

**“MY vs THEIR World:” “OUR World” Learning Network for
Autism Spectrum Disorder**

by

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Abstract

People with Autism Spectrum Disorder are not properly accommodated in the built environment, societal daily life, and medical services. Autism is a behaviourally defined disorder based on impairments in social-emotional relationships, and restricted patterns of behaviours, interests or activities. Remaining unaware of the disorder fractures a person's with autism relationship with neurotypical people; diverging an autism "my" world and neurotypical "their" world. To merge the two worlds, the thesis has three architectural goals utilizing the Autism ASPECTSS Design Index for a new "our" world: to encourage interaction, spread awareness, and teach autism resilience skills for unsettling environments. The building, located in Gorsebrook Park, Halifax, Nova Scotia, is a three tier learning centre that provides knowledge and services for the public, professionals, and people with autism. The resulting "our" world advances the concept of inclusive design; intertwining different groups that require support to meaningfully engage and understand each other.

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To my friends hopscotching multiple time zones - Yan, you've always had my back and cared for me; your luxury noodle soup will forever be my favourite. Theresa, you're the glue that brought all of us together; please pay for grandma's next meal. Bianca, we balance each other out; I can feel compassion in your eyes. Alice, you've graciously welcomed me into your life; your whimsical mind is my inspiration.

To Enrique - you're my charm against the elements: crash mat (earth), parachute (air), extinguisher (fire), and lifebuoy (water); I will have to learn shapeshifting to repay your generosity.

Chapter 1: Introduction

1.1 “My” World and “Their” World

How to bridge the gap between “my” and “their” world?

The fundamental question of the thesis is how to bridge the gap between “my” and “their” world? The perspective of an autism “my” world and neurotypical “their” world is based off the autism autobiography by Donna Williams, titled *Nobody Nowhere: The Remarkable Autobiography of an Autistic Girl*, where she felt she lived in a “world under glass” (Williams 1999, 6).

In a world under glass,
you can watch the world pass,
And nobody can touch you,
you think you are safe.
But the winds blow cold,
in the depths of your soul,
Where you think nothing can hurt you,
till it is too late. (Williams 1999, 6)

The dichotomous relationship is also found in Temple Grandin’s *Emergence: Labeled Autistic*. Grandin refers to “my” world as “inner world” (Grandin and Scariano 2005, 9) and “their” world as the world “out there” (Grandin and Scariano 2005, 11). Her childhood memories explain “how autistic children perceive and respond in unusual ways to the strange world around them - the world they are desperately trying to give some order to” (Grandin and Scariano 2005, 11-12).

The two world existence is due to unawareness and misunderstanding on both sides of an interaction between a person with autism and a neurotypical, which can potentially

cause feelings of isolation and separation. Within “my” world, the common autism behaviours initiate the narration of perception and events. In contrast, “their” world is resistant to people with autism, as most neurotypical people are unaware of how it feels to be on the spectrum and do not know how to recognize the behaviours of the disorder. This could lead to an emotional response of discomfort, confusion, anger, or annoyance, and accumulate to society stigma against the disorder. To address the divergent relationship, the thesis investigates three goals through architectural means: first to encourage mutual interaction, second to spread autism knowledge, and third to help people with autism gain skills to cope in unpleasant environments.

1.2 Thesis Questions

1. How to bridge the gap between “my” and “their” world?

1 a.) How to encourage interaction/conversation between people with autism and neurotypical people?

1 b.) How to spread autism knowledge/awareness across a broad range of people?

1 c.) How to create an opportunity for a person with autism to gain resilience to a neurotypical environment?

1.21 Encouraging Interaction

How to encourage interaction/conversation between people with autism and neurotypical people?

The first goal introduces a new “our” world as a method for encouraging interaction/conversation between people with autism and neurotypical people. “Our” world is a mutual space that welcomes “my” and “their” worlds to come together peacefully. The intention of “our” world is to teach

autism skills and knowledge to both people with autism and neurotypical people, which may become a precursor to motivate meaningful engagement and understanding. To do so, autism learning programs and sensory neutral social spaces are proposed to create a lens into the other's world. The building is designed with Autism ASPECTSS Design Index to accommodate the architectural needs of a person with autism; so they can feel at ease within the built environment and have more energy for socializing or completing activities (Mostafa 2015a, 58).

1.22 Spreading Knowledge and Awareness

How to spread autism knowledge/awareness across a broad range of people?

The second goal proposes multiple groups of people whom lack services and education within one building: public, professional, and people with autism. The public as a whole has varied knowledge, experience, and exposure of autism spectrum disorder. Further, there is an issue of continually circulating information that is out of date and incorrect. It will be difficult for a person with no background in psychology to verify the credibility of the resources. In the professional field, it has been found in Nova Scotia that family doctors, psychologists, psychiatrists, and occupational therapists have inconsistent knowledge of the disorder (AutismNS 2016, 16). It is a critical knowledge deficit issue, and leads people with autism in Nova Scotia to have prolonged diagnosis, and insufficient amount of services for children and adults.

The building organization is a three tier learning centre that provides programs for the public, professionals, and people with autism to learn separately in their own educational

centres and collectively from each other in the social spaces. The thesis will discuss architectural strategies for programming, sensory zoning, and escape spaces, which allow people with autism the ability to manage their sensory intake and take their time to join a conversation in a social space.

1.23 Neurotypical Environment Resilience

How to create an opportunity for a person with autism to gain resilience to a neurotypical environment?

The third goal accepts the reality that most of the built environment is designed for neurotypical people, therefore people with autism need to gain resilience skills to overcome difficulties and not be restrained to small comfort zones. It is an inappropriate approach to design only a sanctuary for people with autism, because the greenhouse effect makes the outside environment seem more harsh the longer they stay in the calming space (Mostafa 2015a, 58). A careful ratio of spaces that are autism friendly and more neurotypical is preferred, and a gradual gradient between these two spaces can help a person tackle the challenge on their own terms. The thesis will discuss the structural gradient strategy as a method for creating a building that is flexible for the user to choose their sensory exposure, and have control on how they feel, not the architecture controlling them.

1.3 Overview

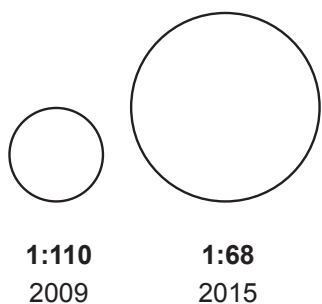
The thesis begins with Chapter 2 with an explanation of Autism Spectrum Disorder. It discusses the increasing statistics, updated spectrum definition, autism behaviour, and associated conditions. Chapter 3 breaks down the Autism ASPECTSS Design Index, created by Magda Mostafa. The design methods focus on sensory control, autism behaviour,

and resilience. Chapter 4 analyzes the existing autism programs in Nova Scotia and proposed programs of the building. The data is taken from Autism Nova Scotia's report and leads to the decisions for the three group audience: public, professional, and people with autism. Chapter 5 discusses the building proposal, Gorsebrook Learning Network Centre. It is organized into the overall "our" world concept, site in Halifax, building compartments, three learning centres, and detailed five space analysis. Lastly, the conclusion reflects on the thesis questions, research summary, recommendations, and contributions of the work.

Chapter 2: Autism Spectrum Disorder

2.1 [____] on the Spectrum

Autism Spectrum Disorder is a neurological disorder that is advancing continually in clinical research. Statistical numbers of the disorder are increasing drastically, and diagnostic criteria has changed to improve diagnosis procedures. The most recent *Diagnostic and Statistical Manual of Mental Disorders Fifth Edition*, DSM-5, designates the condition as a multidimensional spectrum instead of a linear spectrum in the previous DSM-4 (Mazurek et al. 2018, 269). The DSM-5 incorporates developmental stages, in that a person with autism must show symptoms from early childhood (APA 2013). The diagnosis behaviour criteria is separated into two domains: “social communication and interaction” and “restricted, repetitive patterns of behaviour, interests or activities” (Carpenter 2013). In addition, autism commonly occurs with other conditions, such as Sensory Processing Disorder and executive functioning impairments. Each person with autism has an unique behavioural profile; therefore, a building needs to be flexible for the range of communication, interaction, behaviour, and sensory on the spectrum.



The prevalence of autism has nearly doubled within six years (data from AutismNS 2016).



The gender ratio is 4:1 male to female (data from APA 2013).



There are an estimated 13900 people on the spectrum in Nova Scotia (AutismNS 2016, 4).

2.2 Statistics

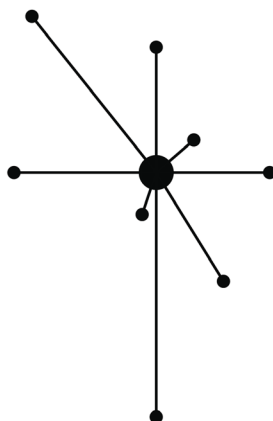
Within six years, the prevalence of Autism Spectrum has almost doubled, from 1:110 in 2009 (AutismNS 2016, 4) to 1:68 in 2015 (AutismNS 2016, 4). The gender ratio is 4:1 male to female (Ofner et al. 2018, 1). In relation to Nova Scotia, there are estimated 13 900 people are on the autism spectrum (AutismNS 2016, 4). This increase isn't likely to

drop, as Autism Spectrum disorder is considered the most heritable childhood psychiatric disorder (Tantam 2012, 7). Within an affected family, parents and siblings of a person with autism are more likely to present characteristics of autism behaviour, such as unusual face scanning strategies (Tantam 2012, 7).

2.3 Spectrum

2.31 DSM-4 Not Linear

The previous criteria for diagnosing autism in the *Diagnostic and Statistical Manual of Mental Disorders Fourth Edition* (DSM-4) categorized the disorder into four separate disorders: autistic disorder (Kanner Syndrome), Asperger's disorder, childhood disintegrative disorder, or pervasive developmental disorder not otherwise specified (APA 2013). It was understood as a linear spectrum, ranging from low functioning (autistic disorder/Kanner Syndrome) to high functioning (Asperger's disorder). This became an inconsistent diagnosis tool for clinicians, because there was descriptive overlap and no clear boundaries between disorders on the spectrum (Tantam 2012, 179). As a condition over a life span, the linear system did not accommodate the changes of the disorder over time, therefore it was unpredictable if a clinician would diagnose the same person with autistic disorder as a child and Asperger's disorder as an adult, or vice versa in rare cases (Tantam 2012, 183). It was found that the separate diagnoses were not applied consistently across different clinics and treatment centres, which initiated the changes in the new DSM-5 (APA 2013).



Autism is a multi-dimensional spectrum.

2.32 DSM-5 Multi-Dimensional Spectrum

The DSM-5 denotes autism as an umbrella disorder that allows for variation in symptoms and behaviours (APA 2013). Rather than a linear system, it is a multi-dimensional application for assessing severity in two domains, social communication and restricted and repetitive behaviour (Mazurek et al. 2018, 269). The decision was intended to “improve the diagnosis of ASD without limiting the sensitivity of the criteria, or substantially changing the number of children being diagnosed” (APA 2013).

2.33 Developmental Stages

The DSM-5 added a new criterion that the DSM-4 did not take into account, which is assessment linked with developmental stages. The criterion is “individuals with ASD must show symptoms from early childhood, even if those symptoms are not recognized until later” (APA 2013). This could potentially expand the age range for younger children and adults, whose symptoms might have not been fully recognized until social tasks became too demanding (APA 2013). In support, an experienced clinician Digby Tantam has observed that most of his patients, recommended by their caregivers or themselves, sought help during transitions between developmental stages (Tantam 2012, 19).

2.4 Autism Behaviour

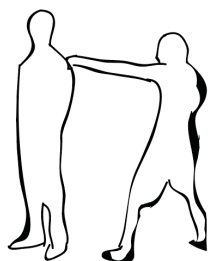
2.41 DSM-5 Behavioural Criteria

The first main category of the DSM-5 behavioural criteria is “persistent deficits in social communication and social interaction across contexts” (Carpenter 2013). It has three subcategories addressing social initiation and response, non-verbal communication, and social awareness, insights

and relationships. The second category of the DSM-5 behavioural criteria is “restricted, repetitive patterns of behaviour, interests, or activities,” (Carpenter 2013) pertaining a diagnosis if the person has two of the following subcategories. The subcategories include repetitive speech/motor movements/use of objects, routines, restricted interests, and Sensory Processing Disorder (Carpenter 2013).

