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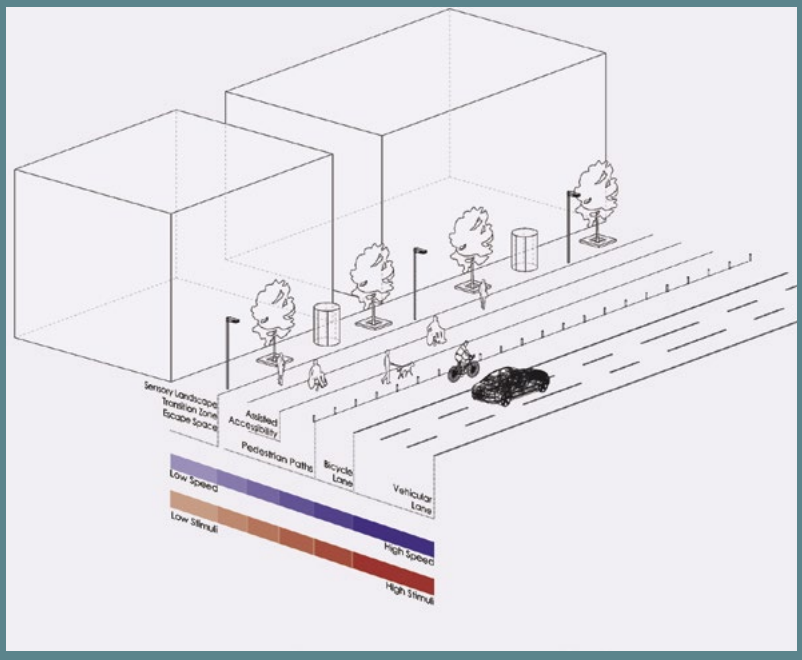

THE AUTISM FRIENDLY UNIVERSITY DESIGN GUIDE

MAGDA MOSTAFA, PHD

Autism Design Consultant, Progressive Architects,
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ACKNOWLEDGEMENTS

Special acknowledgement goes to the following individuals and groups, without whom much of the insight and work produced within this guide would not have been possible: Adam Harris first introduced me to Fiona Earley and the DCU Autism Friendly initiative in 2019. I have endless and ever-growing admiration for Adam and the tremendous work he has done and continues to do with and for AsIAm. He is a force to be reckoned with in the autism world, and my respect for him and the team he has assembled grows daily. The foundational research that Katie Quinn from AsIAM along with Teresa Burke and Mary Rose Sweeney from DCU, conducted in 2018 was instrumental to help pave the way to this guide, and for this I am grateful.

DCU Estates Office, led by Peter McDonnell (Estates Projects and Information Manager), who formulated the initial project brief and scope of services for DCU Student Support and Development for the appointment of specialist consultancy services for the creation of this guidance document, Adolfo Rey and Paula Hawkins (DCU Health and Safety), were all an essential project management and architectural voice.

Other architectural input, in relation to the proposed Glasnevin Student Residences (GSR) project came from Mark Faulkner and Luise Volschecnk (Coady Architects). Their generosity of time and ideas is greatly valued.

The support received from DCU Student Support and Development led by Claire Bohan, was instrumental to the establishment of Autism Friendly DCU, and her continued backing was invaluable. This process was broadly consultative and informed by all those involved in the lives of autistic students at DCU. First among that group are the OT team at Autism Friendly DCU- Susan Madigan and Euan Kelly. I have always learned so much from OTs, as the first designers of the autistic experience, and working with Susan and Euan was no exception.

Today, more and more technology permeates our lives, and is inevitably becoming more and more enmeshed with architectural design. Many of the technology guidelines proposed here are only made possible because of DCU's commitment to becoming a smart campus, spearheaded by the work of Kieran Mahon and his team at Smart DCU. DCU Estates Office collaborates closely with Smart DCU and are working to open up built asset information to support not only operational functions but also for teaching and research and to improve staff and student experiences. Both teams were continuously generous with their time and expertise, and the guide is richer because of that generosity.

I have always believed that autism friendly design cannot be without first listening to the autistic voice. All too many times people are surprised when they ask me “how should we design this for autistic users?” and I respond “ask them”. The autistic voice is the expert voice here. The autistic perspective is the one that illuminates autism friendly solutions. In that spirit, this guide was broadly consultative and inclusive of the autistic voice- throughout the process, from inception to design workshops to peer review. For their generosity on this front I would like to thank: Malene Larsen, DCU student and inspiration for the sensory pathways guideline which will always in my mind be the Malene Pathway; Laochin Brennan, DCU student for his generous input in providing perspective of neurodiversity; Eleanor Walsh, AsIAm youth Ambassador, actress and my speaking partner and keynote friend and inspiration for the “stimmy” spaces included in the guide; Kevin McLoughlin AsIAm youth Ambassador and my design thinking partner and travel companion and inspiration for the development of the Autism Friendly Design Thinking Methodology guide based in part on his input and feedback on the workshops we co-moderated in Dublin and at Google in Zurich; and Joan McDonald the founder of Autistic Paddies, for her perspective from the world of the autistic adult.

I am grateful to my international network of fellow thought leaders who gave generously of their time to review this work: Rachel Updegrove, US-based designer and architectural graduate, and the inspiration behind the concept of autism being different every day; and Eron Friedlaendar, physician, scholar, writer and mother of an autistic young man soon to be a university student himself, and most importantly friend. Your support has been priceless.

Two women have worked closely with the guide since its inception- Fiona Earley the engine behind Autism Friendly DCU was endlessly generous of her time, knowledge and expertise; and Injy Ashour is the organisational and graphic talent behind the artwork of this guide, in addition to the continuous source of support and patience throughout. The work is undeniably richer because of both of your support.

Finally, my work on autism began almost 2 decades ago with the brave support of my research supervisor, who took on a subject with me that neither of us know anything about. She was a pioneer in the architectural world and helped me carve this pathway of work that has led to this guide which is the first of its kind. During the writing of this guide she sadly passed away after a life dedicated to creating healing spaces for people- I am grateful to Zakia Shafie for her guidance and support all those years ago.

CONTENTS

PART 1 - Vision, Rationale and Method

1.0 INTRODUCTION
1.1 History of the initiative

Dublin City University (DCU) was designated the world's first autism-friendly university in 2018. It is committed to supporting and celebrating all students and staff who are on the autism spectrum. DCU works closely with global best practices and has committed to adapting the environment, raising awareness and acceptance, and building initiatives to make it as easy as possible for autistic community members to participate fully in all aspects of university life. Pursuant of that goal, they have commissioned the development of this Autism Friendly University Design Guide to provide the requisite built environment infrastructure to realise their programs, processes and procedures to successfully realise a truly autism friendly university.

Autism spectrum disorder diagnoses have been increasing globally in the past two decades, with many scholars and researchers pointing to the early 2000's as the point where these diagnoses spiked. This was aligned with expanding diagnostic definitions; increasing awareness across the medical, educational and public realms; and the redefinition of some otherwise misunderstood diagnosis as actually autism spectrum.

Now, almost 20 years later, what I call this "peak cohort" has progressed through various early intervention, early childhood, Primary and Secondary level mainstream, special education, and alternative format educational systems. Their progress has been supported by research, multiple interventions, evolving pedagogies, growing societal awareness at a level not afforded to the cohorts of the decades preceding them.

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"many members of this "peak cohort" are now increasingly emerging from their lives as schoolchildren, and as they age out of school, find themselves ready for a higher education that is unfortunately unprepared for them."

Although far from perfect, and with much room for increased awareness, acceptance, inclusion and support, many members of this "peak cohort" are now increasingly emerging from their lives as schoolchildren, and as they age out of school, find themselves ready for a higher education that is unfortunately unprepared for them. A mindful organization of the built environment of these higher education spaces may, however, play an important role in achieving these goals, by removing barriers and creating spatial opportunity for more authentic and integrated inclusion of autistic students with their fellow learners. Research has shown that the architectural environment can play a conducive role in the facilitation of inclusion and support of access for autistic individuals, particularly in learning environments[1]. This guide is hopefully a small first step to that preparation at the level of higher education.

"Research has shown that the architectural environment can play a conducive role in the facilitation of inclusion and support of access for autistic individuals."

1 Mostafa, M. (2008). An architecture for autism: Concepts of design intervention for the autistic user. International Journal of Architectural Research, 2(1), 189-211.
Mostafa, M. (2020). Architecture for autism: Built environment performance in accordance to the autism ASPECTSS design index. In Autism 360° (pp. 479-500). Academic Press.

1.2 Note on language

Throughout this guide, we will be using identity first language and the term “autistic individual/person/people” to describe individuals from the autism community. This is based on current literature and preferences of autism self-advocacy and autistic individuals I work with around the world as communicated to me through our work together. There are alternative and equally valid terminologies that may also be preferred by some individuals and groups- such as “individuals with autism” and “individuals on the autism spectrum”. We may use these terms occasionally throughout the guide when and where they are more relevant. General sentiment in the community seems however to indicate preference of the latter form- “autistic individual/person/people” as an alternative to identity-first language. My choice of language is driven by the preferences of autistic individuals themselves.

2.0 OBJECTIVE OF THE GUIDE

" All students in higher education campuses have the equal right to a built environment that not only does not create barriers to their physical access to an education, but provides, whenever and wherever possible, built environment supports that facilitate their access to the learning experience."

This guide is founded on a basic foundational understanding that all students in higher education campuses have the equal right to a built environment that not only does not create barriers to their physical access to an education, but provides, whenever and wherever possible, built environment supports that facilitate their access to the learning experience. This learning experience encompasses a wide scope of spaces and is not limited to the core educational spaces- but expands to include social, informal learning, administrative spaces, recreational, sports, support and residential spaces.
The focus of this guide is to layer over standard best practices of architectural design and site planning, with concepts and guidelines specific to the special needs and abilities of autism. Resources to be used in conjunction with this report specific to Ireland are guidelines published by the National Disability Authority and their affiliated Center for Excellence in Universal Design. Resources relevant to international contexts outside of Ireland include but are not limited: the Americans with Disabilities Act (ADA) Standards, and the UK's Building Regulations and the International building Code[1] .

The objective of this guide is to provide the outline for the requisite built environment strategies to achieve this goal broadly across all spaces within the DCU campus. These strategies will operate on various scales- from that of furnishing and interior issues, to navigation and wayfinding within and around buildings, to landscape and urban level issues such as public spaces, mobility and circulation. It is the hope that this outline will serve to guide DCU's own assessment and adjustment of current spaces across campus as well as provide guidance for any future builds as the university continues to grow and expand.

1Access to and Use of Buildings, vol. 2. Buildings Other than Dwellings. "The Centre for Excellence in Universal Design." Centre for Excellence in Universal Design, 6 Nov. 2020, universaldesign.ie/.
Department of Justice, 2010, pp. 149–158, 2010 ADA Standards for Accessible Design.
"Disability Statistics." National Disability Authority, 18 Dec. 2020, nda.ie/.

Although focusing primarily on the perspective of the autistic student in most cases, given the scale and central nature of their role on campus, this guide also aims to support all autistic users of campus- autistic staff, autistic visitors and the general autistic community around campus.

Central to the process of the guide is that it be created in a broadly consultative manner, with substantive contribution from the very voice it sets out to serve- the autistic voice. Working under the guidance of the Autism Friendly project at DCU, and through its partnership with AsIAm Ireland, a core group of stakeholder voices were consulted throughout the process. These included: Autism Friendly DCU project coordinator, autistic DCU students, representatives from DCU's Neurodivergent Student Association, AsIAm representatives, DCU Occupational therapists, DCU Estates Office, DCU Health and Safety, Smart DCU, DCU neurodivergent staff, and members of Ireland's autism self-advocacy community including AsIAm Youth Ambassadors and Autistic Paddies.

In 2018, DCU in conjunction with AsIAm, commissioned a study to look at the broad social, academic and operational challenges faced by autistic students at DCU. Authored by Mary Rose Sweeney and Teresa Burke of DCU and Adam Harris and Katie Quinn of AsIAm the study was based on a series of surveys of the autistic community. One of its important outcomes was the conclusion of the Principles of the Autism-Friendly University as outlined below. The objective of the guide is to facilitate the principles broadly, and provide the guidance for designers to create the physical stage through which these principles are realized, with a particular alignment with principles 2,3,4,5 and 7.

"Central to the process of the guide is that it be created in a broadly consultative manner, with substantive contribution from the very voice it sets out to serve- the autistic voice."

Principles of our Autism-Friendly University:

1. Encourage and enable autistic students to transition into and participate in university programmes.
2. Support and build capacity to equip autistic students to meet academic challenges of everyday university life.
3. Support and build capacity to equip students with Autism to meet social challenges of everyday university life.
4. Seek to establish an Autism friendly operational environment.
5. Seek to combat the stigma around autism and recognise the diverse experience of those with the condition.
6. Develop understanding and relevant knowledge and skills within the University community.
7. Establish channels so that autistic students can have a voice in various aspects of university life.
8. Increase employability of autistic graduates.

USING THIS GUIDE

In the spirit of the autistic lens this guide uses a lexicon of icons and visual language to indicate and connect key concepts throughout. These include:

General concepts:


Sensory


Social


Academic


Architectural


Operational


Technological


Wayfinging

Sensory Concepts:


Visual


Acoustical


Olfactory


Tactile


Proprioceptive

ASPECTSS Concepts:


Acoustics


Spatial Sequencing


Escape


Compartmental-isation


Transition


Sensory Zoning


Safety

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Coordination Concepts:

Universal Design Coordination: for concepts to be developed from an intersectional perspective to ensure that the proposed facilitation for that autistic community does not create barriers or possible conflicts of needs for other stakeholder groups.

Health and Safety Coordination: for concepts to be developed with particular attention to health and safety guidelines, codes and standards. May relate to issues such as campus public health, fire safety, egress and general safety.

Color Coding:

Challenges

Potentials

Solutions

3.0 Methodology

3.1 Background Data

Two key sources of data were provided by the University and reviewed to foreground this guide:

1. the 2016 "Living with Autism as a University Student at Dublin City University: Developing an Autism Friendly University"

2. sensory audits carried out by various DCU autism stakeholders- students, advocates and staff.

