaautismga. [Online]. Available: <https://www.autism-architects.com/>. [Accessed: Mar-2020].
69. "Autism-Friendly-Design: ga architects: London: United Kindom," gaautismga. [Online]. Available: <https://www.autism-architects.com/>. [Accessed: Mar-2020].
70. "Autism-Friendly-Design: ga architects: London: United Kindom," gaautismga. [Online]. Available: <https://www.autism-architects.com/>. [Accessed: Mar-2020].
71. "Autism-Friendly-Design: ga architects: London: United Kindom," gaautismga. [Online]. Available: <https://www.autism-architects.com/>. [Accessed: Mar-2020].
72. "Autism-Friendly-Design: ga architects: London: United Kindom," gaautismga. [Online]. Available: <https://www.autism-architects.com/>. [Accessed: Mar-2020].
73. "A Centre for Autism - New Struan - aitken-turnbull," aitken. [Online]. Available: <https://www.aitken-turnbull.co.uk/project/centre-autism-new-struan/>. [Accessed: 20-Apr-2020].
74. "A Centre for Autism - New Struan - aitken-turnbull," aitken. [Online]. Available: <https://www.aitken-turnbull.co.uk/project/centre-autism-new-struan/>. [Accessed: 20-Apr-2020].
75. "A Centre for Autism - New Struan - aitken-turnbull," aitken. [Online]. Available: <https://www.aitken-turnbull.co.uk/project/centre-autism-new-struan/>. [Accessed: 20-Apr-2020].

76. "A Centre for Autism - New Struan - aitken-turnbull," aitken. [Online]. Available: <https://www.aitken-turnbull.co.uk/project/centre-autism-new-struan/>. [Accessed: 20-Apr-2020].
77. Jonathan Turner
78. Jonathan Turner
79. Google Images. [Online]. Available: <https://www.google.com/imghp?hl=en>. [Accessed: Feb-2020].
80. Jonathan Turner
81. Jonathan Turner
82. Jonathan Turner
83. Jonathan Turner
84. Jonathan Turner
85. Jonathan Turner
86. Jonathan Turner
87. Jonathan Turner
88. Jonathan Turner
89. Jonathan Turner
90. Jonathan Turner
91. Detroiturbex.com - Stanley Hong's Mannia Cafe. [Online]. Available: <http://www.detroiturbex.com/content/downtown/hongs/index.html>. [Accessed: Feb-2020].
92. R. Runyan, "Rehab this historic Milwaukee Junction building, yours for \$975K," Curbed Detroit, 18-Jan-2019. [Online]. Available: <https://detroit.curbed.com/2019/1/18/18187680/milwaukee-junction-building-rehab-for-sale>. [Accessed: Feb-2020].
93. R. Runyan, "Rehab this historic Milwaukee Junction building, yours for \$975K," Curbed Detroit, 18-Jan-2019. [Online]. Available: <https://detroit.curbed.com/2019/1/18/18187680/milwaukee-junction-building-rehab-for-sale>. [Accessed: Feb-2020].
94. R. Runyan, "Rehab this historic Milwaukee Junction building, yours for \$975K," Curbed Detroit, 18-Jan-2019. [Online]. Available: <https://detroit.curbed.com/2019/1/18/18187680/milwaukee-junction-building-rehab-for-sale>. [Accessed: Feb-2020].
95. R. Runyan, "Rehab this historic Milwaukee Junction building, yours for \$975K," Curbed Detroit, 18-Jan-2019. [Online]. Available: <https://detroit.curbed.com/2019/1/18/18187680/milwaukee-junction-building-rehab-for-sale>. [Accessed: Feb-2020].
96. Google Images. [Online]. Available: <https://www.google.com/imghp?hl=en>. [Accessed: Feb`-2020].
97. Jonathan Turner
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"You are the most brave intrepid person I have ever known, and you have dedicated your life to helping those who are misunderstood and underrepresented."

- Claire Danes