2.42 Social Communication and Interaction

Social-Emotional Reciprocity



Abnormal social approach.

People with Autism can have difficulty with social initiation and response, due to poor skills in social approach, conversations, sharing interests and emotions, social interaction initiation, and social imitation (Carpenter 2013). They may be unaware of how to approach someone and exhibit an “abnormal social approach” (Carpenter 2013) to get someone’s attention, such as intrusive touching or licking of others (Carpenter 2013). Normal back and forth conversations may be hindered with one sided monologues and poor pragmatic use of language for the listener to follow (Carpenter 2013). Topics or objects of interest may be more often kept to themselves and not showed, brought, or pointed out to other people (Carpenter 2013). While interacting with other people, they may be less likely to respond to another person’s smile, and share enjoyment, excitement, or achievements with others (Carpenter 2013). Social interactions may be limited and only initiated to get help from another person (Carpenter 2013). Simple social games may be difficult, because of poor social imitation skills (Carpenter 2013).

Nonverbal Communication

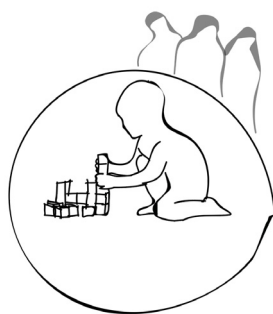
People with Autism can have problems with nonverbal communication, such as social eye contact, coordination of verbal and nonverbal communication, body postures, gestures, and speech (Carpenter 2013). Within a conversation, a person with autism may not use social eye contact and may be unable to coordinate eye contact with their words or gestures (Carpenter 2013). They may not understand body postures or gestures, and misuse them during interaction, such as facing away from the listener or mistaking the meaning of nodding or shaking a head (Carpenter 2013). Facial expressions of others may be difficult to recognize or understand, causing limited or exaggerated use of their own facial expressions and little warm expressions towards others (Carpenter 2013). They may have “abnormal volume, pitch, intonation, rate, rhythm, stress, or prosody” in their speech (Carpenter 2013).



Impaired social use of eye contact.

Developing and Maintaining Relationships

A person with autism can have issues with social awareness and relationships, causing difficulties in developing relationships, adjusting to social contexts, imaginative play, friendship, and disinterest in others (Carpenter 2013). An inability to process another person’s perspective may make it difficult to develop and maintain relationships (Carpenter 2013). They may respond inappropriately to social contexts by not recognizing another person’s disinterest in an activity or laughing out of context (Carpenter 2013). Sharing imaginary play with others can be harder, such as social role playing (Carpenter 2013). Friends can be difficult to obtain, because they may not try to make a friend, have any preferred friends, or become rigid or passive when



Absence of interest in others.

are interested in friendship (Carpenter 2013). In addition, they could be completely disinterested in others and seem withdrawn in their own world, unaware of those around them (Carpenter 2013).

2.43 Restricted, Repetitive Patterns of Behaviour, Interests, or Activities

Speech, Movements, and Play

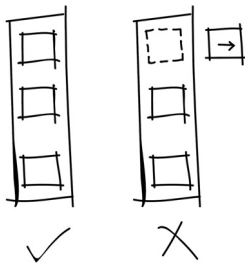
A person with Autism could have “stereotyped or repetitive speech, motor movements, or use of objects” (Carpenter 2013). Their speech style may have excessive formal language, jargon, or metaphorical references that only those who are familiar with the person would understand the meaning (Carpenter 2013). Repetition of words, phrases, songs, or vocalizations may also be used (Carpenter 2013). They may have repetitive motor movements ranging from teeth grinding, hand clapping, toe walking, to spinning whole body (Carpenter 2013). Behaviour towards objects may be lining up their possessions or repetitively turning lights on and off (Carpenter 2013).



Repetitive spinning.

Rituals and Resistance to Change

People with Autism can have “excessive adherence to routine, ritualized patterns of verbal or nonverbal behaviour, or excessive resistance to change” (Carpenter 2013). They may have difficulty functioning without a routine and insist on following their specific or unusual routine (Carpenter 2013). Patterns of verbal and nonverbal behaviour can include the need to say something a specific way, and impulse to turn in circles three times before entering a room (Carpenter 2013). They may have strong resistance to change, such as moving items at the dinner table or driving a different route



Excessive resistance to change.

(Carpenter 2013). Humor, irony, or implied meaning may be difficult to understand due to rigid thinking (Carpenter 2013).

Preoccupations with Objects or Topics

People with Autism can have “highly restricted, fixated interests that are abnormal in intensity or focus” (Carpenter 2013). Their interests may be within a narrow range and abnormal in intensity, such as a focus for numbers, letters, or symbols (Carpenter 2013). For objects, they may have an attachment to carry a piece of string or rubber band (Carpenter 2013). On a single object, they may focus on the irrelevant or non-functional parts (Carpenter 2013).

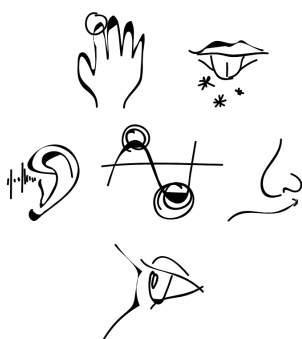


Preoccupation with numbers.

2.5 Associated Conditions

2.51 Sensory Processing Disorder

Sensory Processing Disorder has a high 80-90% comorbid rate to autism spectrum disorder (Galiana-Samal et al. 2020, 5) and is included in the DSM-5 second behaviour domain “restricted, repetitive patterns of behaviour, interests, or activities” (Carpenter 2013). People with Sensory Processing Disorder “have impaired responses to, processing of, and/or organization of sensory information that effects participation in functional daily life routines and activities” (Miller et al. 2009, 1). The atypical sensory behaviours are “hyper- or-hypo-reactivity to sensory input or unusual interest in sensory aspects of environment” (Carpenter 2013). Reactivity to sensory input could be no reaction to pain/heat/cold, odd response to sounds/textures, and overly smelling or touching of objects (Carpenter 2013). Unusual interest in sensory aspects of the environment could be “fascination with lights or spinning objects” (Carpenter 2013).



Sensory Processing Disorder.

2.52 Executive Functioning

People with autism commonly have impairments in executive functioning skills (Tantam 2012, 161). Executive functioning skills are the “neurocognitive skills necessary for the top-down, goal-directed modulation of attention and behaviour,” and measured as three skills: cognitive flexibility, working memory, and inhibitory control (Zelazo 2015, 56- 57). These skills are used for intentional action, such as goals of staying focused while reading or pursuing a career (Zelazo 2015, 57). Cognitive flexibility “involves thinking about something in multiple ways,” which could include task switching or considering another person’s perspective (Zelazo 2015, 57). Working memory is keeping and manipulating information within the mind (Zelazo 2015, 57). Inhibitory control “involves deliberately suppressing attention . . . to something,” for example ignoring a distraction or holding back impulsive speech (Zelazo 2015, 57).

Chapter 3: Autism Design Tools

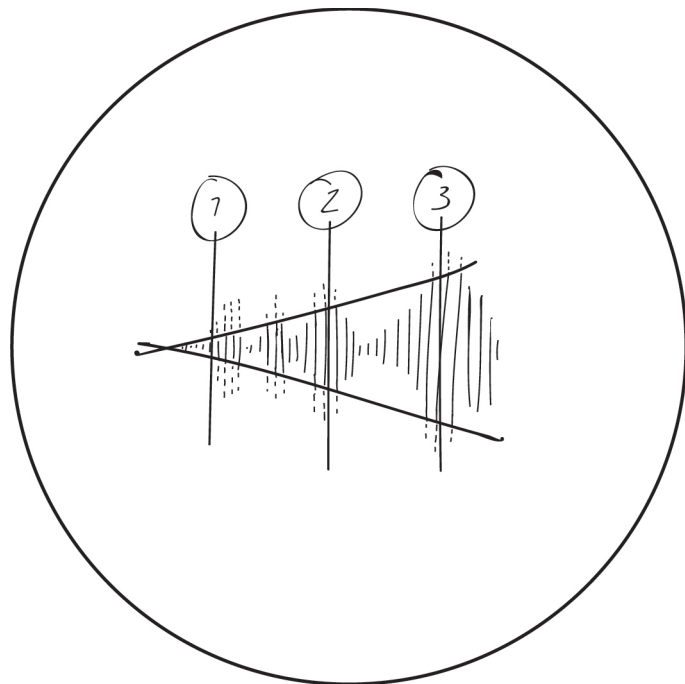
3.1 Pursuing “My” Perfect World

Design for “my” world is a relatively new concept with various approaches and methods within the past two decades, but the first globally released set of evidence based guidelines was the Autism ASPECTSS Design Index by Magda Mostafa, PhD (Mostafa 2015b). Mostafa is an Associate Professor at the American University and Design Associate at Progressive Architects in Cairo, Egypt (Mostafa 2015c). She began research for the Autism ASPECTSS Design Index in 2002, when there was few literature sources on guidelines for autism design (Mostafa 2015a, 55) and no international design codes (Mostafa 2015a, 56). Now with over ten years of research, the Autism ASPECTSS Design Index was awarded in 2014 the International Union of Architects (UIA) Architecture for All Research Award (Mostafa 2015c). The Design Index has one goal: “to alleviate the autistic users sensory overload and provide him or her means to manage it when it occurs, in order to open a window of opportunity for learning, social interaction, and general skill development” (Mostafa 2015a, 58). The three design strategies are reduced sensory input, predictable organization, and designated spaces for resting during sensory overload (Mostafa 2015a, 58). These strategies formed the seven criteria of the Autism ASPECTSS Design Index: acoustics, spatial sequencing, escape space, compartmentalization, transition spaces, sensory zoning, and safety. The thesis does not use spatial sequencing and safety, because the building does not have a usage schedule or is designed specifically for children.

3.1 Autism ASPECTSS Design Index

3.11 Acoustic Control

The acoustics of the space control the background noise, echo, and reverberation in relation to the intended concentration level of the space (Mostafa 2015a, 58).

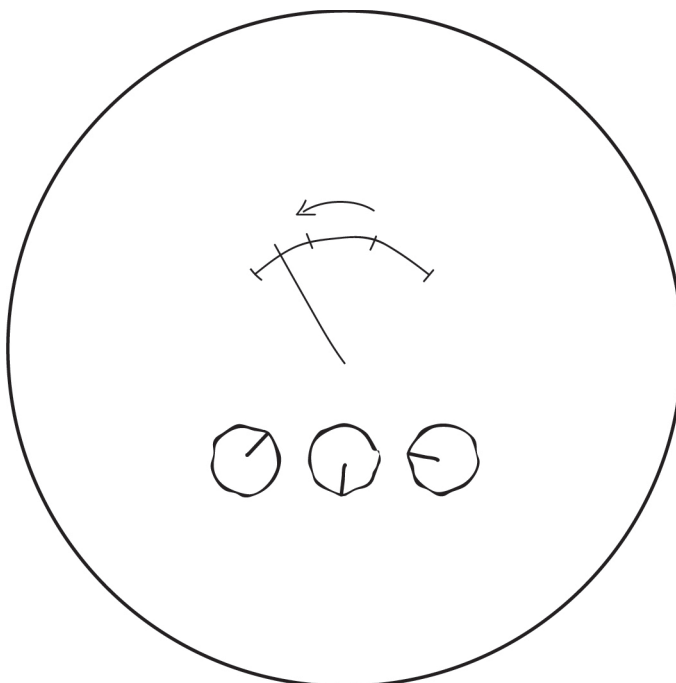


Acoustic Control absorbs sound in relation to concentration level.