The former resource was framed around the objective of identifying and exploring the current services at DCU targeting autism. It aimed to identify gaps and help improve life on campus for these students. The stakeholders base in the study were broad and included students, staff and faculty across multiple campuses. The methodology used began with a literature review of peer reviewed research on the topic of higher education support of autism, as well as a web-based review of European and American higher education institutions. This foregrounding research helped in turn inform the 4 studies that comprised the final project- an online survey of DCU students with autism; an online survey of all DCU students; focus groups and semi-structured interviews of academics and support staff; and a sensory audit of two DCU campuses by 4 students with autism with a focus of noise, smells, lighting and signage.

Additional sensory audits were carried out by Autism Friendly DCU and shared for the purpose of informing this guide.

The following is a summary and visualisation of the most relevant data.

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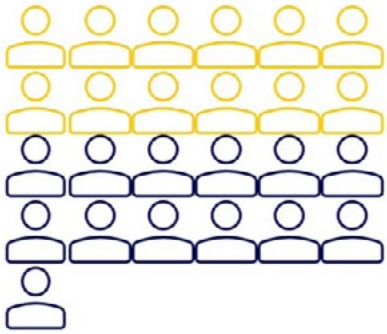
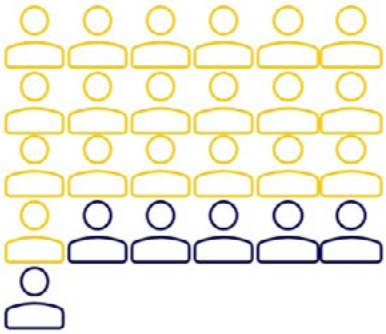
3.1.1 Living with Autism as a University Student at Dublin City University: Developing an Autism Friendly University[1], DCU and AsIAm- a summary



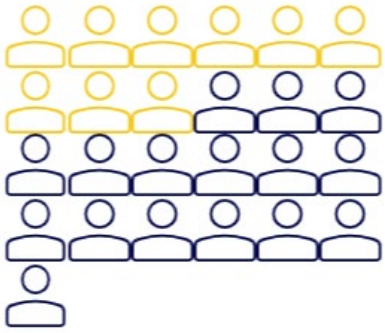
54%

Students who had not disclosed their diagnosis to the DLSS



29%

Students who had disclosed their diagnosis to academic staff



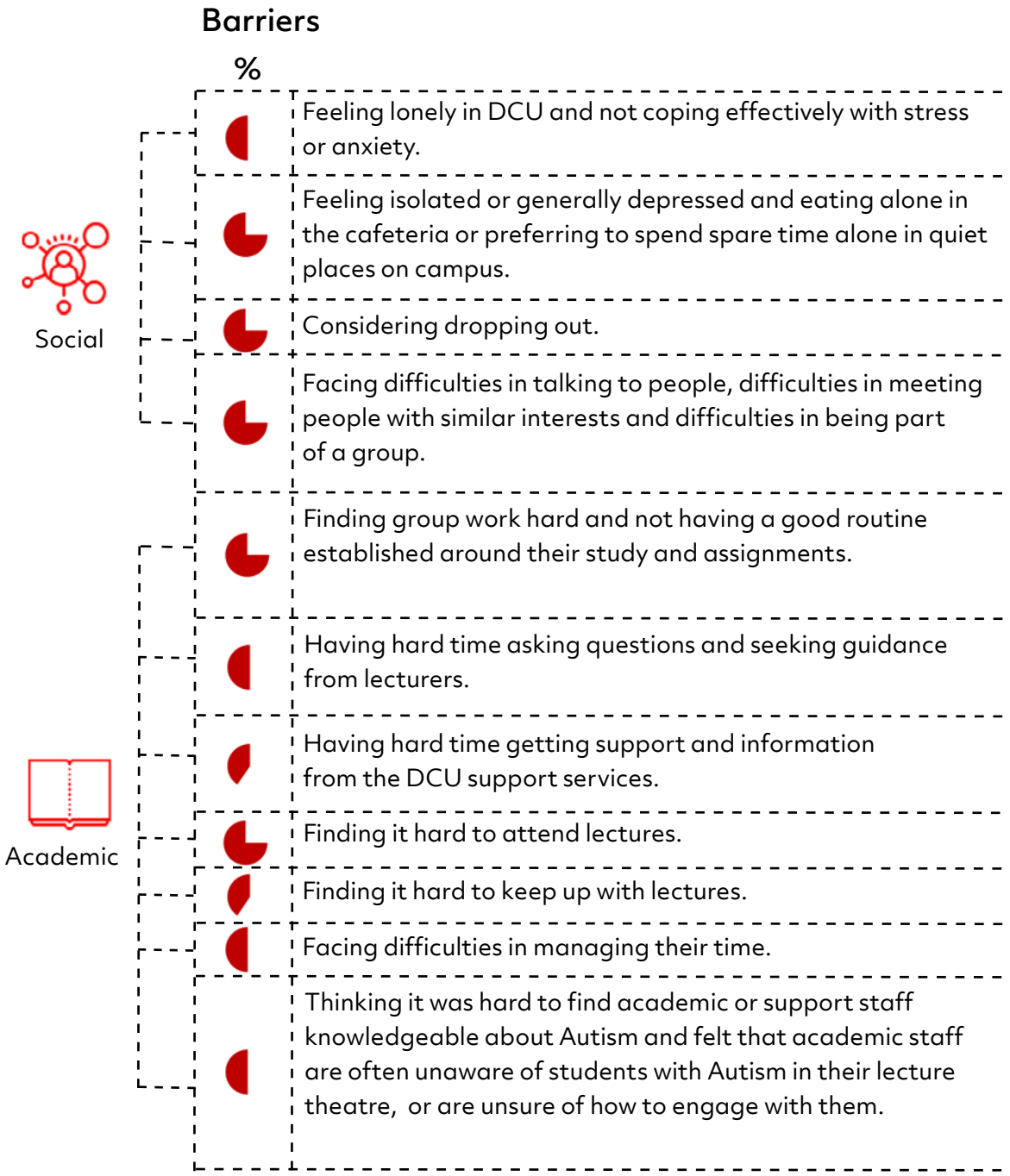
65%

Students who indicated that the range of supports available at DCU were adequate to meet their needs while 35% said they were not adequate

Reasons for non-disclosure

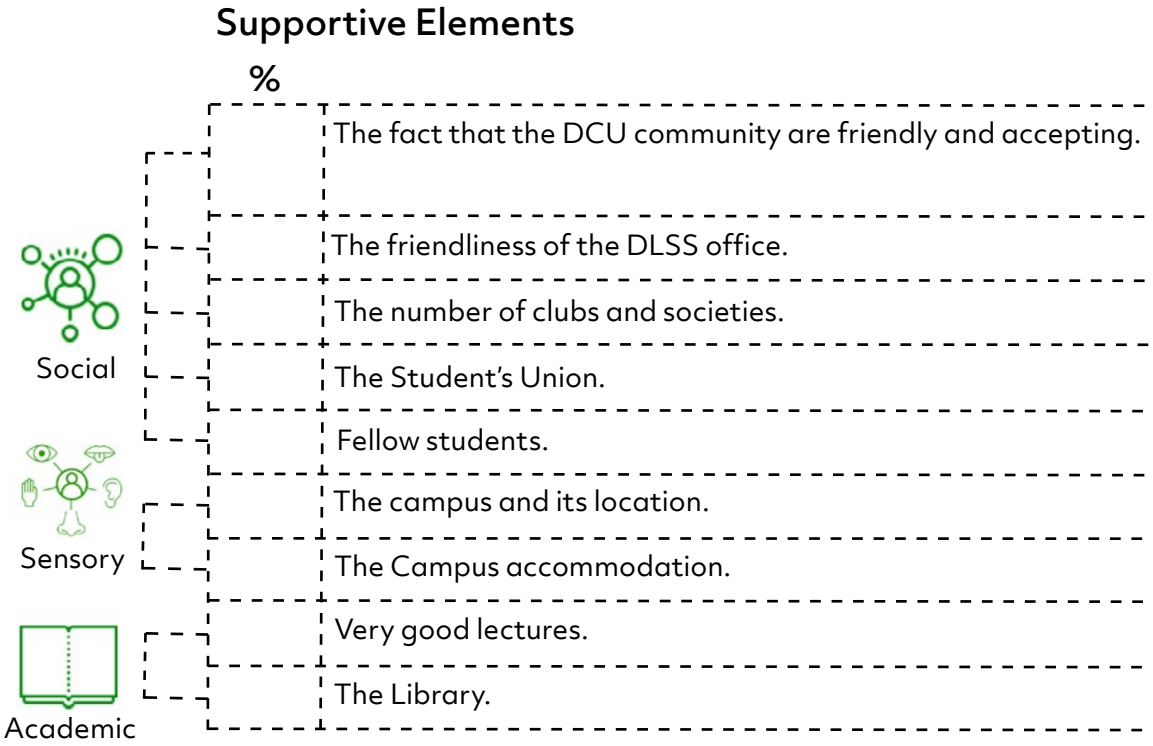
- Stigma
- Fear of discrimination
- Embarrassment
- Shame
- Past adverse experiences when having disclosed to somebody

1 https://www.researchgate.net/publication/333221095_Living_with_Autism_as_a_University_Student_at_Dublin_City_University_Developing_an_Autism_Friendly_University


Barriers
%
Social
Academic
Feeling lonely in DCU and not coping effectively with stress or anxiety.
Feeling isolated or generally depressed and eating alone in the cafeteria or preferring to spend spare time alone in quiet places on campus.
Considering dropping out.
Facing difficulties in talking to people, difficulties in meeting people with similar interests and difficulties in being part of a group.
Finding group work hard and not having a good routine established around their study and assignments.
Having hard time asking questions and seeking guidance from lecturers.
Having hard time getting support and information from the DCU support services.
Finding it hard to attend lectures.
Finding it hard to keep up with lectures.
Facing difficulties in managing their time.
Thinking it was hard to find academic or support staff knowledgeable about Autism and felt that academic staff are often unaware of students with Autism in their lecture theatre, or are unsure of how to engage with them.

Sensory

- Having heightened sensory awareness of noise, bustling environments, smells and lighting.
- Finding social events and restaurants and student bars difficult.
- Cooking smells and cigarette smoke.
- Bright colours like red on walls and fluorescent lighting.
- Bustling noisy spaces such as the restaurants at peak times.
- Queuing systems on campus eateries.
- Hard seating surface.
- Dimly lit spaces.
- Noise from photocopiers in the library.
- Unused or stacked cluttered furniture in classrooms.
- Missing, busy or ambiguous signage or signage not at eye level.
- A low humming noise from a projector left on in one of the lecture theatres as it could be detected by some as a high-pitched sound.



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Suggestions

%

Social

- Creating a society for students with Autism to help them socialise.
- More information on the needs of persons with Autism on campus.
- Providing information on the supports available.
- Addressing over-crowding and noise in lectures and laboratories.

Sensory

- Addressing the sensory issues on campus.
- Improving signage.
- Providing quiet spaces to sit and eat at break times.
- The provision of guidelines to staff around students with Autism.
- Providing additional support naviagting on-campus catering services and introducing a prepay card system to avoid long queues.
- The provision of quiet times at busy events.

Academic

- Support with exams, assignments, planning and organisation.
- Reducing time pressure in labs.
- Increasing the number of posts on Loop (DCU's Virtual Learning Environment (VLE).
- Providing additional library support.
- Providing a greater range of teaching and learning methods, greater variety of assessments, better spread of workload across the semester and greater flexibility with re-sitting exams.

3.2. Design Frameworks and Methodologies

3.2.1. ASPECTSS Framework provides the primary research and design datum throughout both the research phases of assessment of space and problem definition, as well as the development of design guidelines.

The Autism ASPECTSS Design Index, published in 2013, is a research-based framework of 7 architectural principles developed to be used as a design framework for multiple purposes and at different scales. These purposes include built environment assessment and auditing; development of autism-sensitive and autism inclusive design solutions; and as a frame of reference for Post-Occupancy Evaluation[1]. These processes can also be found at multiple scales- from interior spaces to buildings to clusters of buildings to urban settings such as campuses and neighborhoods.

These principles are:

Acoustics

This criterion proposes that the acoustical environment be controlled to minimize background noise, echo and reverberation. The level of such acoustical control should vary according to the level of user focus required within the space, as well as the skill level of its users. For example, activities of higher focus should be allowed a higher level of acoustical control and be part of low-stimulus zones.

Provisions should also be made for different levels of acoustical control, so students can graduate from one level of acoustical control to the next, slowly moving towards a typical environment in order to avoid the “greenhouse effect”.

On the Master Planning level this involves situating Low-Stimulus zones, particularly learning environments, away from sources of external noise, such as high traffic roads, playgrounds, sports facilities etc. It also requires the mindful configuration, operation and material selection of integrated open spaces such as courtyards and pedestrian spaces to minimize echo and noise. Specific design strategies related to material selection, building systems, zoning and operation related to acoustics will be discussed throughout the guide.

Spatial Sequencing

This criterion is based on the concept of capitalizing on the affinity of autistic individuals to routine and predictability. Coupled with the criterion of Sensory Zoning, Spatial Sequencing requires that areas be organized in a logical order, based on the typical scheduled use of such

1 Mostafa, M. (2014). ARCHITECTURE FOR AUTISM: Autism ASPECTSS in School Design. ArchNet-IJAR, 8(1).
Mostafa, M. (2018). Designing For Autism: An ASPECTSS™ Post-Occupancy Evaluation Of Learning Environments. ArchNet-IJAR, 12(3).
Mostafa, M. (2020). Architecture for autism: Built environment performance in accordance to the autism ASPECTSS design index. In Autism 360° (pp. 479-500). Academic Press.

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spaces. Spaces should flow as seamlessly as possible from one activity to the next through one-way circulation whenever possible, with minimal disruption and distraction, using Transition Zones which are discussed below. Such logical hierarchy of spaces has also been found to support individuals who identify as non-autistic, and can help support overall efficacy of functioning of campus.

Escape Spaces

The objective of such spaces is to provide respite for the autistic user from the over-stimulation found in their environment. Empirical research has shown the positive effect of such spaces, particularly in learning environments. Such spaces may include small scale external natural environments, quiet seating arrangements, certain contained free-standing furniture compositions, escape alcoves along circulation elemenets, sensory areas and seating around water features. These spaces should provide a neutral sensory environment with minimal stimulation that can be customized by the user to provide the necessary sensory input. Although developed with the autistic user in mind, escape spaces work intersectionally across multiple user groups and needs, and provide potential spatial respite for multiple users needing sensory escape- those with anxiety, social challenges, physical and mobility challenges and any user feeling overwhelmed.

Compartmentalisation

The philosophy behind this criterion is to define and limit the sensory environment of each activity, organizing at both the master plan level all the way down to the interior of spaces, into compartments, or sensory cells. Each compartment should include as close as possible of a single and clearly defined function and consequent sensory quality. The separation between these compartments need not be harsh, but must be intentional, through spatial layering, softscapes, change of colour or material and even through variances in lighting. The sensory qualities of each space should be used to define its function and separate it from its neighbouring compartment. When coupled with this consistency in activity, this criterion will help provide sensory cues as to what is expected of the user in each space, with minimal ambiguity.

Transitions

Working to facilitate both Spatial Sequencing and Sensory Zoning, the presence of transition zones helps the user recalibrate their senses as they move from one level of stimulus to the next. Such zones can take on a variety of forms and may be anything from a distinct node that indicates a shift, to a full sensory space that allows the sensory re-calibration before transitioning from an area of high-stimulus to one of low-stimulus. Elements such as Sensory Gardens can provide a primary transition space of the campus of the Master Plan, and the integrated natural open spaces, woven throughout the campus can provide additional levels of transition at different scales and in different locations. This criterion provides another opportunity for intersectional benefit across multiple user groups.

Sensory Zoning
This criterion proposes that when designing for special needs, spaces should be organized in accordance with their sensory quality, rather than typical functional zoning. This requires grouping spaces according to their allowable stimulus level, into “high-stimulus” and “low-stimulus” with transition zones aiding the shift from one zone to the next.

Safety
A point never to be overlooked when designing environments for everyone, but particularly those with special needs and vulnerabilities such as autism, safety is even more of a concern with users who may have a different sense of their environment and atypical sensory and mobility facilities.

3.2.2. Design Thinking Methodology

Developed in 2003 at the Hasso Plattner Institute of Design at Stanford University, known as the d.school, this methodology prescribes 5 phases of the design process: Empathise, Define, Ideate, Prototype and Test. A fundamentally cyclic process, it helps guide designers and users through the complexity of design solutions and multiple scales and for complex problems.

3.3. Key Questions and Guiding Prompts

3.3.1.What built environment elements are barriers to effective accessibility for autistic students?

1. Sensory Stressors
    1.1 Acoustics
    1.2 Color
    1.3 Texture and Materiality
    1.4 Lighting
    1.5 Smell
    1.6 Taste and Food Offerings
2. Wayfinding and Navigational Challenges
3. Operational Challenges
4. Programmatic Challenges

3.3.2. What built environment strategies has DCU put in place to support autistic students?

1. Quiet Pods
2. Escape Pods
3. One-Way Circulation[1]

3.3.3. What built environment strategies would you like to see put in place?

1 One-way circulation has always been an organisational strategy recommended in conjunction with spatial sequencing and sensory zoning as part of facilitating ASPECTSS Guidelines. This guide was developed and written largely during the Covid-19 pandemic of 2020/2021. As a strategy to allow occupancy on campus safely, and as part of facilitating social distancing, one-way circulation strategies were put in place in certain parts of campus such as entry gates and the canteen, to minimize crowding and face to face interactions. In the course of many of the focus groups, autistic participants noted the value of this circulation system, in addition to other social distancing measures which allowed for increased personal space and more controlled proximities. There may be some value in considering continuing some of these practices, particularly at congestions and high stimulation points, in support of the Autism Friendly Design Guidelines.

3.4. Stakeholders

1. Autism Friendly University Team
2. Autistic and Neurodiverse Students
3. DCU Estates
4. Smart DCU

3.5. Tools and Techniques

3.5.1.Stakeholder Focus Groups

A series of stakeholder focus groups were held. These include: DCU Autism Friendly University Director and student sensory audit walkthrough; DCU Estates Office and Smart DCU problem definition and probing workshop; and a focused autistic student perspective workshop framed around the same Design Thinking Workshop research questions, but individualized to their experience and with an in-depth focus on their perspective. This afforded a very detailed understanding of the barriers on campus and the unique perception of the autistic student of the physical environment, as well as the physical and operational adaptations they have already put in place for themselves.

3.5.2. Design Thinking Workshop

The first 3 phases or Empathise, Define and Ideate were used in the preliminary data gathering workshop with DCU stakeholders. Using virtual visual boards a half-day workshop was dedicated to answering the key research questions which helped identify the barriers (Empathise) the existing solutions (Define) and the future aspirations (Ideate). Typically conducted in a real-time physical environment, an adapted format was developed to help both alleviate the stress of a social environment for the autistic participants as well as accommodate the restrictions of the Covid-19 pandemic. We are currently developing translations and versions of multiple Design Thinking tools specific to the autistic community for use during workshops specifically with and for the autistic community. The hope is that this would allow the Design Thinking method itself to be more accessible and inclusive of neurodiverse and autistic voices for all areas of design, as equal participants of our communities. These ideas were first piloted at the AsIAm conference in Dublin in September 2019 and later at Google Zurich's Autism Forum in November 2019. These strategies were developed further and specifically for virtual use for this project. They followed these basic principles:

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Design Thinking- the Autistic Perspective:

- Visual over verbal: visual prompts, cues and images can help illustrate ideas and problem spaces in the design thinking workshop. Visual organization of material can be helpful, particularly in orienting and connecting concepts. Mindmaps, logical color-coding and sticky-note clustering are examples of such strategies. For example green for go was used throughout the workshop- and this guide- to indicate positives and potentials- and pink or red for stop was used to indicate problems.

- Order over stimulation: typically design thinking sessions may quickly become visually chaotic and over-stimulating with multiple ideas layering and flowing. Although thought to be central to the design thinking process and acting as a creative backdrop for sparks of ideas and connections, this can be overwhelming for the autistic participant. Efforts were made to create clear grids of space where specific ideas were to be shared. Separate boards and "fresh starts" were created for each new portion of the workshop.

- Personal over broadly social: in the face-to-face workshops first piloted at AsIAm in Dublin and later at Google Zurich, the number of participants was central to the success or failure of the inclusion of the autistic voice. In the former, close to 100 participants joined the workshop which created a significant barrier to autistic participation. The physical space around the visual material that was to be interacted with was overly crowded, and many autistic participants sat out. To accommodate, an extension time was allowed for those who were unable to interact with the visual material and share their notes, but this was not ideal as it singled out the autistic users and created a possible stigma. In the next iteration, the number was greatly reduced to 20 participants. Further refinement of the participant number and organization was carried out in this workshop, with a total of 15 participants split into groups of 5 with one moderator. This allowed a more personal connection among participants and allowed for a manageable social environment.

- Autistic social space balanced with Neurotypical social space and Autistic expertise: the organization of the participants was balanced to allow the comfortable and stigma-free sharing of autistic voice as the "expert" voice. Groupings were curated to include a member from all stakeholder representation, but with a focus on autistic perspective as the expert user.

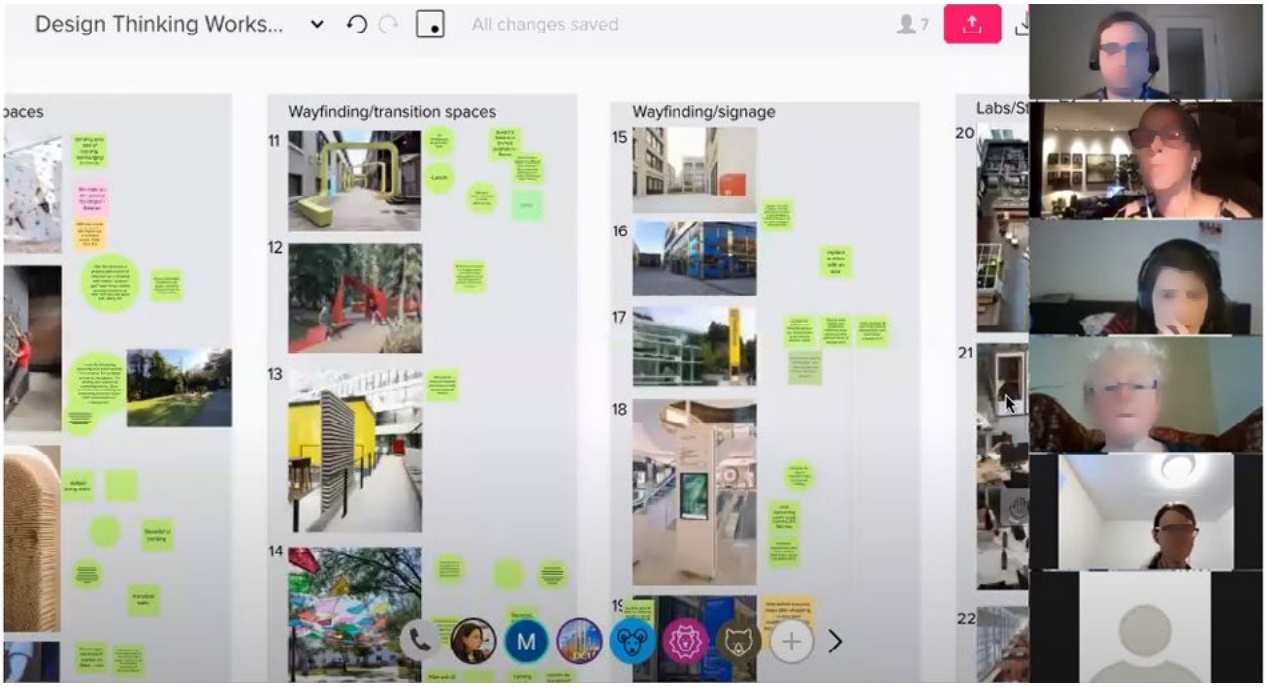
- Planning ahead and social familiarization: the objective, detailed agenda and participant bios of the workshop were shared ahead of the workshop. A video tutorial illustrating how to use the virtual visual board was also shared, with a contact person for technical support. Time was allocated in the agenda to ensure that everyone was comfortable using the platform and that everyone was familiar with one another, and their role in the workshop.

- Timing and scheduling is key: the shared agenda was organized down to the granularity of 5 minutes, with clear start and stop times for each activity, and clear times for breaks. The activities themselves were timed with a visual timer that everyone could see, a practice common in the Design Thinking method, and very supportive of the autistic perspective.

- Predictability and preparedness: as a general concept, in the planning and process of the workshop, the objectives were always clearly stated, the agenda always visible and recapped often and expectations were always clear. Although some design thinking methods may remain open-ended to encourage lack of conformity of ideas, this lack of structure and expectation may be difficult for autistic users, so expectations are shared with the invitation to propose new ideas.

The workshop participants were broadly representative of the DCU Autism Friendly University community including representatives from the autistic student body; the Neurodiverse Student Society; AsIAm Student Ambassadors- Ireland's National Autism charity and self-advocacy group and DCU partner; DCU Student Services; Occupational Therapists from DCU Student Services; DCU Estates Office and Facilities; DCU Health and Safety; and Smart DCU.
The workshop was moderated by the core design team in partnership with the Coordinator of DCU's Autism Friendly University Initiative.

Workshop Discussion:



Workshop Board Format:

PART 2- Results

4.0 Preliminary findings (framed around key questions and through proposed tools)

In response to the 3 key questions, and number of problems, potentials and solutions were found. They are categorised typologically around formal learning spaces, informal spaces, social spaces, public spaces, transitions and circulation spaces.

The range of problems identified focused primarily on: sensory overloads in the form of noise sources, overly bright or flickering lights and crowds and smells; the various functional and sensory challenges faced with large open-plan spaces and double-height spaces; wayfinding barriers in the form of unclear signage and entrance/exit distinction and lack of transition spaces.

The range of solutions and potentials identified included: operational strategies that enforce predictability like the ability to book desk space; the use of sound field systems to support lecture acoustics; furniture flexibility to customise arrangements, divisions and their respective activities; compartmentalised spaces for different groupings of students ranging from individual to small groups; one-way circulation systems particularly in crowded areas; maximised daylighting and naturally lit spaces; effective signage; access to technology supports and infrastructure such as charging stations and other devices; the appropriation of alternative parallel pathways for more sensory mitigated and appropriately transitioned pedestrian circulation throughout campus.

As per the visual coding of this guide, these findings are color-coded in the following pages through graphical summaries using red to indicate problems, green to indicate solutions and blue to indicate potentials.

Formal learning spaces

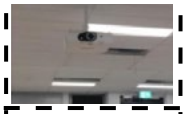
Challenges Potentials Solutions

1

Wooden chairs in lecture halls are potential sources of noise.

2

Some lights in lecture halls can be too bright.



Fans, Ac's, Projectors..etc are potential sources of noise.

3

It is sometimes unclear which doors are entrancs and which are exits.

4

Sound Field system in lecture halls to make sure the lecturer is prioritised no matter what position the student is in.

5

Adapting all the learning spaces to be smart tech might be a source of discomfort for some studends or staff members as they prefer a more traditional process of teaching/ learning.

6

Outdated designs in lecture halls, overcrowding, low ceilings and long lines of seating.

7

Waiting areas are needed before lecture halls and labs to avoid long lines in corridores.

8

It would be nice to have the flexibility in furniture arrangement and types of seating to facilitate the different kind of interactions that the students need in group work.

9

Students should have the option to record lectures using their own devices and should have access to charging stations.

Informal Learning space: Library

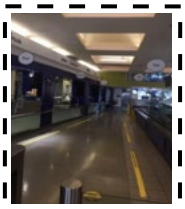
Library

1. Open-plan lobbies in library make the place very noisy and there are no rules addressing noise.
2. Library Group study rooms are sound-proof.
3. Separate sections in the library for working with others and working solo, away from others.
4. Needs more soundproof places and noise partitions.
5. The Ability to book desk space.

Informal/social spaces: Canteen

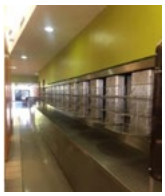
1. 
   The outside area of the canteen is unutilised, could be used as a covered outdoor eating area to be a quieter place for the autistic community.
2. Different types of eating spaces are needed, the upper floor storage above the canteen could be converted to a quieter eating space.
3. 
   Grey space in front of the main canteen is under utilised.