1. high concentration
2. medium concentration
3. low concentration

3.12 Escape

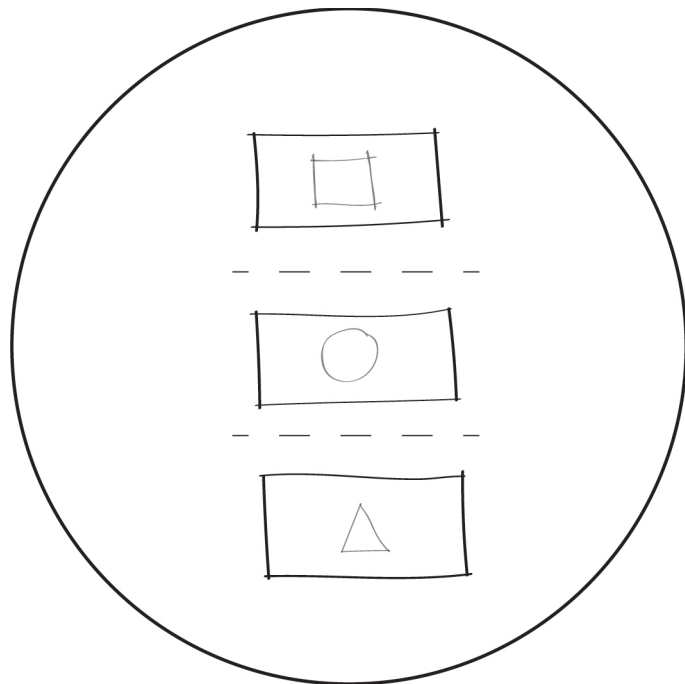
An escape space provides an opportunity for people with autism that become overwhelmed in a public space to vacate and regulate their nervous system in an calming area. The important factor in this method is the option of customization, where the person can choose the sensory settings that they need (Mostafa 2015a, 58).



An escape space allows people with autism to manage their sensory levels in a customizable space.

3.13 Compartmentalization

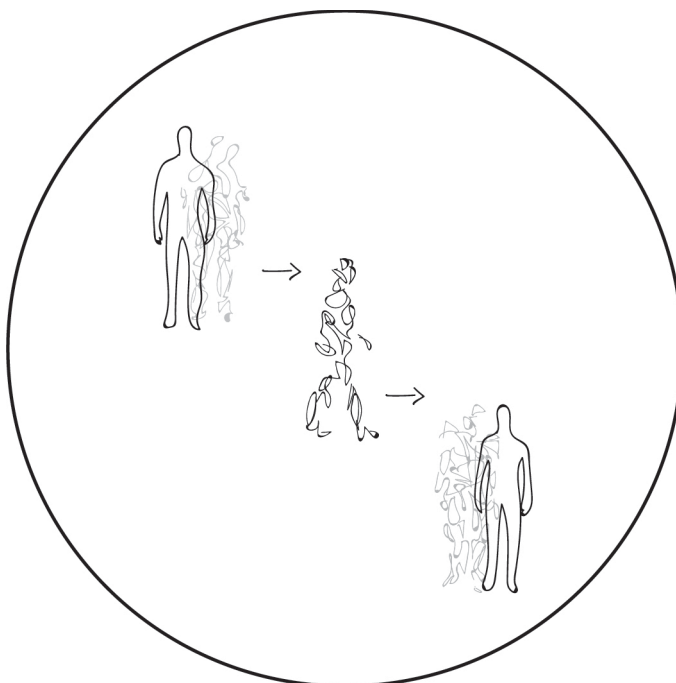
Compartmentalization is organizing a building into spaces that have single uses and lower occupancy (Mostafa 2015a, 58). This allows for the experience to have the minimum of sensory and social intake, enabling a person with autism to participate in an activity easier (Mostafa 2015a, 58). The separation between compartments can be visually signalled through changes in material, architectural composition, or floor variances (Mostafa 2015a, 58).



Compartments have their own functions and sensory qualities, and their separation is indicated by sensory cues.

3.14 Transition Spaces

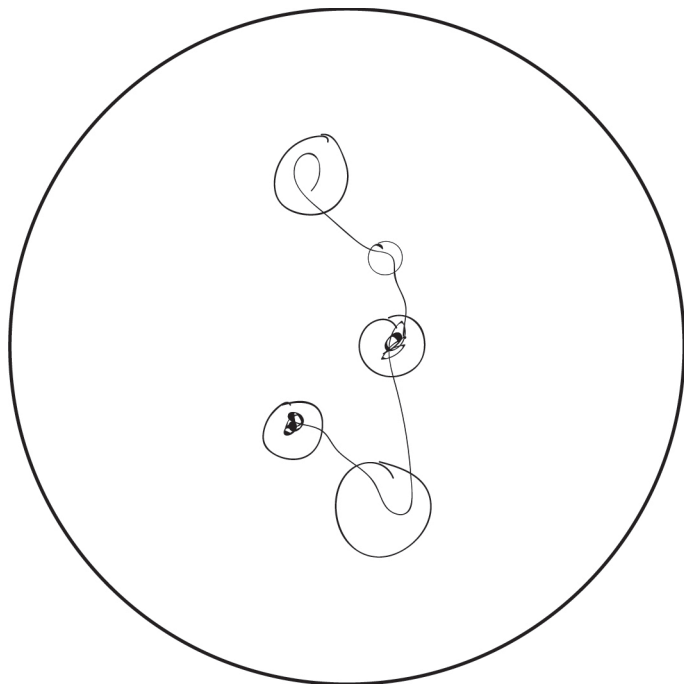
Proceeding areas in a sequence with different sensory states require a sensory neutral transition space between them. This allows time for a person with autism to recalibrate their nervous system before entering the next stimulus level (Mostafa 2015a, 58).



A transition space provides the opportunity for a person with autism to prepare before entering a new sensory zone.

3.15 Sensory Zoning

Sensory Zoning groups programs in accordance to their sensory level, and places transition spaces in between them (Mostafa 2015a, 58-59).



Programs are grouped by their sensory levels and have transition spaces between the groups.

Chapter 4: Existing Autism Services and Proposed Programs

4.1 Response to the Call for Action

Although Autism Spectrum Disorder is gaining ground in the clinical research sector, the implementation and usage of this knowledge is falling behind in the public and private health care system. In Nova Scotia, a non-profit organization called Autism Nova Scotia is desperately trying to catch people falling through the cracks of the health system. This is too strenuous for a small group to handle, and they have released numerous public reports asking the government to provide services. The thesis is an architectural response to the call for action; tackling Autism Nova Scotia's goals for improvement by interlinking public, professional, and autism learning centres within a single building.

4.2 Autism Nova Scotia

AutismNS is a community organization in Nova Scotia that supports people with autism and their families. The organization has a network of connections within the School Boards, Department of Education, Special Education Programs and the Services Advisory Committee, Preschool Transition Specialists, Early Intervention Services, daycares across the province, Department of Community Services, IWK Health Centre, and Private service providers (AutismNS 2016, 21-22). As demands for autism support programs have grown in the province, AutismNS has been working on providing programs and services for "employment, education, respite care coordination, expanded family support, system navigation support, social and life skills training, autism appropriate housing" and many others

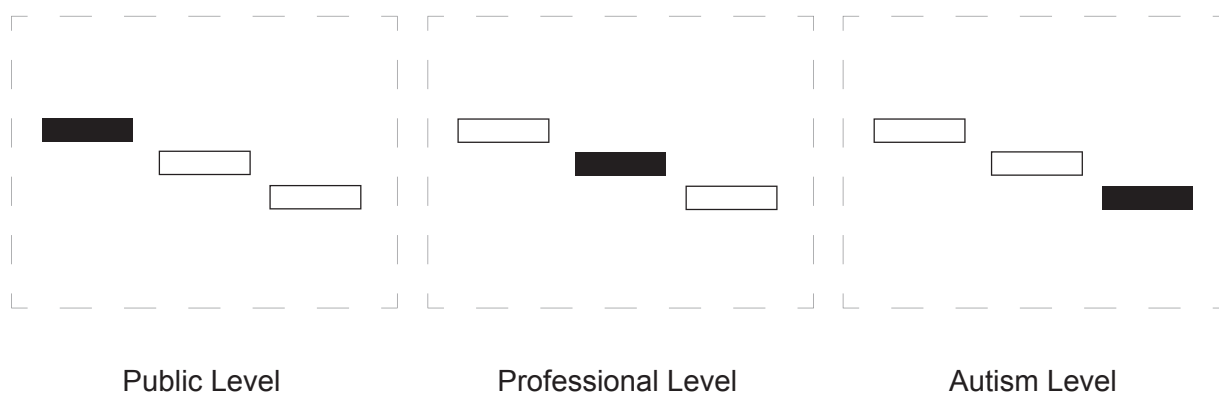
(AutismNS 2016, 7). However, the organization has few staff members and the “demand is consistently exceeding available resources” (AutismNS 2016, 21).

4.3 Assessment of Programs and Services

Nova Scotia was deemed the national leader of autism supports in 2010, but the province still has a long way to go, as many families and people with autism are currently in crisis (AutismNS 2016, 4). In recognition of a growing issue, the Nova Scotia Autism Management Advisory Team (AMAT) published *Autism Management Advisory Team Report on Lifespan Needs for Persons with Autism Spectrum Disorder* (AMAT Report) in 2010 (AutismNS 2016, 6). The report recommended the top priorities for support: “early diagnosis and intervention, well-trained educators, health professionals and respite workers, and needs-specific resources and services” (AutismNS 2016, 6). In response the following year, the government developed the *Autism Spectrum Disorder Action Plan* that outlined five areas for investment and support: “intervention and support service for families with preschool children diagnosed with ASD; supports for adults with ASD and their families; skills training and awareness; and partnerships to support programming and services” (AutismNS 2016, 6). Since the publishing of the Action Plan in 2011, the government has only focused on one of the areas listed previously, early intervention, which was already initiated in 2004 with the Early Intensive Behavioural Intervention (EIBI) (AutismNS 2016, 6-7). AutismNS released their own report in 2016, *Choosing Now: Investing in Nova Scotians Living with Autism*, with an overview of the continuing problem and solutions on how Nova Scotia can do better to accommodate the needs of people with autism.

4.4 Proposed Programs

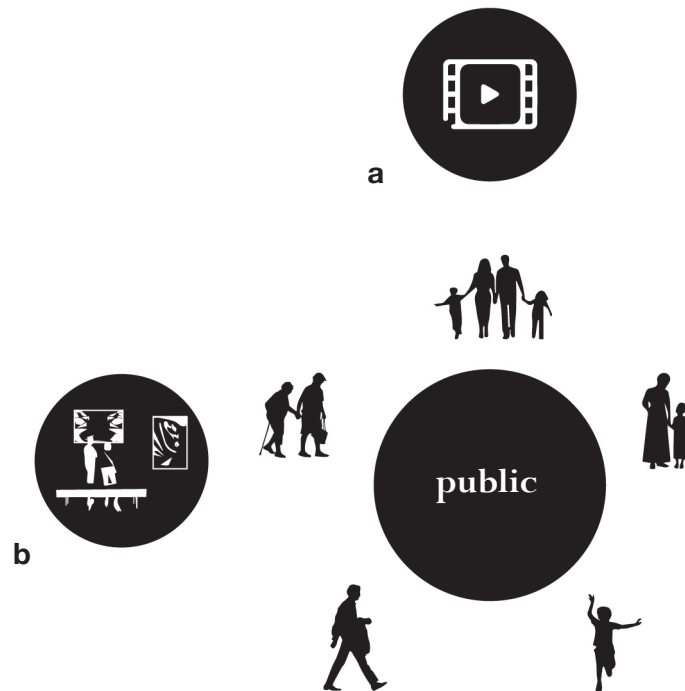
The thesis intends to address three of the five concerns listed in *Autism Spectrum Disorder Action Plan* in 2011 that have not been resolved by the government: “skills training and awareness, partnerships to support programming and services, and supports for adults with autism and their families” (AutismNS 2016, 6). Supports for adults is crucial, because the Nova Scotia public health care system does not provide diagnosis or adequate support services. This leads adults and even children who cannot handle the waitlists for diagnosis, to spend thousands of dollars for help from private psychologists. The main issues are public stigma, professional skills training, and autism support and services for all ages. From the concerns, the targeted audience chosen are three groups of people: public, professional, and people with autism. The building organizes the groups across three separate levels: public on third level, professional on second level, and people with autism on first level.