   Trees should be more highlighted more not hidden.
4. Suitable for a sensory/adult gym- individual workout spaces, climbing places..etc. Anything in relation to gyms, could be individual items scattered accross the campus.
5. 
   Queue at the tills is noisy and confusing for some people.

6  Two way system to navigate and enter the canteen.

7  The presence of some barriers is a source of confusion.

8  Some signage is put up to direct people to the different places in the canteen.

9  The noise and smell at the queue to dispose empty trays and dishes is a source of discomfort to some people.

10  Coffee machines canbe a source of noise.

11  Lots of signage for social distancing,

12  Chairs at tables are 2m apart for social distancing.

13  Sanitiser dispensers distributed throughout the canteen as a COVID-19 precaution.

Informal/social spaces: U-Building

1 

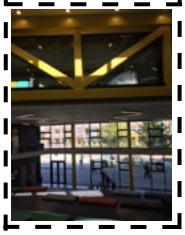
A lot of comortable seating is available and seating areas that allow for different orientations.

2 

Some public areas have plastic chairs which can be a source of noise when moving around.

3 

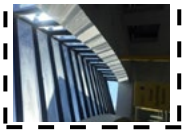
Garbage bins are a source of smell.

4 

High ceilings in some of the spaces.

5 

Open plans and double height spaces cause the noise to travel up to different floors.

6 

Large windows and bright sunlight in some zones.

7 

Flourescent light in some zones is too bright.

8 

Banners for clubs and societies.

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Progressive Architects

9 

Banners on walls for different events happening.

10 

Signage available.

11 

Charging stations and other devices are available.

12 

Some signage written in English and Irish are confusing and hard to understand.

13 

Some room names and numbers are available but are not always used.

7 

Some sound proof rooms are available but don't work very well as the overall acoustics of the building aren't ideal.

Informal/social spaces

1

GSR: New student residence design

The new design allows for customisation by adapting neutral colors and not committing to anything visually in terms of signage..etc

2

The new design of the common spaces includes a sensory garden, courtyards and breakout spaces.

The ability to customise bedrooms to incorporate different sensory and storage solutions. Storage that allows people to see their things, homes for collections.

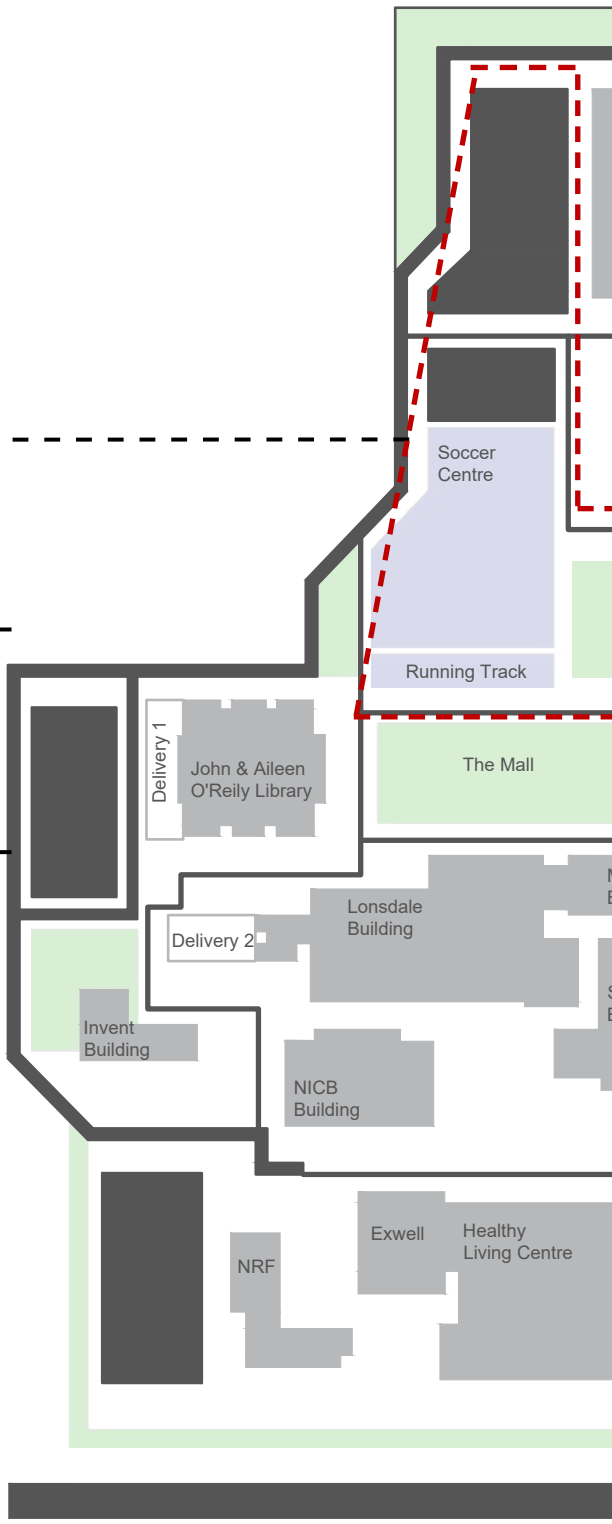
Hard to keep the room warm.

3

Changing rooms are spacious, and have individual stalls if someone needs more privacy.

4

Lacks directionality in the long tiled corridore, could be chaotic sometimes.



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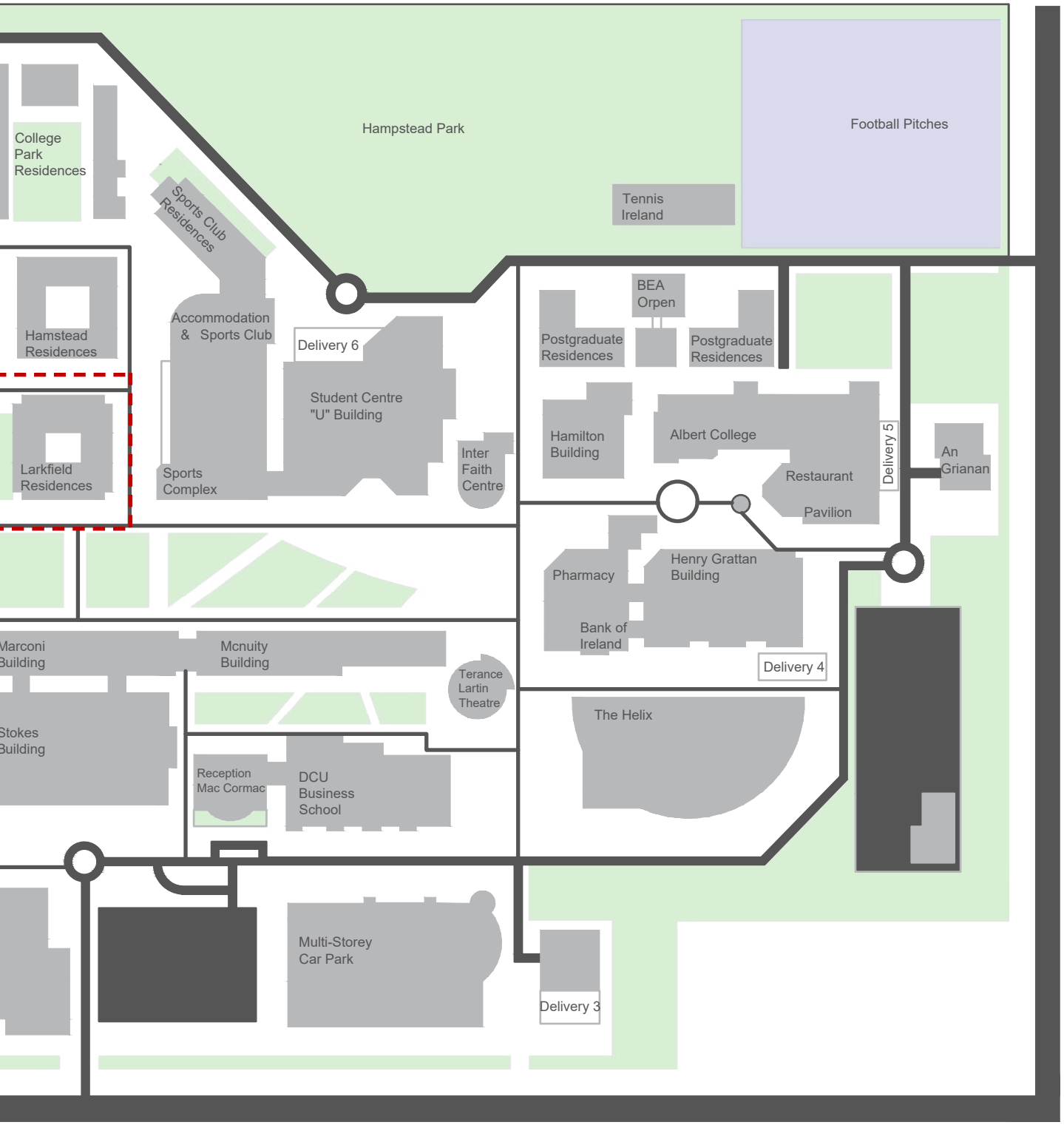

Hampstead Park
Football Pitches
College Park Residences
Sports Club Residences
Tennis Ireland
Hamstead Residences
Accommodation & Sports Club
Delivery 6
Student Centre "U" Building
BEA Orpen
Postgraduate Residences
Postgraduate Residences
Hamilton Building
Albert College
Delivery 5
An Grianan
Restaurant
Pavilion
Larkfield Residences
Sports Complex
Inter Faith Centre
Pharmacy
Henry Grattan Building
Bank of Ireland
Delivery 4
Marconi Building
Mcnuity Building
Terance Lartin Theatre
The Helix
Stokes Building
Reception Mac Cormac
DCU Business School
Multi-Storey Car Park
Delivery 3

Public spaces/transition and circulation

1

2

Example of the transition spaces used as alternative circulation routes to escape the noise and crowding.

Needs lighting to be safe at night textured walls, ground or sensory pools would be pleasant in such spaces.

Interactive artistic spaces and passageways. Could be interesting to view over time and see new shapes and colors.

3

A transition space that is pleasant for circulation due to the flow of the road and the greenery.

4

Example of unclear paths, needs more continuity and flow to understand where the circulation is.

5

Park entrance to DCU isn't clear so some people aren't aware of the route due to the lack of signage.

Entrance: could be one way, car circulation as well (one way traffic), to have more space for pedestrians as this area has a lot of traffic.

The alternative route is a pleasant green space with benches to rest during the journey.

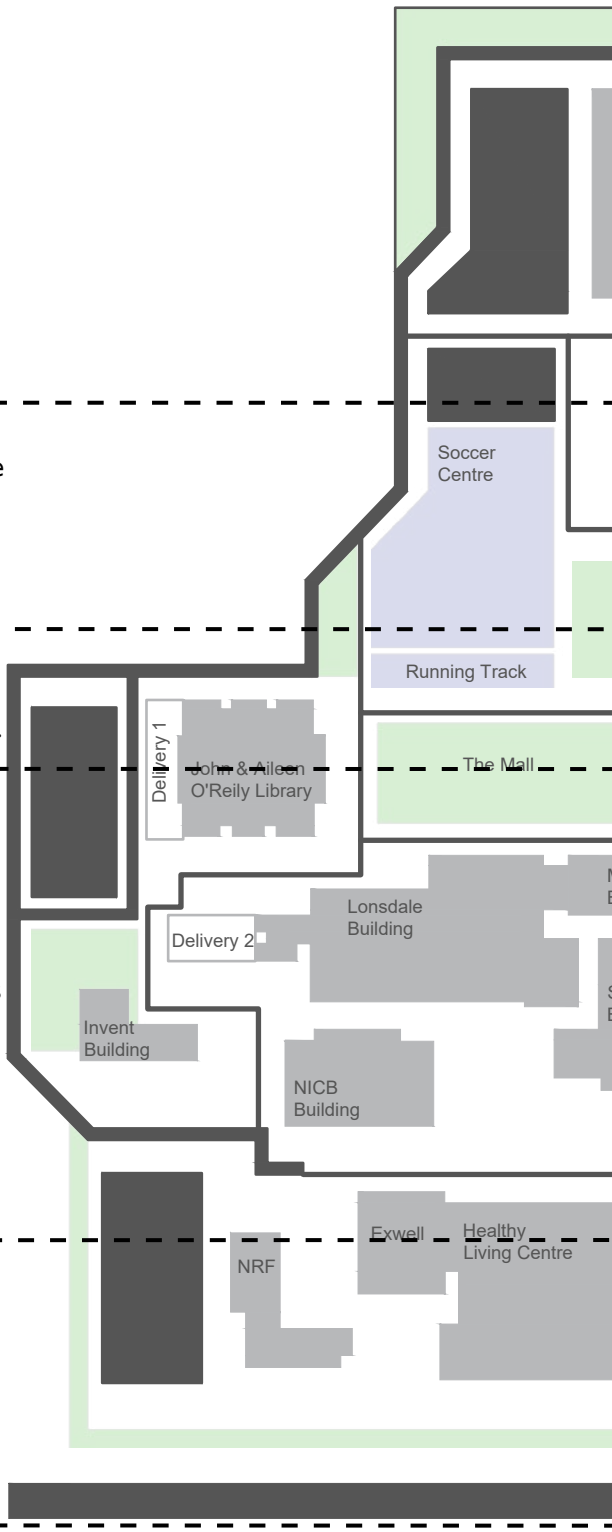
5

Multi-storey car parking

Can be very difficult to navigate (levels/entrances etc.)

Poor Lighting and smell.

Smart lighting has been installed.