Group distribution across floor levels.

4.41 Public Level Programs

Located on the third floor, the public learning centre consists of interactive and expressive autism narratives. The learning programs are film screening, art gallery, and exhibition. As the most neurotypical level, the escape space provided is a cafe.



a | film screening

b | art gallery/exhibition

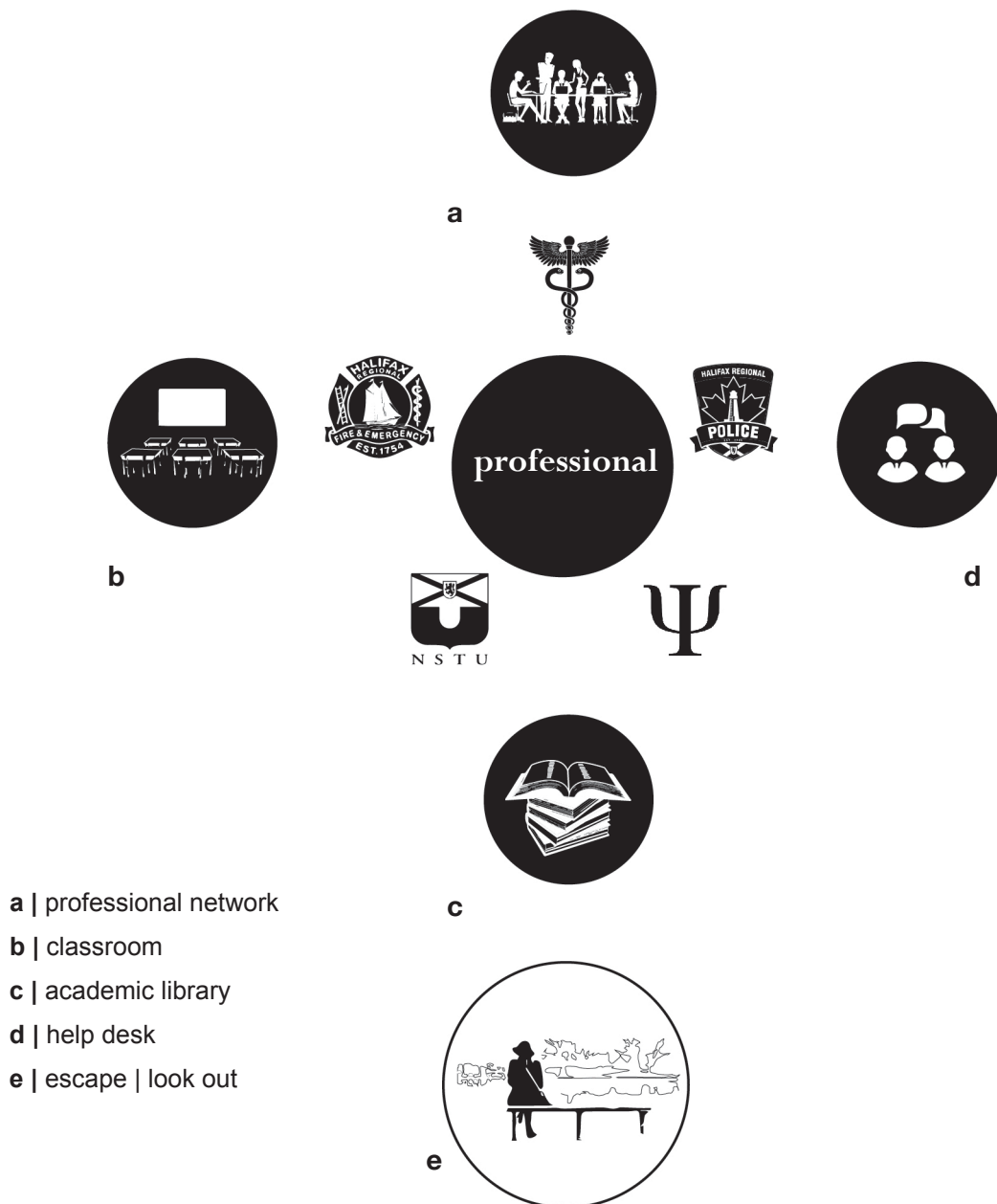
c | escape | cafe



Public level education and escape programs.

4.42 Professional Level Programs

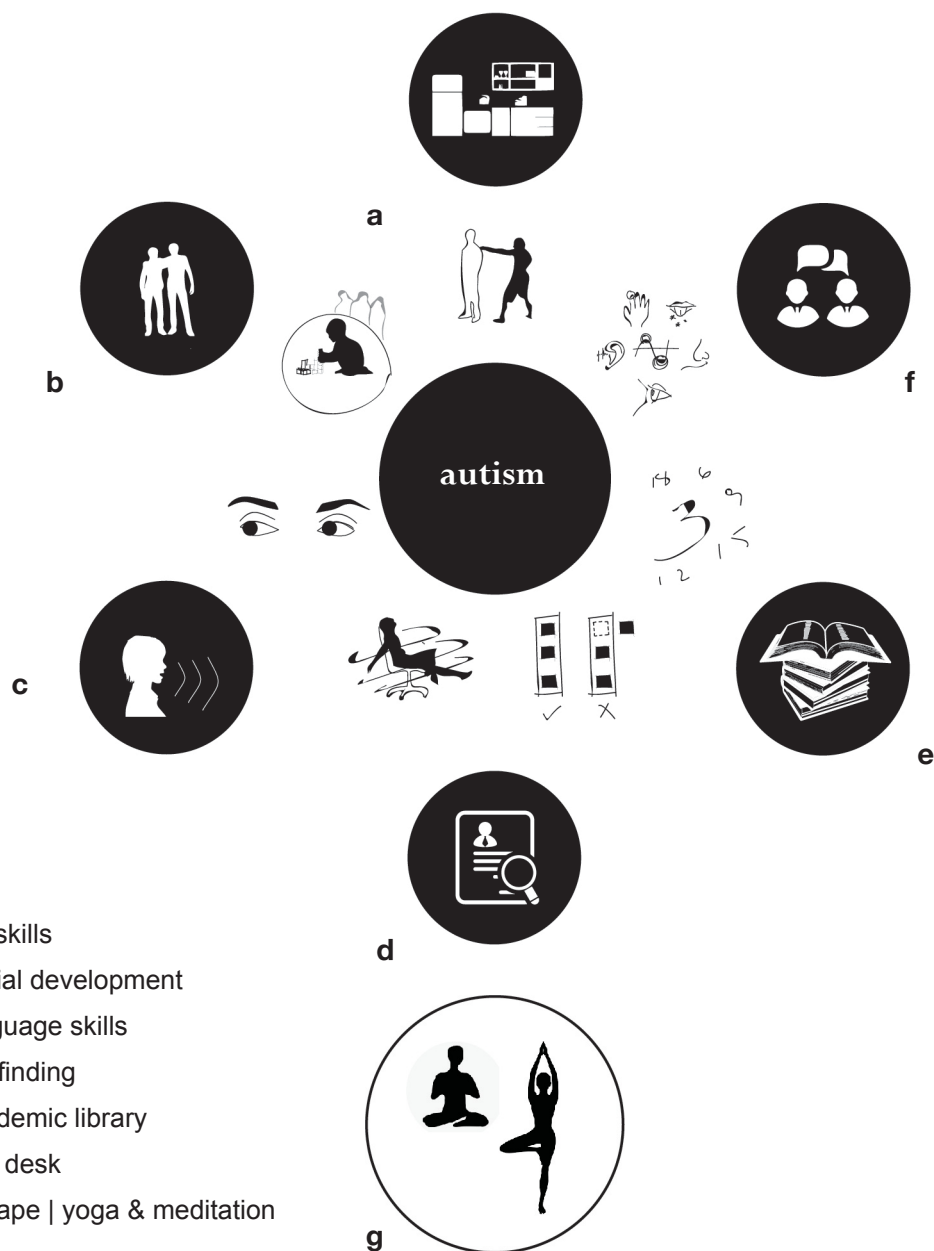
Located on the second floor, the professional learning centre aims to educate doctors, psychologists, psychiatrists, police, first responders, fire fighters, and teachers on autism practices. The centre will host a multidisciplinary information hub, classroom, academic library, and help desk. The escape space is half enclosed with a private look out.



Professional level education and escape programs.

4.43 Autism Level Programs

Located on the first floor, the autism learning centre provides autism services and information for all ages. The learning programs are life skills, social development, language skills, job finding, academic library, and help desk. The escape space is tailored for the highest sensory sensitivity and provides a fully enclosed yoga and meditation room.



Autism level education and escape programs.

Chapter 5: Gorsebrook Learning Network Centre

5.1 “Our” World Concept

To bridge the gap between “my” and “their” world, the thesis proposes an architectural manifestation of “our” world in Gorsebrook Learning Network Centre, Halifax, Nova Scotia. Guidelines from the Autism ASPECTSS Design Index were used throughout the building to create “our” world; a shared space based on mutual understanding and interaction. The building strategies for communion are: encouraging interaction, spreading awareness, and gaining resilience to the built environment. The building is organized into compartments that have one programmatic usage and distinct sensory quality. The vertical organization is three levels with the same compartment layout, which ascend upon an autism to neurotypical built environment gradient. Following the gradient are the three learning centres for people with autism, professionals, and public. Horizontally, the building has a gradient from high stimulus learning environments to low stimulus escape spaces. The staircase transition zone interjects both the vertical and horizontal gradients, acting as the mid range gradient point and common place for social activity. The building offers flexibility for the user to control the procession to meet their needs at the moment.

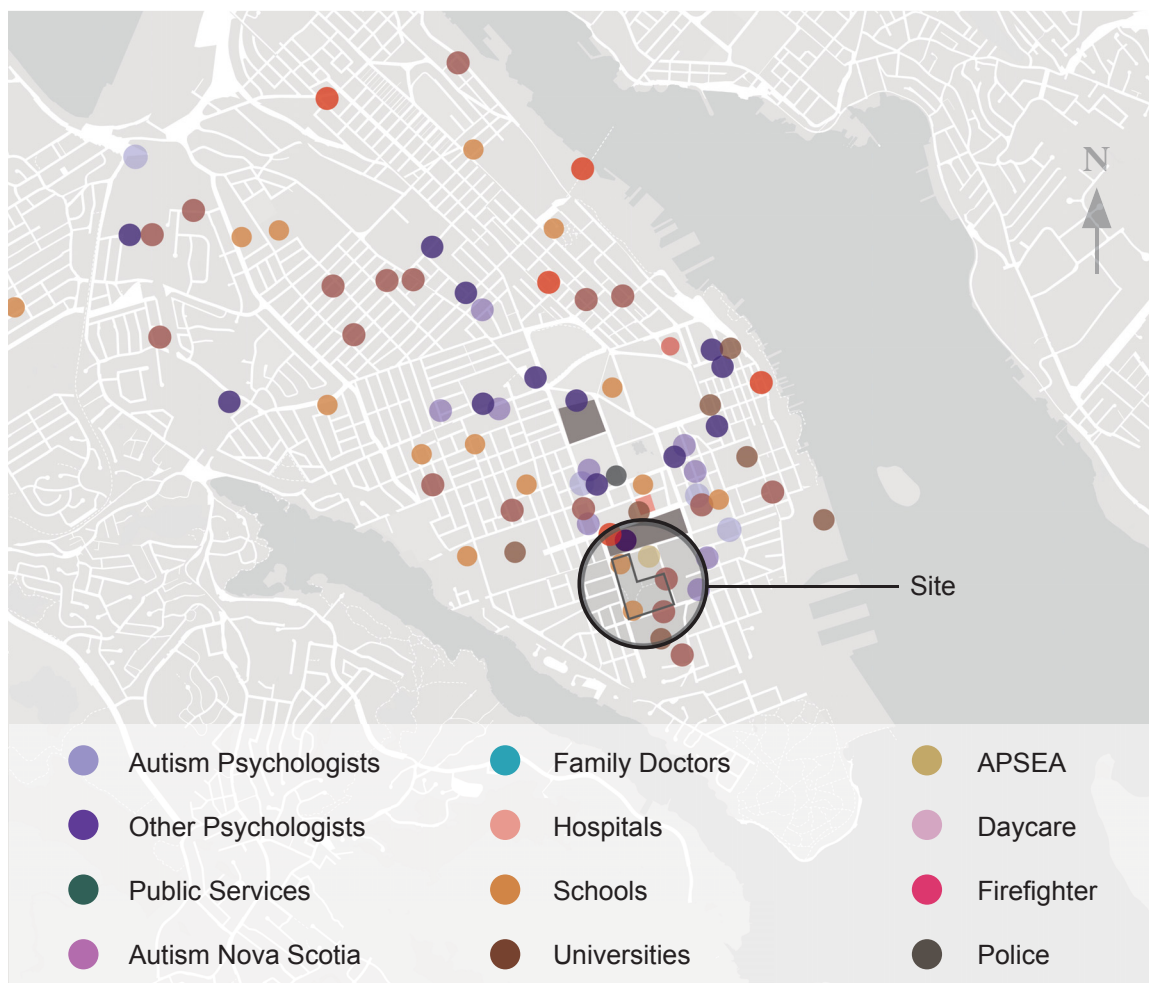


The relationships of the three worlds.