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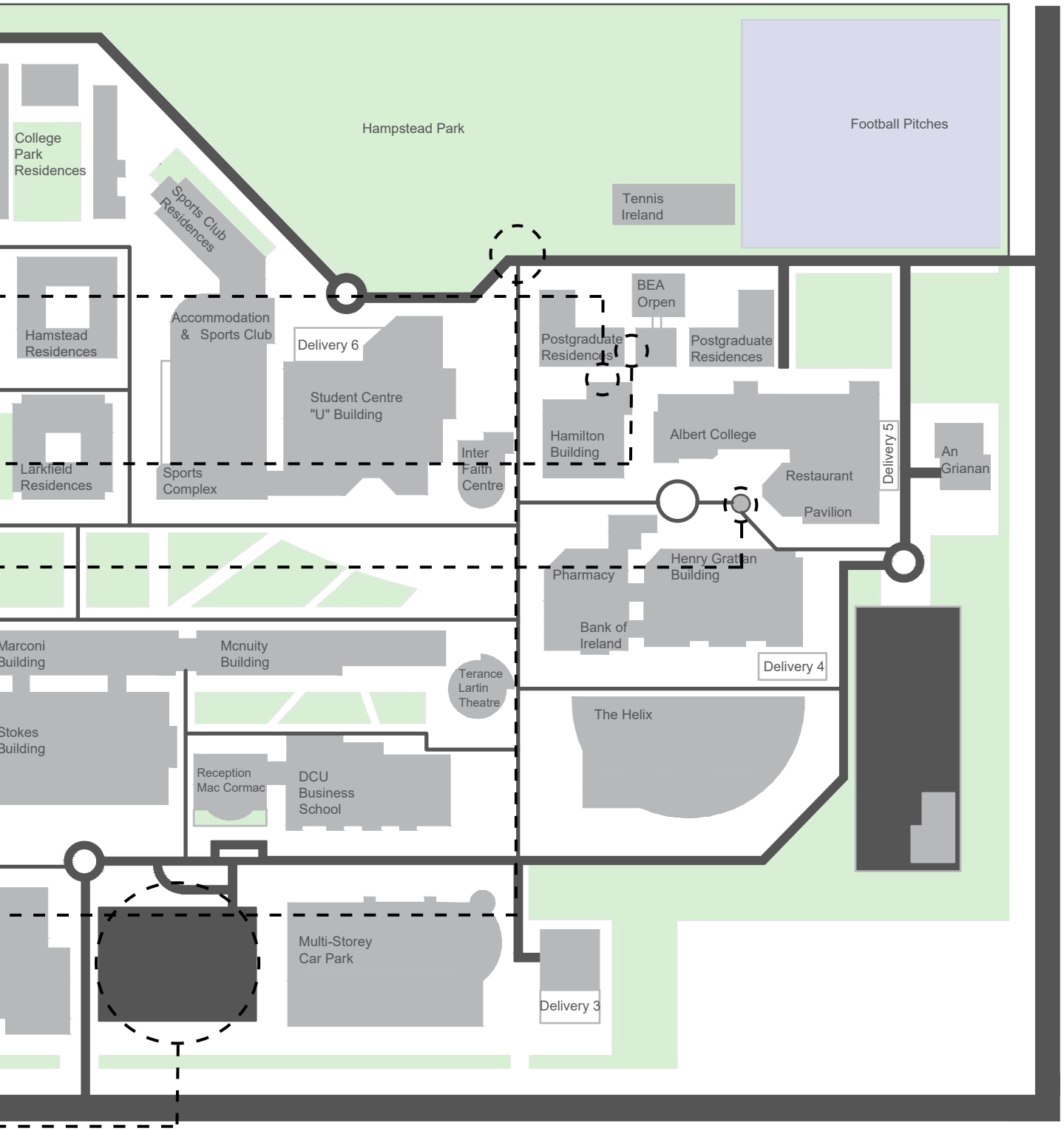
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Marconi Building
Mcnuity Building
Terance Lartin Theatre
The Helix
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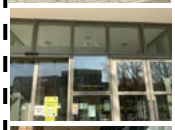
Reception Mac Cormac
DCU Business School
Multi-Storey Car Park
Delivery 3

Public spaces/transition and circulation

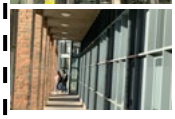
Signage and Navigation

1 

Difficulty in locating doors of buildings and distinguishing between the entrances and exits.

2 

Unclear building numbers.



Difficulty in knowing the function of buildings because they lack proper signage.

3 Graphic signage and color coding building signage to distinguish between their functions.

4 Developing a convention for naming spaces to give consistency accross campuses.

5 Compartmentaliastion to create clear visual pathways using semi barriers that could also act as acoustic blocks.

6 Outdated campus maps and difficulty in finding interactive maps.

7 An overall lack of clarity on the alternative routes available.

8 Compartmentalised circulation and entrances for each user group (pedestrians bicycles and cars). It would encourage people to cycle more feeling that they don't have to share the road with cars.

9 One-way circulation - covid examples could be used to aid in figuring out circulations for some spaces.

10 Having a network of color coded elements flowing across the campus directing people to different places.

11 Dedicating fast lanes for people in a hurry so they don't disrupt the normal flow of people when they're passing by.

12 Lack of rules on how to use spaces such as being allowed to walk on green spaces or not. Lack of rules on how to navigate spaces during crowding.

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Technology and Wayfinding

1 
The inability to use technology to link wayfinding information to quiet space locations/information. Existing Safe Zone App functionality is limited.

2 
Accessing relevant campus/built asset information is difficult (fragmented).

3 

The development of a new 3D digital campus model and platform (could assist with external and internal wayfinding if funded and resourced properly),

4 
Building Information Live Data (BILD) integrated in the 3D model, such as information gathered from existing building management systems (heating cooling etc.)

5 
Linking sensors to the 3D digital campus model and platform/apps/wayfinding tools.

6 
VR to have a “dry run” of a journey or destination to familiarise oneself with the process and for new students and staff to experince the place ahead of time.

7 
Test system in place for automated crowd counting.

8 
Provision of assistive technology for students to use independently. Universal access to claroread.

9 
Leverage the Artificial Intelligence capabilities of the university to identify the common patterns of sound (might be subliminal) that impact negatively the experience of the Autistic person.

10 
Detection of the lighting in a room (i.e. colour temp of light can be used to determine the source). This information to feed into the Pathfinding solution to make the user understand what to expect when they enter a room.

11 
Noise cancelling Ear Buds (unobtrusive) that can be controlled by an App to suite the preferences of the wearer. Ideally directional to allow the user to decide what sound / voice they wished to focus on. Augmented hearing features (e.g. the ability to enhance voice - shift pitch/tone/frequency to a more pleasant range of frequencies.

Public spaces/transition and circulation

1

Quality of space

There's a general lack of consistency in the colors of the buildings, some are vibrant and some are minimal. A standardised palette is needed, but it's hard to find a scheme that suits everyone.

Color schemes that have the least negative impact.

Bright colors and contrast are helpful for visually impaired students.

2

Grip on the ground in busy outdoor areas and passageways so it's not as easy to slip in the rain.

Texture of surfaces that still allows for easy transport of roller bags for equipment that wouldn't cause too much noise.

Textures that don't limit access for wheelchairs.

3

Dissociating the sensory environment from the city - the campus is much quieter than the city, it feels like a sensory escape.

Lots of trees helps with sensory environment and keeping noise levels low.

Canopies over outdoor seating - consideration of Irish weather.

Sound insulation, through hallways around the public space that are specifically designed to capture the sound.

Lack of fresh air in some spaces.

The walkway in St. Patrick's campus with the coloured stained glass and the sun shining through is a positive sensory experience and a nice place for visual stimming.

Diversity of spaces

1

DCU has a lot of types of spaces (eg. the interfaith center, the sensory pods, the library, green spaces).

2

Public seatng is needed that doesn't require people to buy food in order to use it.

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3 New seating in the new mall between Henry Gratin and the library incorporates different textures and USB plugs,it is a great way to spend time outside

Swings, hammocks and rocking chairs

4 An outside unused space next to the information desk that could work as a sensory garden.

Sensory garden for navigating with your other senses/sensory garden wall.

5 Physical engagement in interactive spaces.

Responsive outdoor spaces, playground for adults, climbing walls, trampolines and bouncing floors- individual elements spreading accross campus.

6 Pin up wall to leave positive comments with your native language. could also include a more artistic side.

1 **Quiet spaces**

Lack of suitable quiet spaces on Glasnevin Campus.

Quiet spaces can be outdoors but need to be sheltered from the wind.

Integrating quiet spaces and breakout areas in the staff canteen building.

Rooftop spaces/roof gardens, can be quiet escape spaces.

2 The new quiet pods in st. Patrick's campus are poorly located as you have to pass through crowded spaces to get to them.

3 The Lighting presets in the sensory pods aren't suitable for eveyrone.

The sensory pods should be advertised better and be made more available for staff members.

Semi-private spaces help diverse people - they can be singular spaces.

PART 3 - Guidelines

5.0 Guiding Principle

This guide is governed by several guiding principles, which directly and indirectly may influence design decision making when assessing current environments as well as future design projects. The following are conceptual positions from which it is proposed that design decisions should be made:

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5.1. Users as a Spectrum

This guide takes the position of nuerodiversity and ability as a spectrum. It advocates for viewing the human condition as a continuum of different but equally valid perceptual understandings of the world around us, with the consequent abilities that are a result of those perceptions and differences. It advocates for looking beyond mere inclusion to aspire to a state of blurred boundaries between "normal" and "special" to see all users as human, with equal rights, and calls for the provision of equal opportunity across that spectrum. In the spirit of this spectrum, and the impossibility to delineate a harsh line between the autistic and non-autistic, it is the position of the author of this guide that many of the spatial supports outlined here will benefit the majority of the community, and at the minimum they will hopefully do no harm.

This guide supports the well-known adage that no two autistic individuals are the same, but also that a single autistic individual, like all individuals may have different needs and priorities at different times. Autism is not a monolith nor is any autistic individual a single, static, unchanging set of challenges and needs. Skills develop, interests shifts, perspectives change and the autistic individual, like all individuals, evolves, grows and changes over time. Together these principles, and others outlined in this guide, form the basis of what the author has coined "Spectrum Thinking".

5.2. Good Design is a Basic Human Right

The design recommendations and frameworks set forth in this guide support the notion of good design as a basic human right. Historically design standards and their best practices were based on the premise of an able bodied, hearing, seeing, moving, typically perceiving male form of certain anthropometric composition. This notion, given the users as a spectrum concept outlined above, is far from standard or statistically typical. This guide outlines recommendations that will work to support the right of every human being, regardless of their perceptions or abilities, to enjoy with equal access, good design.

5.3. Accessibility, Inclusion and Universal Design

In the discipline of special needs design, various definitions are presented to outline positions and concepts- accessibility, inclusion, universal design etc. This guide advocates a position of Universal Design and fully Inclusive Design, which is aligned with the concept of the human condition as a spectrum of different but equally valid perceptions and abilities. This guide calls for the implementation of design standards and concepts that create sound design solutions for all user groups in a manner that refrains from mutual exclusivity. In other words, it advocates design solutions that will not exclude any user group, nor favour one user group over the other, or create impediments related to usability when facilitating use for another. The 7 Principles of Universal Design[1] should help frame this balance, to ensure that strategies proposed in this guide are mutually beneficial to all groups, and never create barriers or impediments for others. The necessity for such coordination is indicated throughout the guide.

1 http://universaldesign.ie/what-is-universal-design/the-7-principles/

5.4. Universal Design, Resolving Conflicting Needs and Agility, Flexibility, and Adaptability

Although Universal Design principles strive to be broadly inclusive and equitable, we find ourselves often in conflict with design solutions that may provide access to one need by creating an obstacle for another. Much like a Hippocratic design oath, designers must strive to "do no harm". For example, the transparency and open sight lines proposed to facilitate visual navigation and spatial orientation for the deaf community, as advocated by the Deaf Space principles championed by the work at Gaulledet University by architect Hansel Bauman 2, may simultaneously create an overload of unnecessary visual stimulation for the neurodiverse and autistic community. Similarly, textured paving materials proposed for tactile stimulation for autistic users may provide a mobility barrier for wheelchair and walker users as well as be possible snag points for blind users navigating with a cane. These types of intersectional conflicts need to be identified through broad and transparent dialogue and as inclusive an empathy-driven, human-centered approach as possible, but may need to be resolved on a case-by-case basis. Throughout this guide, such potential points of conflict may be identified, and the suggestion to probe further dialogue across multiple user groups is encouraged to ensure we reach full universal design aspirations. Although not always possible, this type of intersectional design which does not create more exclusion while attempting to be more inclusive, is the aspiration.

5.5. The Right to Universal Delight

A term inspired by the work of Chris Downey and his architecture for the blind, we should think of Universal Design as a minimum threshold, a starting point from which we aspire to "Universal Delight". Not only does every student, staff member and administrator have the right to get to every class, access every shelf in the library, reach every counter of the cafeteria, sit in every communal area, but they also have the right to feel safe, comfortable, included, free from stigma and happy while doing so. Although almost a utopian aspiration, the objective is that along the pathway to reaching that aspiration- although it may never be attained- we will find design solutions that create moments that go beyond physical access and sensory mitigation, and provide the backdrop for social engagement, friendship creation, stigma elimination, identity fulfilment and moments of delight in the university campus experience.

5.6. Community is stronger as a holistic entity

A natural extension of viewing the human condition as a spectrum of needs, with equally valid abilities and challenges and perceptions of the world, the concept that the community is stronger as a holistic entity is a resultant notion of the whole being a sum larger than its parts. The design strategies in this guide support that notion in that by including all needs equally in our society and the spaces we design for ourselves collectively, our communities will be stronger and more diversely equipped with abilities for development.

2 https://www.gallaudet.edu/campus-design-and-planning/deafspace

5.7. Independence, in whole or in part, is the Ultimate objective

The design strategies outlined in this guide should all be premised on the notion of independence being the ultimate objective for the user groups of this project. For example, when designing wayfinding, navigation and circulation patterns, their configuration, quality and signage should bear in mind the diverse abilities of the user groups this project serves, and strive to allow for maximum independence, with safety and supervision. This concept has benefits that are twofold- it allows for pragmatic training towards independent living which alleviates the cost and difficulty of finding inclusive services, as well as providing a sense of self-esteem and equality to the users of the project, which in turn supports the development of skill. This concept is not exclusive to autism, but to all university-age students and can be expanded to other special populations such as the elderly and young children.

5.8. Design is the Backdrop for Dignity and Respect for All

Finally, architecture and its design, is the stage on which our daily lives are performed. A university campus is no exception, and if designed thoughtfully and mindfully, with all needs in mind, but particularly autistic needs, it can play an role in reducing stigma, allowing social interaction, promoting comfort, respecting boundaries, and celebrating special needs and "idiosyncrasies"- not as exceptions of the "norm" but embraced as different but equally valid, and even in some cases superior, ways of perceiving, and engaging with, the world around us. A university campus can be seen as a microcosm of adult life, a place where adult social skills are honed, and patterns are developed for life. Should we create the architectural backdrop that allows for dignity and respect for all, that has the potential of far-reaching social change as these citizens move into the workforce and create a ripple effect hopefully in their own communities of dignity and respect for all. Strategies incubated in the built environment on campus will hopefully inform and infiltrate their later lives and allow these students to become future agents of change to a more autism friendly world.

6.0 Campus Design Guidelines

The guidelines outlined here are intended for overall use throughout the campus for current retro-fit solutions, facilities management reconfigurations and possible future builds.
The implementation of these guidelines will be illustrated in the test cases in Part 4 section 8 of this guide.

General:

6.1. Community Integration, Blurring the Boundaries and Space as a Source of Stigma Reduction

This guideline calls for a dismantling of an "us and them" position, which reflects on the spatial organization of functions and services in the master plan. It calls for the blurring of boundaries but between user groups, and the removal of distinction between autistic space and other spaces. It works hand-in hand with the guiding principle of Users as a Spectrum, and translates spatially into the removal of segregation between autistic and non-autistic users. It also calls for the provision of joint spaces and opportunities for social interaction whether within discrete functions, or between zones of use. This principle is showcased in Section 8.1, in the Glasnevin Student Residence Student Commons.

The guiding principle of this test case calls for the creation of space first where autistic needs are prioritised, and second where a truly diverse society can thrive, showcasing the value of autistic space not only for the autistic population, but for all. It provides an opportunity to showcase that this is possible and beneficial for other users- students, staff, visitors. By highlighting these benefits, hopefully the stage will be set for the opportunity of social connections, the valuing of the autistic perspective and ultimately the reduction of stigma around autism.

6.2. Reverse Inclusion

A continuation of the previous principle, the concept of reverse inclusion is one where the typically minority group becomes the majority, where the special need becomes the typical, and the typical need the special. This can be seen as a form of spatial paradigm shift, and can create the opportunity for the very immediate realization of the importance of providing for the needs of everyone. Again, the test cases presented in this guide are such experiments and will hopefully catalyse other similar solutions at different scales across campus. The principle of reverse inclusion has been used to develop similar guidelines such as DeafSpace.

Similarly, autistic space would call for the prioritization of the sensory needs of users with autism and the full application of the Autism ASPECTSS™ Index: acoustical control, spatial sequencing to follow time scheduling of use, the provision of escape space, compartmentalization of space into functionally specific zones, the provision of transition spaces between high and low stimulus

zones, zoning around the sensory quality of spaces into high and low stimulus zones and safety. These are discussed in detail in the following section.

This concept can be applied to the interface spaces of campus such as the surrounding streets, as well as the social collective spaces, where autistic needs are accommodated first, and typical users are integrated into those spaces, with the objective of raising awareness and sensitivity to the diverse and equally important needs of others.

Other spaces across campus that can apply this concept include the development of sensory gardens, the compartmentalisation of urban streetscapes and the provision of a network of escape and sensory respite spaces across campus. These concepts are illustrated in detail in section 6 figures 1 and 2.

6.3. Site Planning and Building Design as a Tool for Social and Environmental Management and Mediation

- Layering

This criterion applies to both the physical and spatial layering of spaces. It calls for the blurring of the in-out distinction, not only for environmental control purposes of minimising thermal exchange, but also to help provide a series of social mixing spaces to encourage social skill development across the users of campus. Entry sequences, interstitial spaces and building approaches are all ideal spaces to create micro-climates of sensory refuge and transition-spaces that allow for social interaction and exchange in a manageable and sensory mitigated way. Examples of this are illustrated in section section 6 figure 2.

- Introverted Design

This criterion looks for the organization of spaces and zones around open spaces such as courtyards, with primary orientation looking inward. This is particularly useful for environmental control, drawing daylight into the core of buildings, as well as to create discrete identities and social exchange spaces of different scales. This approach should be combined with the integration of natural elements at different scales.

- Creating Microclimates and Buildings within Buildings

A natural culmination of the criteria above, the creating of Microclimates and Buildings within Buildings, can be adopted. This criterion calls for spatial organizations that will create smaller, manageable environments, that are more climatically controlled, private and acoustically managed in addition to the creation of transitional in-between spaces using a Buildings within Buildings approach. Precedence supports the success of this approach specifically for autism and learning environments.[1]

1 Mostafa, M. (2020). Architecture for autism: Built environment performance in accordance to the Autism ASPECTSS design index. In Autism 360° (pp. 479-500). Academic Press. Of specific interest is the Abu Dhabi Autism Center by Simon Humphreys

6.4. Integration of Natural Elements and Design of Open Spaces

- Spatial Hierarchy

In conjunction with the concept of Layering, it is recommended that buildings and their groupings are organized around a series of natural environments in spatial hierarchy in scale and level of privacy. This will allow for the weaving and integration of nature throughout the buildings. Ease of access to these natural environments will have beneficial effects, as research has shown that exposure to, and learning within, natural environments may have equal, if not better results than internal environments.

- Water and Organic Features

It is recommended that natural features, particularly those with multi-sensory qualities such as water, aromatic gardens, textural natural materials, be adopted in the spatial hierarchy of these natural environments. Not only will they assist in environmental control, but they will also offer crucial therapeutic multi-sensory input opportunities for the autistic and non-autistic users of the campus. The application of this may be seen primarily in sensory gardens and other natural sensory networks embedded as part of the sensory escape network illustrated in section 6 figure 1.

6.5. Universal Design: the Autistic Perspective

DCU is committed in its broad design philosophy of campus to follow Universal Design Guidelines1 Developed to be inclusive of all needs and ensure that the needs of one group do not create a barrier for others, historically these guidelines have not been fully tested against autistic use and needs. The hope is that this guide and its resultant design interventions at DCU will provide that opportunity. This guide recommends that all design interventions that result from it, be tested against this standard, and ensure that any solutions generated from this guide do not impeded the access and usability of any other group on campus.

- Equitable use
- Flexibility in use
- Simple and Intuitive Use
- Perceptible Information
- Tolerance for Error
- Low Physical Effort
- Size and Space for Approach and Use

1 http://universaldesign.ie/What-is-Universal-Design/The-7-Principles/ accessed January 2021

6.6. Agility, Flexibility and Adaptability

To ensure that the above principles of Universal Design, as well as the earlier guiding principle of Universal Delight, are fully realised, a certain level of agility, flexibility and adaptability may need to be provided when autistic design interventions may impede the accessibility and needs of other user groups. For example, tactile and textured paving surfaces may be introduced in order to create a sensory rich landscape for autistic users to provide proprioceptive and tactile self-stimulatory opportunities for sensory regulation needs. These can involve cobble-like surfaces and changes in texture along the flow of a pathway. Surfaces such as these however are extremely difficult, if not dangerous, for different mobility assisted pedestrians such as wheelchair users, walker users, cane users and the visually impaired. In this case, these sensory pathways should be designed in parallel to, or off the main flow of pedestrian traffic, to provide agility in how the circulation pathway can be used.

Similarly certain lighting levels that are soothing for autistic users, may be challenging for low vision users. In spaces that are general use, such lighting controls can be adjustable giving each user or group of users that ability to adapt the space to their needs. Other examples include adjustable and customisable furniture layouts. While autism friendly classrooms may need a higher level of compartmentalisation, breaking the space and its consequent furniture arrangements into smaller stations and clusters, a general purpose classroom conducting a large group activity may be impeded by this arrangement. Consequently furniture should be flexible with its arrangements and be easily adaptable. Another example of adaptability is the use of RGB light to create color on a neutral paint wall surface. In certain spaces, color preference may play an important role, such as escape spaces and sensory alcoves. The use of dimmable, color adjustable RGB indirect light washing over the wall surface or as a backlight can create temporary color that is adaptable to each users' needs.

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6.7. Acoustics

This criterion proposes generally that the acoustical environment be controlled to minimize background noise, echo and reverberation. The level of such acoustical control should vary according to the level of user-focus required within the space, as well as the skill level of its users. For example, activities of higher focus should be allowed a higher level of acoustical control and be part of low-stimulus zones.

Provisions should also be made for different levels of acoustical control, so students can graduate from one level of acoustical control to the next, slowly moving towards a typical environment in order to avoid the "greenhouse effect".

Research has shown the efficacy of sound masking technology in limiting the travel of sound in open plan spaces. Although not specific to the autistic user, this research showed the efficacy of sound-masking in creating less distraction and disturbance, allowing more focused attention in open plan spaces.[1]

1 Desroches, I. E., & OAAAS, A. S. T. (2014). SOUND MASKING SYSTEMS AND THEIR EFFECTIVENESS.

Research has also indicated the decibel levels of below 55 db correlate with reduced behavior indicating distress in autistic students, with distress behaviours increasingly significantly at the 55-70 db range. Although this study was conducted in a K-12 setting with a small sampling of students, it provides some of the first empirical research available on specific decibel levels for learning environments and autistic comfort. [2]

Acoustical Design Interventions:

1. Planning level
On the Master Planning level this involves situating low-stimulus zones, particularly learning environments, away from sources of external noise, such as high traffic roads, playgrounds, sports facilities etc. Sensory qualities, particularly acoustical, should be taken into consideration when zoning and managing facilities and activity distribution. Where unavoidable noise sources are located near low-stimulation zones such as residences, study spaces, libraries, classrooms and escape spaces appropriate acoustical mitigation should be introduced- this can include internal wall cavity insulation, use of acousti-block, installation of sound absorbent materials on various surfaces including flooring, walls and ceilings as well as use of double glazing and sound absorbent blinds or curtains in window treatments.

2. Interiors: Macro Level
Acoustical regulation may also be needed for existing and future large open plan interior spaces. To allocate the level of such mitigation, spaces can be classified into 3 levels: low-stimulation spaces such as reading spaces in libraries, study spaces, residences and classrooms which require the highest level of mitigation; high stimulation spaces such as dining halls and student commons which require a moderate level of mitigation as well as micro and personal solutions; and transition spaces such as corridors, foyers, entrance lobbies and atriums which require moderate to high mitigation depending on their surrounding sensory environment. Global solutions at the macro level of the acoustics of the space, depending on the classification, can include:

- Wall-mounted sound absorbent materials. In teaching spaces and corridors these can serve multiple purposes and be used as pin-up surface for visual materials and signage, but within an ordered visual pattern. Color and pattern should be selected with minimal visual distraction in mind, using the color palettes described in this guide.
- Sound absorbent acoustic flooring systems and the use of materials such as carpet tiles or sound absorbent vinyl.
- Acoustical ceiling treatments including acoustical panels, baffling systems and ceiling mounted sound absorbent panels, depending on whether it is a retro-fit or new build.

ResearcH JournaL, 27.
2 Kanakri, S. M., Shepley, M., Tassinary, L. G., Varni, J. W., & Fawaz, H. M. (2017). An observational study of classroom acoustical design and repetitive behaviors in children with autism. Environment and Behavior, 49(8), 847-873.

3. Interiors: Micro Level
In addition to macro level global solutions, micro-environments can be created within larger spaces, as oasis of calm and quiet for the use of autistic students, and others needing sensory refuge. These solutions can include:

- Ceiling or floor mounted installations to create small domains of acoustical control. Again color and visual stimulation limitations should be carefully considered.



- Free standing seating/meeting/studying pods of different configurations and levels of enclosure. These can range from fully enclosed pods through a gradient of solutions to light individual semi-open configurations.




- Free standing and flexible acoustical paneling can be used to configure adaptable spaces for different groups sizes from the individual to the group, and for different activities from study, to escape to socializing.



- Interiors: Geometries and spatial configurations

Certain geometries will increase reverberation and echoes, particularly when multiple hard surfaces are parallel to one another at short proportional distances. For retro-fits, spaces can be partitioned and reconfigured to break up the space, panelling can be introduced to alter the reverberation surfaces and reduce echo. For new builds careful attention should be given to spatial configurations to avoid these acoustical challenges, and ceiling heights, spatial proportions and parallel surfaces should be carefully assessed particularly with regards to the functions and sensory level of the space.

- Operational: Personal level

Individual noise cancelling devices have become extremely popular with university students, particularly those with sensory sensitivities and autism, due to their ability to reduce the impact of external noise. When used with white noise and certain binaural sounds, they have been shown to possibly help with anxiety, reduce stress and increase focus and attention. Even when not in use, wearing these devices can signal in a socially recognizable and acceptable way that the individual may not want to engage in social and verbal interaction at this time, and give the autistic individual a certain level of control over social approach and engagement.

Since such devices can be prohibitively expensive, a device library may be extremely helpful with dispersed charging/check-out stations across campus, and enrolment in a program to allow reduced cost access to such devices for all students registered in the Autism Friendly and Neurodiverse Students initiatives.

6.8. Spatial Sequencing

This criterion is based on the concept of capitalizing on the affinity of autistic individuals to routine and predictability. Coupled with the criterion of Sensory Zoning, which will be discussed shortly, Spatial Sequencing requires that areas be organized in a logical order, based on the typical scheduled use of such spaces as well as their logical sensory flow. Spaces should flow as seamlessly as possible from one activity to the next through one-way circulation whenever possible, with minimal disruption and distraction, using Transition Zones when needed.
Spatial sequencing helps create constancy and could potentially support anxiety reduction, by allowing the users relief from the anticipation of unexpected events or activities. Although difficult to implement broadly across the entire project, it should be applied with particular attention in general use spaces such as the cafeteria, library and student commons, as well as more holistically across campus from one building to the next- for example from entrance to admissions to student services to learning spaces to library to residence- replicating whenever possible the sequence of activity as mapped across campus throughout the day. An example of this sequencing is illustrated in Section 8.1 figure 11, with a flow of activities from the general sensory playscape of the public space of the mall, to the pre-entry socializing space, to the transitional space, to the large group socializing/dining space to the moderately quieter study

space to the final and most secluded isolation and sensory escape space. Access to the start and end point of these sequences should be open, as well as the allowance of bypass circulation to fast track to, for example, the moderately quiet study space.