5.2 Site

5.21 City Scale: Halifax, Nova Scotia

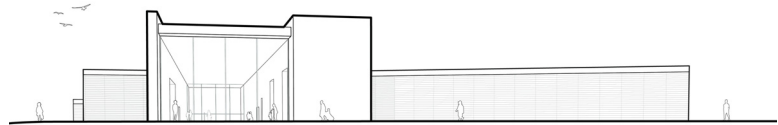
The site is centrally located near all three groups, within Gorsebrook Park, south end of downtown Halifax. Nearby are residential areas, universities, public schools, and hospitals. Three of the four private psychology clinics that offer autism diagnosis and treatment, and Autism Nova Scotia organization are within a few blocks distance.



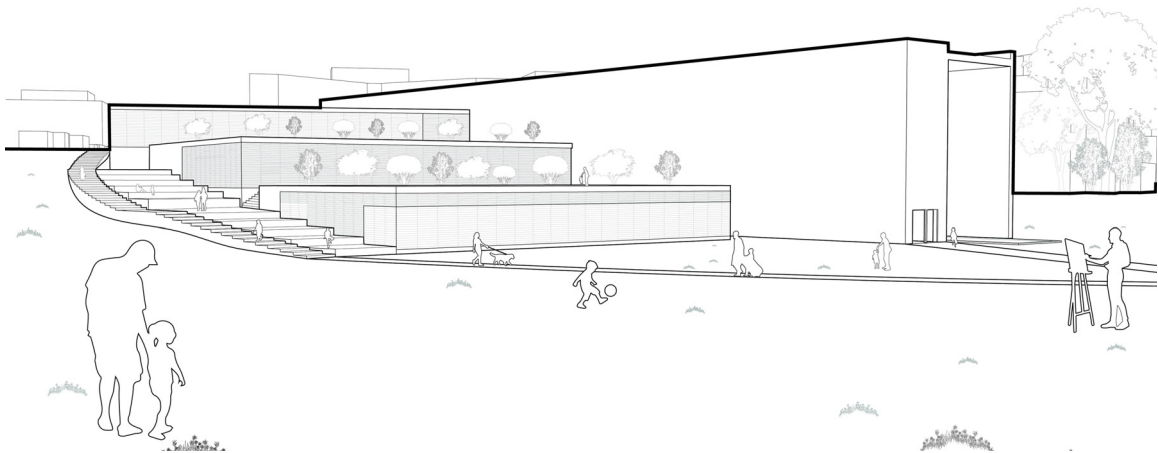
The site is located in the South End of Halifax, nearby schools, hospitals, and residential areas (HRM 2012; HRM 2020).

5.22 Site Scale: Gorsebrook Park

The building is located on the hill of Gorsebrook park and strategically uses the topography to arrange the building's three levels of gradient from top to bottom and left to right of the building. At the top of the hill, street level to a busy four lane street, is a long water pool and tree canopy leading to the building's main entrance. The floor levels cascade down the hill; descending from the public, professional and autism learning centres. The autism level has a discrete entrance into the transition zone and a water pool accessible from the building interior. The publicly accessible green roofs of the professional and autism levels contribute to the green space of the park.



View of entrance on Robie Street (in collaboration with Alice Bardos).



View of transition zone and learning centres with green roofs (in collaboration with Alice Bardos).

Directly across the site is the IWK children's hospital, which provides a developmental clinic, preschool and school-aged autism team, autism research centre, maritime psychiatry, social work department, occupational therapy department, and Early Intensive Behavioural Program (AutismNS 2016, 21). Next to the IWK is the QEII Health Science's Centre.

On the same city block, there is the Atlantic Provinces Special Education Authority (ASPEA) that manages the autism resources for the education system, and a junior high and elementary school.



Building situated within the Gorsebrook Park topography (HRM 2012; HRM 2020).



North of the building are hospitals (HRM 2012; HRM 2020).



a | IWK children's hospital

b | QEII Health Science's Centre

c | Gorsebrook Junior High School

d | Inglis Street Elementary School

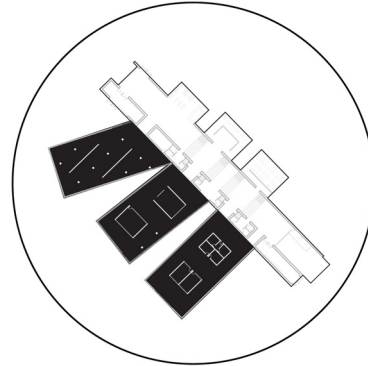
e | Atlantic Provinces Special Education Authority

Two public school anchor the city block's corners, and the APSEA deeply set back from the street (HRM 2012; HRM 2020).

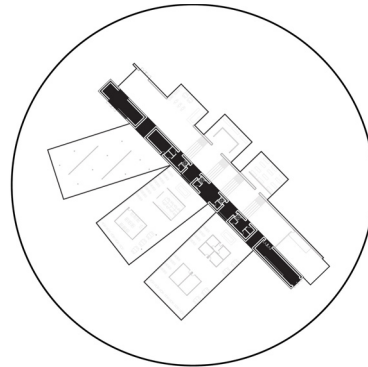
5.3 Building Compartments

The building is organized into compartments that have singular program intent and sensory quality.

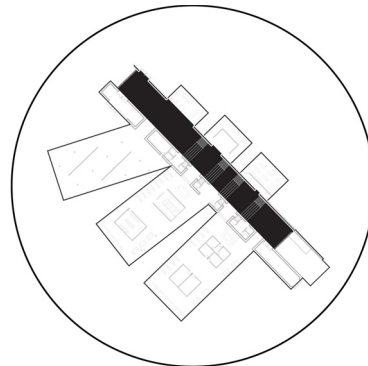
Learning Centre
Compartment



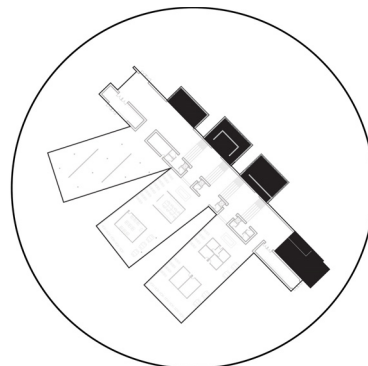
Service
Compartment



Transition Zone
Compartment



Escape Space
Compartment



Compartments of building.