6.9. Escape Spaces

The objective of such spaces is to provide respite for all users, but particularly autistic and neurodiverse users from the over-stimulation found in their environment. Empirical research has shown the positive effect of such spaces, particularly in learning environments. Anecdotal evidence has even supported that the mere knowledge of the presence of such spaces, and the knowledge that they are accessible to the user at any time, may be sufficient to reduce anxiety in the environment. These spaces should provide a neutral sensory environment with minimal stimulation that can be customized by the user to provide the necessary sensory input. They can also help provide proprioceptive input and support the sense of physical orientation within space and provide vestibular input. They should be easily accessible, adaptable and sufficient in number to fulfil the sensory needs of the community, while still respecting the varying needs of individuals for personal space. They should be acoustically controlled with design features such as sound absorbent materials, physical partitioning, sound masking technology and soft finishes. Their sensory environment should be kept as neutral as possible with natural materials whenever available, muted colors, adjustable LED or natural lighting, minimal ornamentation or visual distraction. Individual control over lighting and sound levels should be made available whenever possible. Their scale should remain intimate, with a range of sizes from the individual escape space to the small group escape space of no more than 5 people.

Escape spaces can take on many forms and scales and may include small scale external natural environments, seating around water features, quiet seating arrangements, sensory areas, alcoves off circulation spaces, as well as free-standing micro-environments within larger open plan spaces. Many of these typologies are illustrated in section 8 Test cases 1 and 3 in the GSR Student Commons and Sensory Alcove.

Escape spaces should be organised in a well-distributed and easily accessible network across campus, as illustrated in figure 1. As broad a variety of these should be made available, from individual to communal, enclosed to open and static to dynamic. Escape spaces should be located in accessible areas such as in alcoves along corridors; as free standing or partitioned spaces within larger classrooms and open plan spaces such as libraries, the student commons and the cafeteria; along pedestrian pathways and in quiet garden spaces and courtyards. Examples of these respectively can be small individual soft relaxation pods, small group free-standing partitioned quiet spaces, individual chairs with closable shielding, quiet benches in open gardens and swinging or rocking hammocks and seats. Like the spectrum itself that they serve these escape spaces should be designed along a gradient- from the fully enclosed, quiet individual, static escape space to the larger sized more open two person escape spaces that may provide the dual function of calm and safe social interaction opportunity, to the dynamic open

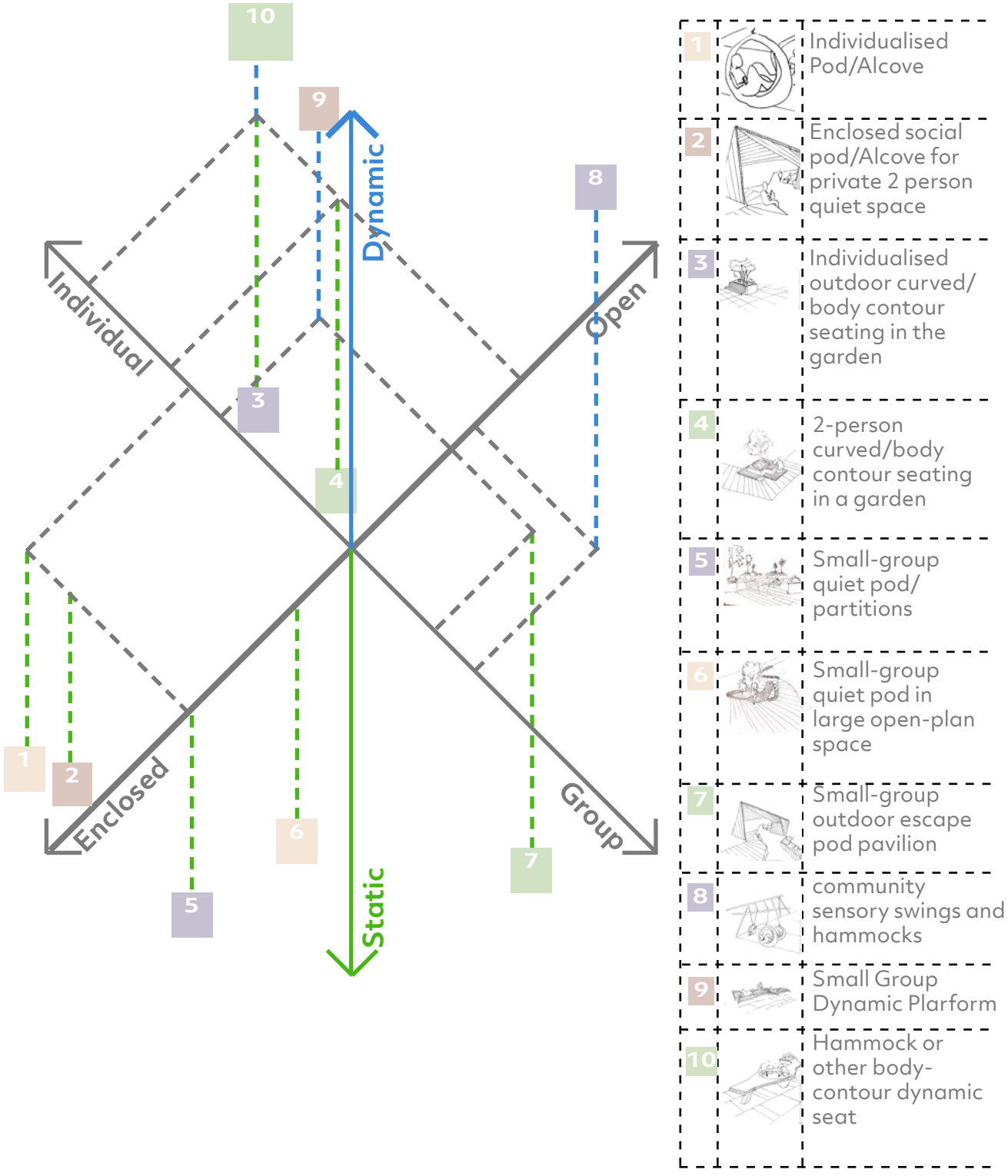

Figure 1: Sensory escape network

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"Like the spectrum itself that they serve these escape spaces should be designed along a gradient- from the fully enclosed, quiet individual, static escape space to the larger sized more open two person escape spaces that may provide the dual function of calm and safe social interaction opportunity, to the dynamic open but controlled small group escape space that allows more stimulation and a greater possibility of interaction, but in a protected and sensory mitigated manner."

but controlled small group escape space that allows more stimulation and a greater possibility of interaction, but in a protected and sensory mitigated manner.

This gradient of spaces not only provides choice to the autistic user to fulfil needs as they arise and to the degree that they are required, but it also provides the opportunity for skill development, particularly the skills of sensory filtering, sensory management and social skills. By using this spectrum of differently sensory mitigated space, the autistic user can gradually develop skills, slowly allowing less enclosure and more sensory input into their escape experience, as well as occasional manageable social interactions in a safe space. Not only does this support skill development, but it also helps the autistic user to rely less on sensory mitigation, and avoid the "greenhouse effect" [1]. Precedence supports that spaces created originally for escape and transition can be later appropriated for other functions by autistic users, such as for self-initiated conversation, socialisation and reward [2].

Research and best practices have demonstrated that sensory overload is experienced by a far larger sector of the population than just the autistic community. Both Escape spaces and Transition spaces have been shown to be supportive of, and consequently used by, many members of the community beyond their original intent of the autistic population alone. Escape spaces in particular should not be appropriated entirely by the general population and need to remain with prioritised access to the autistic users of campus. Although disclosure of diagnosis should not be a pre-requisite for use of these spaces, should their number be insufficient to serve everyone, priority for autistic users must be organised operationally in some way.

1 Similar greenhouse effect avoidance and skill development support should also be noted in other sensory mitigated spaces such as autism friendly classrooms, by providing a gradient of sensory mitigation and options and degrees of such mitigation.
2 Mostafa, M. (2018). Designing For Autism: An ASPECTSS™ Post-Occupancy Evaluation Of Learning Environments. ArchNet-IJAR, 12(3).

These spaces serve a larger purpose of showcasing the value and the autistic perspective and perceptual model of the environment- and the benefits that perspective and its need for occasional escape may afford others. Access to these spaces should be open to the entire community, but in a way that respects and celebrates ownership and domain to the autistic community. They, along with all other autistic spaces across campus, should be seen as a living autism awareness network, a string of calm and respite and beauty that stitches across campus and brings with it an understanding, value and celebration of the autistic viewpoint.

6.10. Compartmentalization

The philosophy behind this criterion is to define and limit the sensory environment of each activity, organizing space into compartments, or sensory cells. In its fullest manifestation, each compartment would include a single and clearly defined function and consequent sensory quality. The separation between these compartments need not be harsh nor even tangible but can be through intangible design features such spatial layering, softscapes, change of colour or material and even through variances in lighting. The sensory qualities of each space should be used to define its function and separate it from its neighbouring compartment. When coupled with this consistency in activity, this criterion will help provide sensory cues and social cues as to what is expected of the user in each space, with minimal ambiguity.

Streetscapes are an ideal example of a space in need of compartmentalisation to optimize autistic use. Currently most streetscapes have mixed use sidewalks, with strollers, scooters, pedestrians all mixing with no barrier between them and adjacent cyclists, public transportation and other vehicles. Even with bicycle lanes and dedicated bus lanes, this fluid cross section, with no sense of boundary, can cause unnecessary stress for autistic users arriving to campus. A proposed compartmentalized solution of the typical city streetscape is illustrated in figure 2. It demonstrates the various levels of boundary that can be used to define compartmentalized zones- visual compartmentalisation with paving lines between different pedestrian speed lanes, permeable compartmentalisation with low post boundaries between pedestrian spaces and vehicular spaces and soft intangible compartmentalisation with boundaries in the interstitial space in the setbacks of buildings which can act as a transition zone. This solution also intersects with the fulfilment of the Safety criteria.

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> “These spaces serve a larger purpose of showcasing the value and the autistic perspective and perceptual model of the environment- and the benefits that perspective and its need for occasional escape may afford others. Access to these spaces should be open to the entire community, but in a way that respects and celebrates ownership and domain to the autistic community.“

Compartmentalisation in internal spaces can also help demonstrate the value of agility, flexibility and adaptability. Autism Friendly classrooms, particularly those supporting progressive pedagogies that require multiple parallel modes of instruction and learning, can be compartmentalised in a way that creates discrete spaces for each activity. These compartments can be conceived of as modules that are interchangeable and easily arranged by students and instructors themselves. This gives autistic students some level of agency over their spatial needs and can be guided by a clearly labelled visual menu of modules and alternative plan layouts displayed in the room. This can be additionally supported by optional interior prompts such as carpet lines, color blocking or painted datum on the walls.

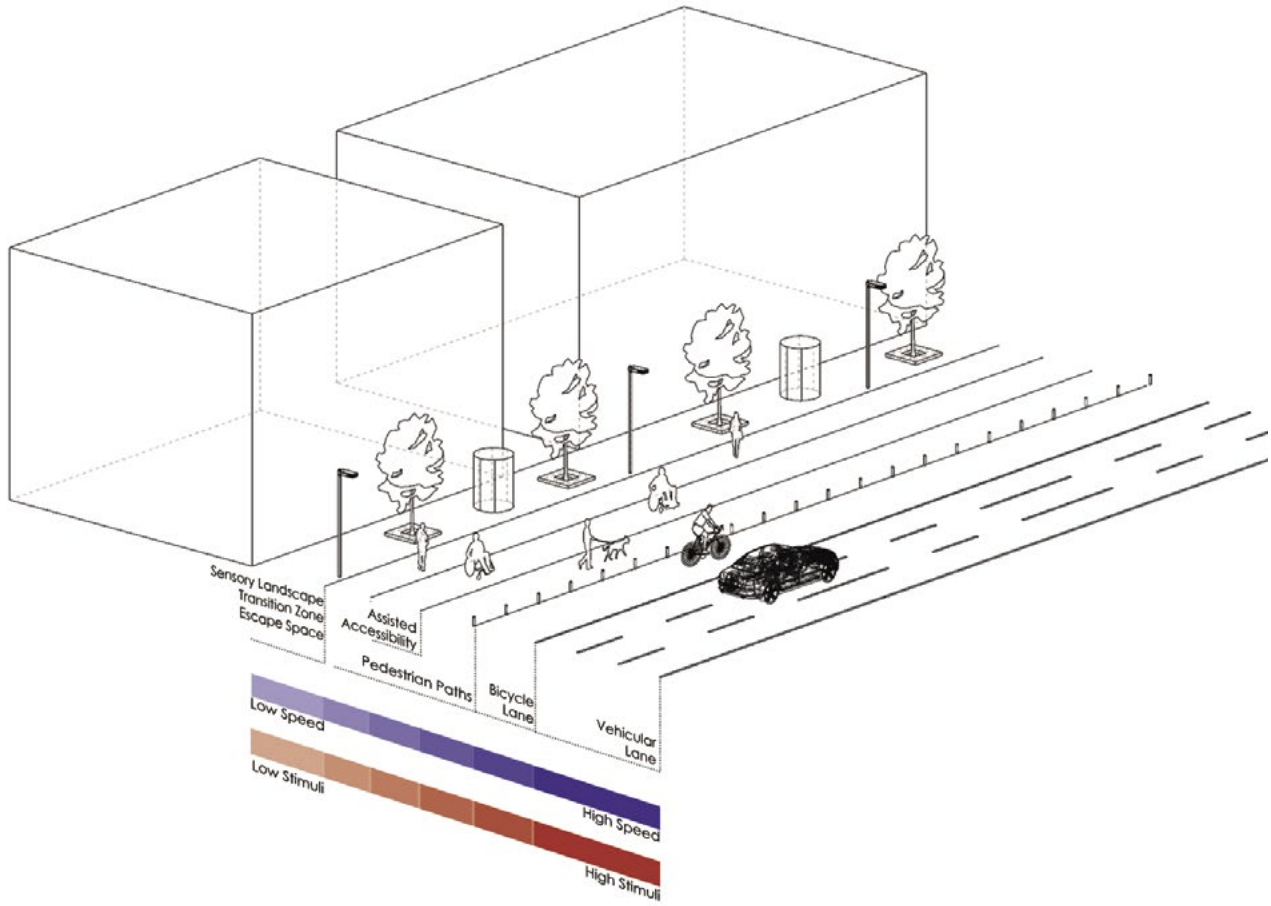

Figure 2: Compartmentalised street section

6.11. Transition Zones

Working to facilitate both Spatial Sequencing and Sensory Zoning, the presence of transition zones helps the user recalibrate their senses as they move from one level of stimulus to the next. Such zones can take on a variety of forms and may be anything from a distinct node that indicates a shift, to a full sensory space that allows the sensory re-calibration before transitioning from an area of high-stimulus to one of low-stimulus. A network of transition spaces should be planned across campus at all junctures from high stimulation to low stimulation whenever possible. The most logical of these solutions is the affordance of transition and creation of such spaces at all entry sequences to all buildings, which is the most common juncture of high-stimulation to low-stimulation, particularly in educational buildings where learning takes place which requires a calm focused atmosphere. Transition should also be made available at the public entrance to campus, as students leave the city domain and enter campus proper. Public transportation and urbanscapes can be incredibly stressful for the autistic community. The sensory overload of sounds, movement, smells, lights and signage overlaid with the unpredictability of

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"Provision of a sensory neutral recalibration transition zone at major access points to campus can help provide the respite needed to adjust, create calm and calibrate one's sensory levels for the start of the day."

pedestrians and vehicles, can easily create sensory overload. Being experienced typically at the start of your time on campus only compounds the detrimental effect of this overload. The focus groups conducted with DCU students confirmed this, and revealed that the arrival to campus by foot, bicycle or by public transportation presents a heightened sensory overload for the start of the day. Provision of a sensory neutral recalibration transition zone at major access points to campus can help provide the respite needed to adjust, create calm and calibrate one's sensory levels for the start of the day. These spaces should be shaded from possible weather conditions, allow comfortable seating and integrate natural elements. Similar outdoor seating and integrated natural open spaces, woven throughout the campus can provide additional levels of transition at different scales and in different locations.