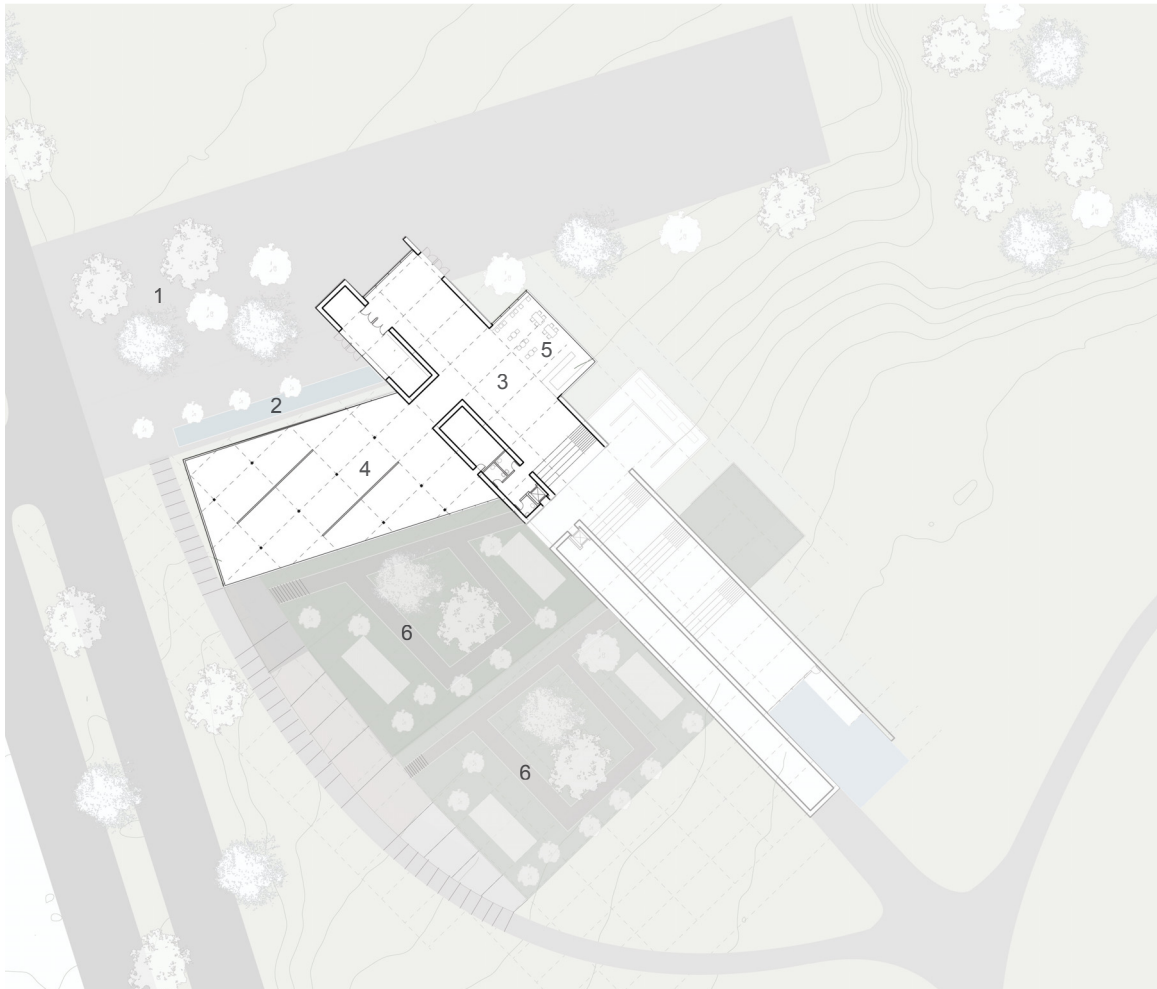
5.4 Three Learning Centres

5.41 Public Level

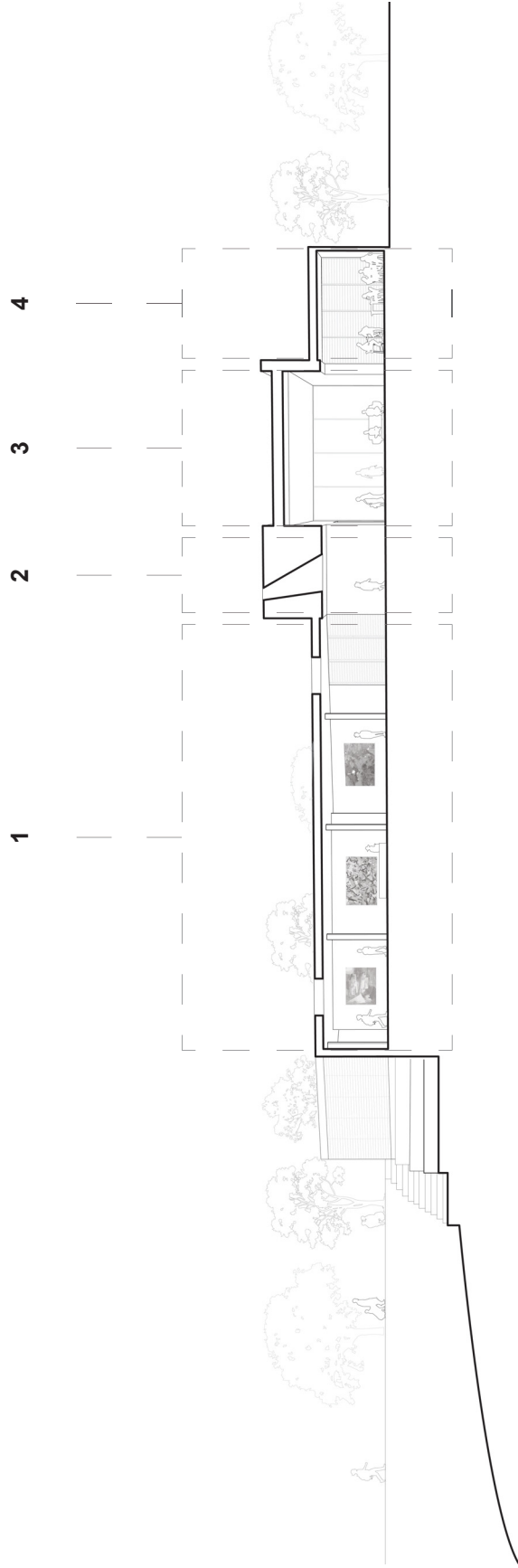
The third floor has a main entrance facing Robie Street, with trees and a reflection pool. The learning centre for the public is an exhibition space for autism art and film. The content will express a person's with autism perspective of how they perceive and feel within the physical and social environment. The neurotypical level is the least sensitive end of the sensory zone gradient, therefore a cafe is provided as a neurotypical type of escape. The following levels going down have green roofs accessible to the public, which give back land to the hill.

Programs

1. Entrance Plaza
2. Reflection Pool
3. Transition Zone
4. Exhibition Room
5. Cafe
6. Green Roof



Public level floor plan with entrance on Robie Street (base map from HRM 2012 and HRM 2020).



1. Public Learning Centre
 Learning compartment that holds autism curated exhibitions and art galleries. Highest neurotypical experience with structural grid asymmetrical to the room shape.

2. Lightwell
 Sensory cue seperation between the learning and transition zone compartments.

3. Transition Zone
 Sensory neutral intermediary space between different stimulus areas.

4. Cafe Escape Space
 Neurotypical escape space when user becomes overwhelmed and needs rest.

Public learning centre section (in collaboration with Alice Bardos).

5.42 Professional Level

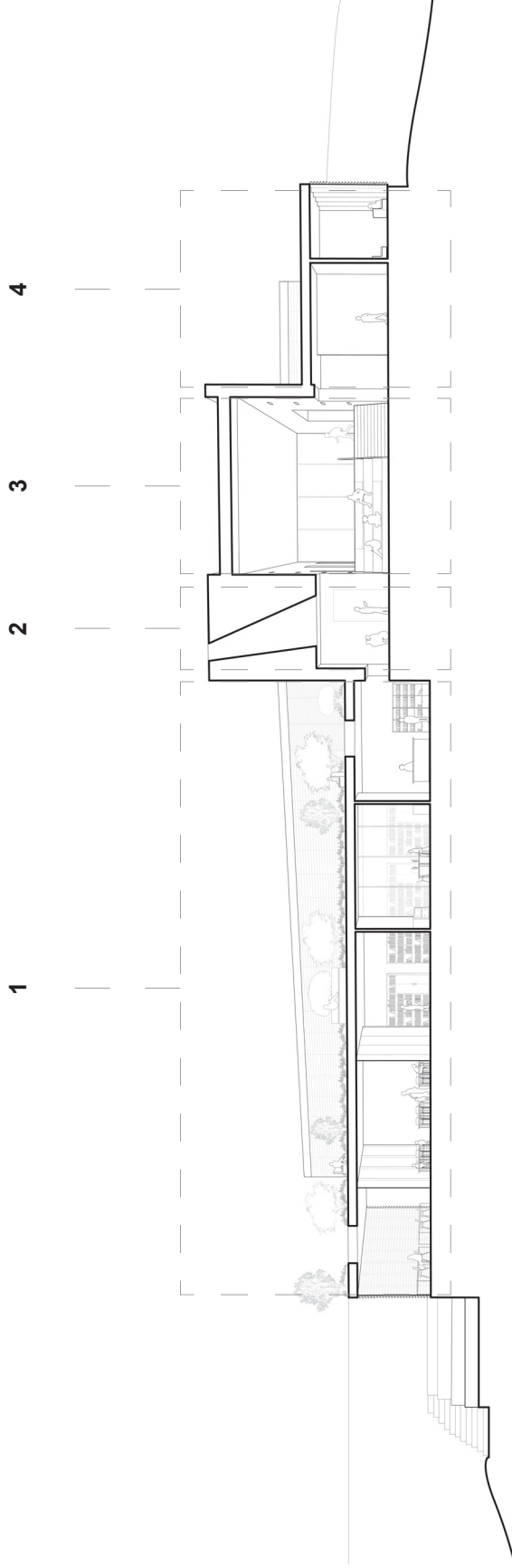
The second floor has a learning centre for professionals, staircase transition zone, and escape room. The organization of the learning centre follows the same layout as the autism learning centre, but the structural grid relationship creates an asymmetrical layout of programs. The first enclosed room contains a multidisciplinary office for professionals, who oversee the support services in the building and coordinate a information network hub. The second enclosed room is a professional classroom for autism education. Near the entrance is a help desk and academic library, and in the back are study areas.

Programs

1. Transition Zone
2. Multidisciplinary Office
3. Classroom
4. Academic Library
5. Study Area
6. Help Desk
7. Escape Room
8. Green Roof



Professional level floor plan (base map from HRM 2012 and HRM 2020).



1. Professional Learning Centre

Learning compartment for professionals to access autism resources and learn courses. Medium neurotypical experience with structural grid slightly asymmetrical to the room shape.

2. Lightwell & Peek-a-Boo

Lightwell is a sensory cue separation between the learning and transition zone compartments. The peek-a-boo offers view into "their" world and indicates the upcoming circulation.

3. Transition Zone

Sensory neutral intermediary space between different stimulus areas. Acoustic strategies control echo and reverberation in space. Sitting area offers opportunity for "our" world interaction.

4. Escape Space

Neurotypical escape space open to the staircase, and a protected viewing area in the back for people with autism.

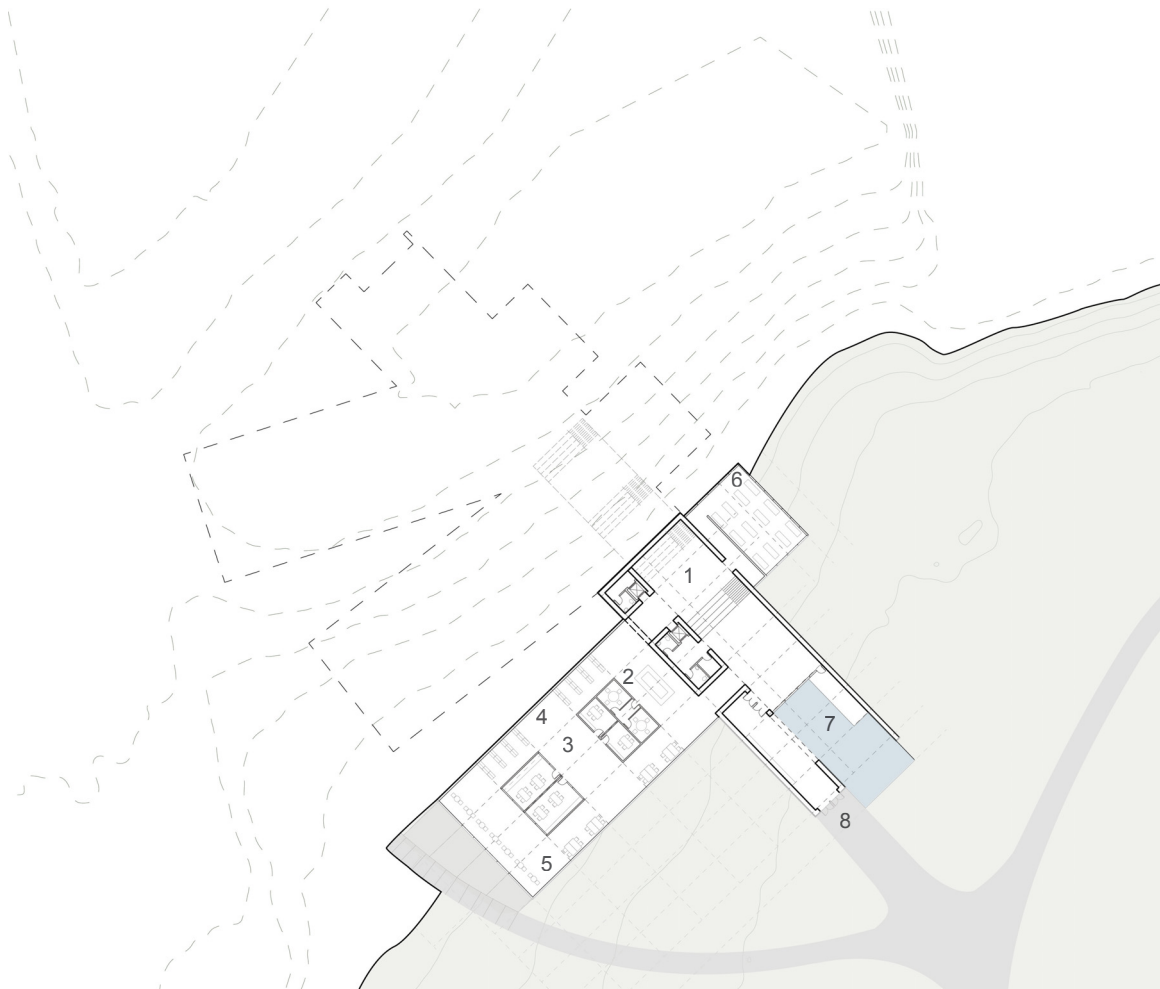
Professional learning centre section (in collaboration with Alice Bardos).

5.43 Autism Level

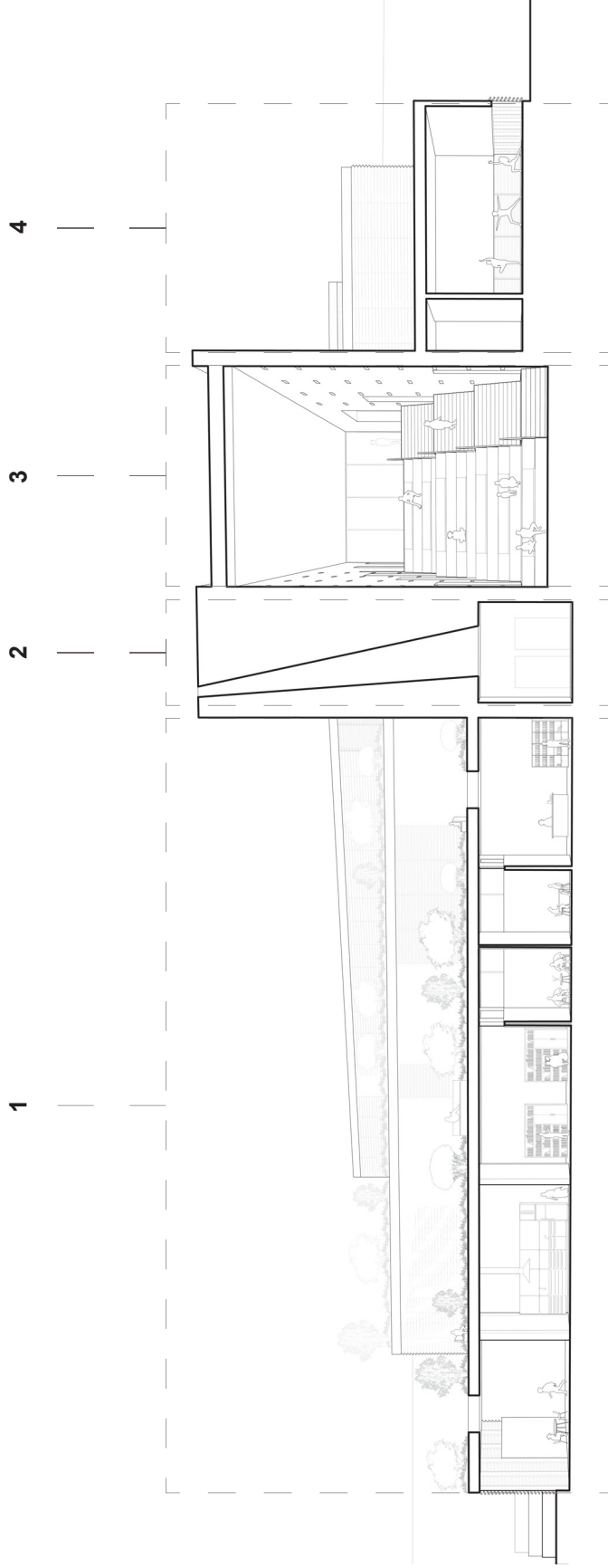
The first floor has an entrance accessible from the Gorsebrook Park valley, connected to walking paths. The level has a learning centre for people with autism, staircase transition zone, yoga/meditation escape room, and reflection pool resting area. The autism learning centre is symmetrical to the structure grid, and has a help desk with consultation rooms at the entrance and enclosed support services at the back. There is a publicly accessible library on resources on the left side, and study and reading areas on the right and back.

Programs

1. Transition Zone
2. Help and Consultation
3. Autism Services
4. Library
5. Study Area
6. Yoga/Meditation Room
7. Reflection Pool
8. Entrance



Autism level floor plan (base map from HRM 2012 and HRM 2020).



1. Autism Learning Centre
 Learning compartment for people with autism to access support services and resources. Autism experience with structural grid symmetrical to the room shape.

2. Lightwell
 Sensory cue separation between the learning and transition zone compartments.

3. Transition Zone
 Sensory neutral intermediary space between different stimulus areas. Acoustic strategies control echo and reverberation in space. Sitting area offers opportunity for “our” world interaction.

4. Yoga & Meditation Room
 Autism escape space for low stimulus reflection.

Autism learning centre section (in collaboration with Alice Bardos).

5.5 Five Space Analysis

The five spaces selected showcase the relationship between the criteria in the Autism ASPECTSS Design Index: acoustics, escape space, compartmentalization, transition spaces, and sensory zoning. From approaching the building from the street, to following the processional sequence through the staircase transition zone, learning centres and escape rooms, the success of the design is dependent on the cohesion between the applicable criteria.

5.51 Robie Street Entrance With Reflection Pond

Compartmentalization

The bustling city life in Downtown Halifax is quietly interlaced with nature along the boulevards and relieved with several green public parks. Gorsebrook Park, the location of the thesis building, is a commonly sought recreation haven for



View of crossing Robie Street to entrance of building.

university students, families, and children. The building, situated within Gorsebrook Park topography, invites the public, professionals, and people with autism for educational support. These three scales, city, park, and building, are separated as compartments with their own distinct function and sensory qualities. The entrance into the building takes into account the qualities of each scale, and utilizes transition zones and escape spaces between them to ease visitors into the building.

Transition Zone

The entry strategy consists of three scales/compartments, ranging down from the city, park, and building, with transition zones aiding the shift from one to the next. The first scale change is from the city to the park, with nature sensory cues to signal the effect of movement. The main entrance of the building is oriented towards Robie Street, a busy four lane street and major public transportation route. This street, however, distinctively introduces natural elements that set it apart from the rest of downtown. It is one of a few street in Halifax with wide boulevards and sidewalks on both sides populated with ancestral trees. The transition itself starts at Robie Street, as the extensive leaf canopy indicates to visitors that they are moving away from the downtown density. Next, the second transition motions for visitors walk on foot into the Gorsebrook park through a human scale tree tunnel that branches off of Robie Street. Outside of vehicles and increasingly more distant from the street behind, visitors can hear the rustle of the wind in the leaves and smell the dew on the grass. The third transition is from the park to the building with a long reflection pool and atmospheric water wall. The reflection pool is aligned to the main entrance and beckons the visitor come closer to the peaceful sight and

sound of water. The slow walk alongside the pool leads to the glass doors into the building's vestibule and succeeding interior transition zone.

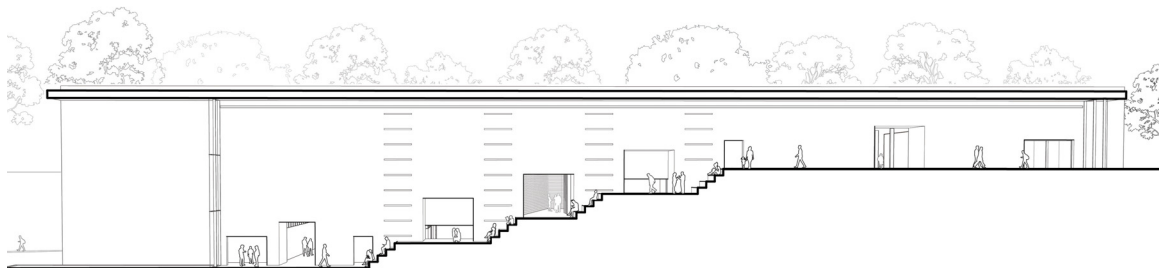
Escape

The second transition zone, Gorsebrook Park, is in the middle of the two drastically different scales/compartments, city and building. To alleviate the contrast and offer a moments rest with views to the park and reflection pool.

5.52 Staircase

Transition Zone

The staircase transition zone is intertwined within the sensory gradient sequence, positioning itself in between each sensory zone to allow the user to adjust and prepare for the next phase in the gradient. The staircase is arranged into sets of half storey rises and long runs to accommodate a longer circulation duration for the user to stabilize their sensory intake and decide their following sequence. To aid in preparation for the next stimulus phase, the staircase is designed with sensory neutral strategies, such as minimal materiality of concrete and wood, and dim lighting.



Cross section of staircase transition zone.

Acoustics

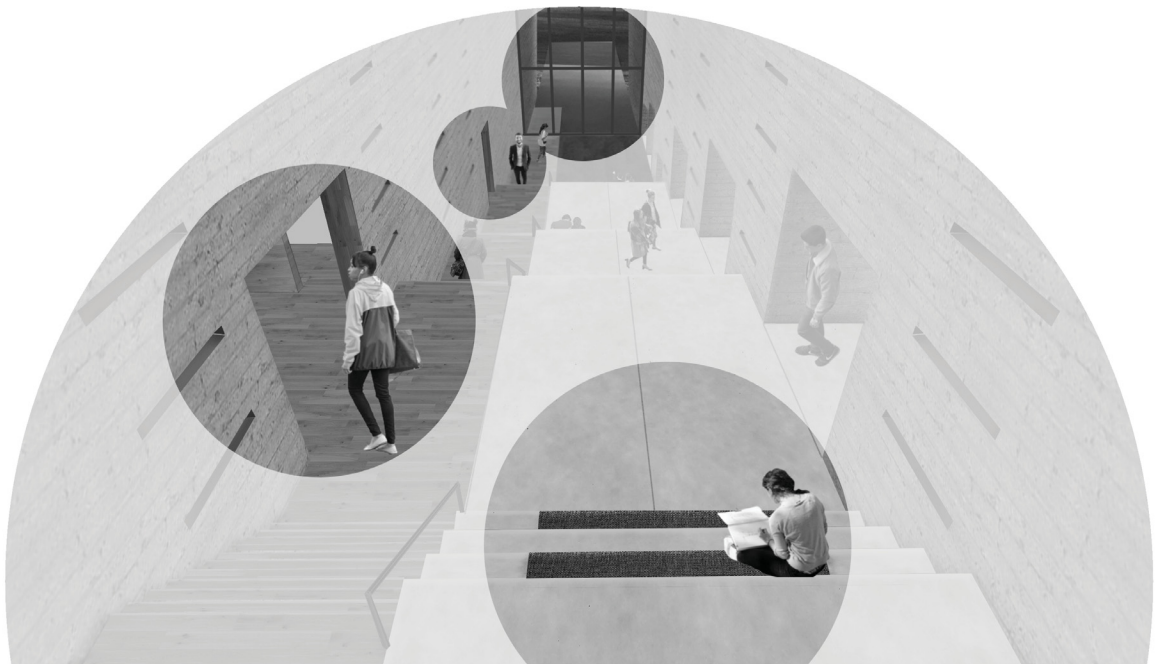
An additional sensory neutral strategy is high control of acoustics in the space to minimize background noise and reverberation. Acoustic slats with absorbent material are engraved in the board form concrete walls to trap and absorb sound. Absorbent materials, such as wood, cushioned seating, and carpet, help to make the space quieter. However, the acoustic control follows the sensory level gradient with higher amount of absorbent material on the autism level. This minimizes the contrast between low sensory level and sensory neutral transition zone, easing people with autism to transition easier.



Acoustic strategies in staircase.

Escape

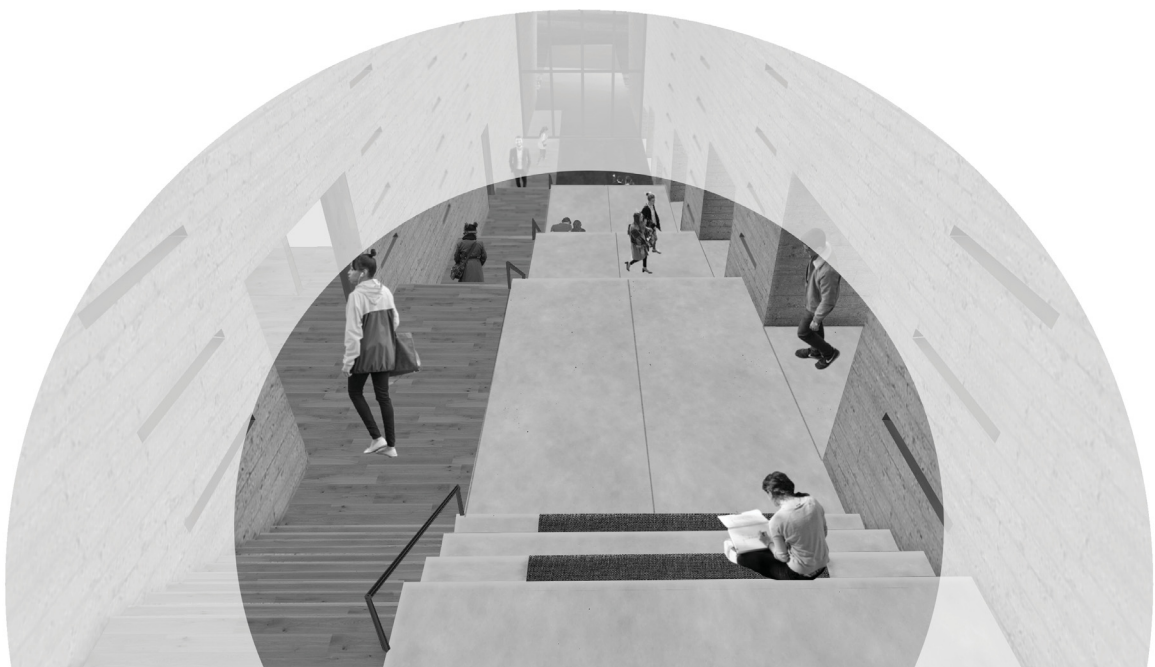
Within the staircase transition zone, there are sets of bench seating for periods of rest, socializing, or viewing the reflection pond past the glazing. The seating area is an opportunity for people with autism and neurotypical people to experience “our” world, where the three groups can come together and have meaningful conversations. The space is flexible for a person to choose to socialize or take a moment to themselves. Entrances to the escape rooms are located off the low stimulus side of the staircase. The outdoor reflection pool is accessible from the bottom of the staircase.



Accessing escape spaces in staircase.

Compartmentalization

The three learning centres and escape rooms are organized in the building as separate compartments, with their own defined functions and sensory qualities. The staircase transition zone separates these compartments from each other. Visual cues of materiality are used to orient a person towards either the escape rooms or learning centres, by following the flooring language. The wood finish on the staircase flows into the escape rooms with a wood wrap entrance, and the concrete finish flooring is connected to the learning centres.

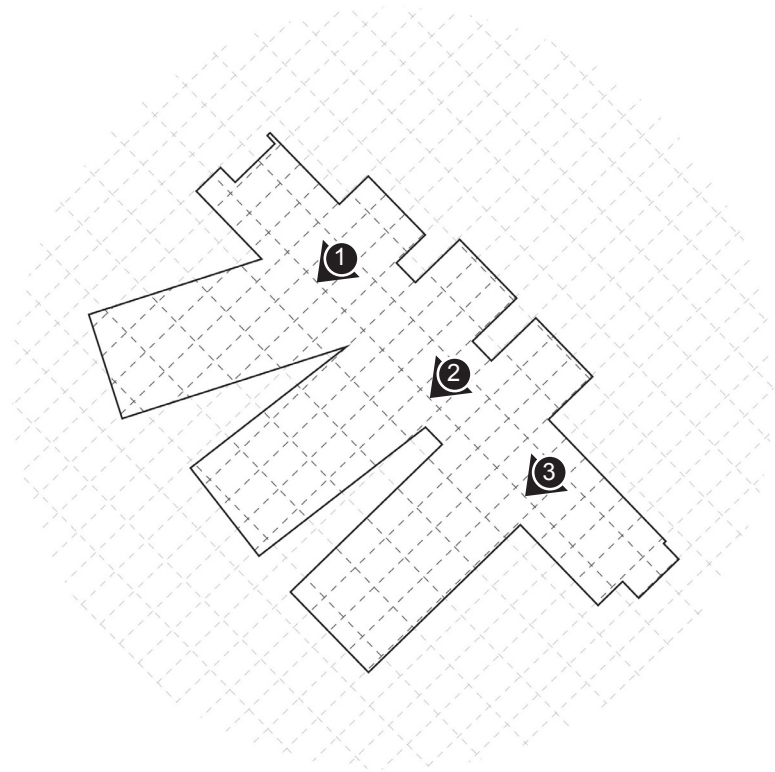


Materiality indicating sensory quality of staircase and adjacent spaces.

5.53 Structure

Compartmentalization

The three learning centres are separated as their own compartments, and each have their own sensory quality. There is one structural grid for the entire building, and each level has a different spatial relationship with the grid. On the autism level, the bounds of the space is symmetrical to the structure grid, whereas the two levels above start to slowly unwind and meet the grid at an angle. The experience of the three structure relationships add to the unique sensory quality of each level, further communicating to the user the distinction of one compartment to another. The experience of the structure gradient is different for a person with autism and a neurotypical person, and will be discussed in the following greenhouse effect sub chapter.



Plan of structural grid and locations of render views.

View 1:
View from third floor
transition zone looking
into exhibition room. The
exterior walls of the room
are misaligned to the
structural grid.



View 2:
View from second floor
transition zone looking into
the professional learning
centre. The exterior walls of
the room are misaligned to
the structural grid.



View 3:
View from first floor
transition zone looking into
the autism learning centre.
The exterior walls of the
room are aligned to the
structural grid.



Greenhouse Effect

The built environment in daily life is predominantly designed by neurotypical people, for neurotypical people, and with little attention towards design methods that make comfortable spaces for neurological disorders, such as Autism Spectrum Disorder. The approach is to accept the reality of most of the built world, and discourage a person with autism to hide away in their own personal sanctuary for long periods of time in order to avoid the “greenhouse effect” (Mostafa 2015a, 57). The “greenhouse effect” causes a person with autism to diminish their resiliency for challenging spaces the longer they inhabit a sensory deprived space (Mostafa 2015a, 57). The experience of the building structure is intended to create a gradient going up the three levels that slowly transitions from autism design to neurotypical built environment.

The structural variance per floor is an opportunity for a person with autism to gain resilience to a challenging environment. This is a valuable skill that can help them venture further and interact with own communities. To encourage learning resiliency, the structure gradient is complimentary with the other design methods to enable flexibility for the user to choreograph their own experience. Within the transition zone staircase, they can preview into the three learning levels entrances and interpret the degree of discomfort in the space from the structural columns placement. They can decide the next phase of their sequence, as to continue ascending into a more so neurotypical built environment in the professional and public learning centres, or vacate to an escape zone briefly.

For a neurotypical person, the structural gradient offers a differential perception between an autism friendly and neurotypical built environment, “my” world and “their” world. The misalignment of the structural columns to the room’s boundary is unsettling to the eye, and a noticeable cue that something is off. The contrast between the public and autism levels grants awareness of the sensitivity people with autism could feel in a challenging environment, and understand the desire to remain in “my” world.

5.54 Peek-a-Boo

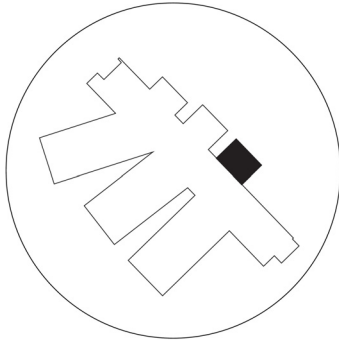


View from staircase transition zone looking into the peek-a-boo window of the autism learning centre below.

Compartmentalization

Visual connection is important within the circulation strategy, because it precludes what to expect next in the building sequence. There are two opportunities of visual connection in the staircase area that look down into the professional and autism learning centres. This communicates in advanced

the separation of compartments and visually interprets the succeeding sensory stimulus level. These two locations are in the elevator waiting areas, that are pockets running parallel between the staircase and learning centres. Each elevator waiting area is half a storey above its visually partnered learning centre and have a low window looking down into the level.



Location of yoga and meditation room.

Experience

In addition to a spatial orientation technique, the visual connection also casts a bird eye view into each “my” and “their” worlds, the autism and professional learning centres. It is an opportunity for both people with autism and neurotypical people to understand each other’s worlds from a different perspective.

5.55 Yoga and Meditation Room



View of the yoga and meditation room.

Sensory Zoning

The yoga/meditation room is located in the low stimulus zone of the building. The low stimulus zone has a gradient from top to bottom intended to accommodate the different needs of the three groups within their own floor levels. The yoga/meditation room is on the autism floor level, which is at the end of the gradient and lowest sensory stimulus. However, the program is also open to neurotypical people, as they can too wish a release from personal stress or anxiety.

Escape

The program and architectural design of the room are coordinated for the autism level, the most sensitive area of the building gradient. The yoga and meditation program offers an opportunity for both neurotypical autism people to escape from the busy learning centre and take time to switch their focus from their surroundings to within themselves. The sensory qualities are gentle with low texture, visual complexity, materiality, smell, lighting, and sound; this helps to ease the person to transition into a personal scale and mindful state. The structure is hidden in the room to simplify visual detailing. There are only two finishes, wood and glazing, to calm visual intake. The wood also initiates a soothing atmosphere with its soft earthy smell. Dim lighting from screened glazing and non-reflective dark surfaces are easy on the eyes. There is also the option of customizing the strength of lighting with self pull curtains to make the room darker.

Acoustics

There is high acoustic control in the room to contribute to the low sensory quality, and act as a sensory cue for a person

with autism to interpret that the room is supposed to be used quietly. The acoustic strategy is absorbent materials and finishes, such as wood clad walls, flooring, yoga mats and equipment, and curtains.

View

Yoga and meditation is practiced on the floor, and the average eye level in both activities is around sitting height, with yoga transitioning above and below this sight line. Therefore, the glazing height is aligned to the height of a person sitting on the ground. This creates a comfortable datum line and human scale for the user to feel connected to the architecture within the large room.

Chapter 6: Conclusion

In order to bridge the gap between “my” and “their” world, the thesis proposes architectural strategies for mutual interaction, autism awareness, and autism resilience skills. Thereby, creating “our” world within a three tier autism learning centre, located in Gorsebrook Park, Halifax, Nova Scotia.

To encourage mutual interaction between people with autism and neurotypicals, the proposed building offers comfortable spaces, designed from Autism ASPECTSS Design Index, for both worlds to co-inhabit together, and learning programs to aid reciprocal relationships.

The learning programs are oriented for three audience groups: public, professional, and people with autism. In doing so, a large range of people can receive autism awareness with specialized educational programs tailored to their own learning style. This is reflected in the building’s gradient organization that is separated into compartments, each designed based on appropriate sensory experience per group.

The gradient organization of the building also lends an opportunity for people with autism to gain resilience to challenging neurotypical environments. The structure grid for the entire building is aligned to the autism learning centre on the first level, which creates an odd structure placement in the second and third misaligned learning centres. This flexible gradient strategy aims to reduce dependency on comfortable spaces, by providing increasingly neurotypical spaces that are accessed through transition zones and have nearby escape rooms.

The AutismNS research provided a clear foundation of the programmatic needs of the community, and future trajectory that the health system needs to take. As a foundation, further research in more detailed autism services and practice is needed. From the key issues reported by AutismNS, the three targeted groups were chosen and their associated learning programs. Together with the Autism ASPECTSS Design Index criteria, the escape and transition programs seamlessly navigate people throughout the building with ease.

The Autism ASPECTSS Design Index for autism friendly design, developed by Magda Mostafa, is recognized globally as one of the leading design methods. The methods integrate well into each other, although overlap can occur that can cause confusion in implementing methods singularly. The research can be complimented further with additional study and analysis of other design methods. During the design phase, it was realized that it's not only the importance of the characteristics of one of the Autism ASPECTSS Design Index, but the overall relationship and balance between them as a whole. The cohesion of the methods together offer flexibility to use the space however the user wants. This can be seen in the organizational gradients between the building compartments, staircase transition zone, sensory zones, structure, and escape spaces.

The combination of providing recommended programs from AutismNS and Autism ASPECTSS Design Index effectively brought "my" and "their" world together into "our" world, as both sides have an opportunity to understand each other within a building they mutually share. A new question can now be asked of the thesis; does the impact of the knowledge

and relationships obtained in the thesis building improve life in the surrounding community and rest of Nova Scotia?

The thesis strongly advocates design for people with autism, and contributes to the field of architecture by encouraging interaction between several distinct user groups in one building. The design proposal reinforces the importance of the AutismNS recommendations for Nova Scotia, to minimize the risk of people falling through the cracks of the health care system. As the Autism ASPECTSS Design Index is commonly used for people with autism exclusively, this thesis expands its application to the relationship between neurotypical and autism friendly environments and the co-inhabitation of the two. The dynamic approach introduces a new concept for spatial, sensory, and social experience; an “our” world space that welcomes neurologically different people into one narrative.

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