6.12. Sensory Zoning

This criterion proposes that when designing for autism, spaces should be organized in accordance with their sensory quality, rather than typical functional zoning. This requires grouping spaces according to stimulus level, into “high-stimulus” and “low-stimulus” with transition zones aiding the shift from one zone to the next.

This criterion can be applied at multiple scales- from a single multi-purpose open plan space, such as a student commons as illustrated in Test Case x; to the scale of a building, with the grouping of high stimulus learning spaces for example- music, performing arts, workshops etc separate from low stimulus learning spaces such as testing centers, lecture halls and general purpose classrooms; to the level of the masterplanning of larger urban scale organisations across campus- grouping high stimulus sports facilities, utility buildings separate from low stimulus spaces such as libraries and classrooms.

6.13. Safety

A point never to be overlooked when designing any environment, safety is even more of a concern for autistic students who may have an altered sense of their environment and face sensory and mobility challenges. All design interventions developed as part of this guide must be coordinated and approved by in-house Health and Safety.

- Choice of materials

Material selection should be made with safety foremost in mind. Durability and robustness are key to allow the campus to age well, and to avoid injury now and in the future. Textures should be chosen to minimize the chance for physical harm, particularly in circulation areas. Non-slip surfaces and soft edges are examples of the detailing required throughout the project. For example, tactile surfaces may be introduced in outdoor spaces to allow for sensory stimulation. These should be reviewed carefully in coordination with other user groups’ safety and mobility needs, as well as general Health and Safety. Certain visual and light features may also be triggering for photo and visually sensitive epilepsy, which is a common challenge found to intersect with autism.

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- Hierarchy of control zones

Despite the proposed public/private interfaces, and proposed porosity of campus to achieve reverse inclusion, it is paramount to put the safety and security of students above all criteria. This will entail the allocation of various levels of control across campus from fully publicly accessible spaces in the public interface spaces (with internal control from inside the campus), to semi-accessible spaces such to completely controlled spaces such as student residence. It is recommended that various levels of security and control be used- electronic key card access, human security as well as digital surveillance, as appropriate.

- Observation

Should the recommendations laid out in this guide be followed, the hope is that sensory and behavioral challenges among autistic students, and their consequent mental and physical health impacts, will be reduced. This does not however completely remove the need for all students, but in particular all vulnerable students such as those in the autistic community, to have some form of responsible and respectful support and observation. Among the guidelines laid out here are provision of sensory escape, sensory isolation and physical separation from larger overwhelming spaces. The need for this isolation should be carefully weighed against the possibility of harm when alone in such spaces. A safe and respectful operational strategy for such spaces should be put in place, which can include visual access from external spaces, panic buttons and other forms of confidential digital communication with DCU Student Services and the Autism Friendly University Initiative.

7.0 ASPECTSS 2.0

The original Autism ASPECTSS Design Index was published in 2013. Since that time it has been applied in multiple contexts of varying geographies and discussed across multiple user groups for different applications and scales. These have included research and design projects ranging in typology from residential to educational to healthcare, and in scope from interior design, architectural design, landscaping and urban design. Throughout these processes, additional design features have come into play, in the role that they can play in creating an autism friendly environment. The following are these design features, and are considered the 2.0 version and iteration of ASPECTSS, and should be viewed as an extension of the original principles.

7.1. Colour

The original Autism ASPECTSS Design Index was published in 2013. Since that time it has been applied in multiple contexts of varying geographies and discussed across multiple user groups for different applications and scales. These have included research and design projects ranging in typology from residential to educational to healthcare, and in scope from interior design, architectural design, landscaping and urban design. Throughout these processes, additional design features have come into play, in the role that they can play in creating an autism friendly environment. The following are these design features, and are considered the 2.0 version and iteration of ASPECTSS, and should be viewed as an extension of the original principles.
General best practice however can provide the following guidance:

- Prudent use of vibrant color:
given the polarizing preferences of color choice, it is best to avoid the use of vibrant, highly saturated colors, particularly in their primary form. This can be limited to minimal elements where vibrancy is necessary for legibility, such as visual orientation maps and signage. There is a limited amount of research that seems to indicate a preference for the blue to green spectrum of color, with an aversion particularly to the color yellow which a small set of research has indicated can be perceived as over-stimulating for the autistic user

- Minimise dramatic contrast:
like with other spatial characteristics, the autistic perspective is more likely to be comfortable with gradual transitions of color, and the use of complementary colours in soft gradients. Contrast should be limited to functional purposes, for example in its use to define boundaries and edges, as opposed to creating visual stimulation for stimulation's sake.

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- Colour as a space-defining strategy:

Colour as a space-defining strategy: colour can be used to help define spatial boundaries and relationships. It can be used in conjunction with the concept of Compartmentalisation to define functionally discrete spaces without the need for tangible boundaries or partitions as shown in figure 3. Colour can also be used to reinforce navigational pathways, either as a continuous fluid coloured pathway on the ground plane, or with minimally color contrasting edge detailing which can act as a navigational datum, to visually root the autistic user as they circulate across campus and through buildings. This need not be executed in expensive material installations but can be achieved and experimented with as simple tactical urbanism with temporary washable Paint[1]

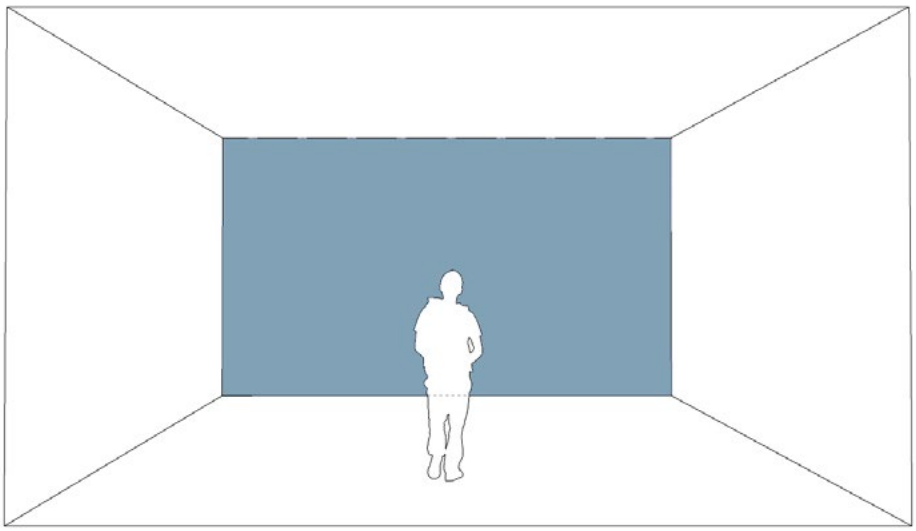

Figure 3: Colour contrast in interior spaces

- Neutral first:

the general rule in autism friendly colour is to begin with a neutral palette and add accent and contrast judiciously and with utility and purpose- to define space, support navigation, distinguish zones or indicate function.

- Natural materials and natural, muted tones:

when choosing between materials for optimal autism friendliness, natural materials are preferred- wood, stone, cotton based fabric etc. The same rule extends to colour choice whenever possible. Natural and earth tones seem to be the preferred choice, particularly in learning spaces[2].

1 Tactical urbanism http://tacticalurbanismguide.com/ accessed January 2021
2 https://issuu.com/gaarchitects4/docs/mla-presentation-november-2010-low-

- Proposed Palettes: Although color preferences are largely individual, with certain colors triggering certain responses in some but not others, a general rule for a neutral, natural tone, minimal contrast palette is proposed and suggested for use in spaces that are designated autism friendly.

7.2. Lighting

Source:
In general, best practices have supported a preference for natural lighting whenever possible, particularly in learning spaces, study spaces, other high focus spaces as well as residential rooms to support healthy circadian rhythms. This also helps support sustainable and energy conscious strategies. To supplement daylight as well as when it is inaccessible to a space, LED lighting is preferable. Research has shown the detrimental effects of fluorescent lighting on autistic behaviour- likely for the dual problems of visual disturbance through flicker and acoustical challenges through the buzzing noise. Conclusively, LED lighting is preferable- with its additional value of energy proficiency- but research has also supported the use of incandescent and halogen lighting.

- Control and adjustability

Whenever possible a level of control and customisability should be made available to the user. This can provide custom lighting levels across different activities as well as for different user profiles of the same space over time. This type of control can include blinds, louvres, adjustable screens and blackout window treatments for daylight control. A full range of full daylight to controlled diffused daylight to full black out ideally should be made available whenever possible, particularly in student residences and personal spaces identified primarily for autistic student use- escape spaces, transition spaces and general autism-friendly designated spaces.
A similar level of adjustability should be made available for artificial lighting systems. Dimming capability should be made available for areas requiring low stimulation and focus, such as study

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and workspaces, as well as for spaces identified primarily for autistic student use- escape spaces, transition spaces and general autism-friendly designated spaces. These levels can be tracked using smart systems, and possibly used as data to further study optimum lighting levels across activities, users, zones and needs. Additional building systems that should have similar individualised adjustability, particularly in student residences, are temperature controls. Similar smart tracking of these temperature patterns of use can also inform more efficient future planning of more sustainable autism friendly building systems.

- Temperature and color

Again, adjustability and customisability are key. Although limited, research has shown a general preference through self-reporting in autistic individuals, for higher Kelvin LED lighting for activities requiring focus and attention[1]. The availability of color temperature adjustability may help autistic users have better control over these preferences and the ability to adjust to specific needs and activities. Similar to light intensity adjustability, color temperature levels can be tracked using smart systems, and possibly used as data to further study optimum lighting temperature across activities, users, zones and needs.

These self-reported findings correlate with other general population research which supports the use of lighting temperature modulation throughout the day to mimic daylight temperature. This research shows that such lighting modulation can help support natural circadian rhythms, promote attention and focus at peak work hours and support regular sleep patterns. Always an issue for university students, sleep is particularly challenging for some autistic individuals. The use of automated circadian rhythm LED lighting modulation- ranging from early morning equivalents of 2700 K to mid-morning equivalents of 4600K to peak noon equivalents of 6500 K and peak awareness- throughout the day may help support sleep and focus, and is currently advised in general healthy built environment systems such as WELL [2]. To add additional customisability and control, a manual override of this automation can be included.

- Location and distribution

Light distribution across single spaces should be as consistent as possible, to avoid dramatic shifts in lighting intensity. Whenever possible indirect lighting should be used to avoid the visual distraction of the light source and its brightness. In cases where light variances are used to support other criteria such as compartmentalisation, light intensity should be kept as consistent as possible across each compartment and discrete space.

- Light as a source of Self-Stimulation and Sensory Regulation

Light can be a powerful source of sensory regulation and opportunity for stimming. Autistic users will often appropriate naturally occurring light effects for this purpose, such as the dynamic dappled sunlight seen between the branches of a tree, the play of light and shadow in a staircase lit by a stain glassed window, the moving shadow of individuals walking past

1 Morrow, B. L., & Kanakri, S. (2017). The Effect of LED and Fluorescent Lighting on Children in the Classroom.
2 https://standard.wellcertified.com/light/circadian-lighting-design accessed January 2021

frosted glass. These are important and necessary moments of sensory regulation and should be incorporated and designed with intent throughout campus. This should always however be carefully balanced against the possibility of becoming a distraction, and also a source of possible hazard to other users, such as photo-sensitive epileptics, who may themselves also be on the spectrum. In addition to formalising examples of these self-stimulatory opportunities, a more intentional and organised opportunity for this type of photo stimulation can be created in landscape spaces, with the careful positioning of patterned screens particularly in sensory spaces such as escape spaces and sensory alcoves or even in a dedicated landscape installation that creates a sensory space similar to a Luminarium[3] , which all the campus and even Dublin community can enjoy.

7.3. Material Selection

In general, natural materials are the preferred choice whenever possible- for example wood flooring and natural fabric upholstery. Tactility should be a guiding factor in material choices. The textural quality of all materials should be as neutral as possible, particularly those in direct contact with users- such as those used in furnishing and surfaces which are accessible, such as alcove seating walls and surfaces. Textural quality can always be added with sensory swatches and loose furnishing to provide textural stimulation when needed, but it should always be against a neutral base palette. Tactile stimulation can easily be added but is very difficult to be eliminated should it be uncomfortable for some users.

Safety should also be carefully considered when selecting materials. Robustness, stable fixation, safe edging details are all elements to be noted. This should be of particular focus when selecting materials for spaces to be utilised by a single autistic user- such as escape spaces, isolation pods and student residential rooms- to avoid the possibility of self-injury.

Maintenance is also an important criteria to be taken into consideration. Materials should be robust enough to withstand use, easy to clean and maintain or at the minimum relatively inexpensive and simple to replace. In some cases customisability of the qualities of materials may be used- such as profile and shape. Examples of this will be illustrated in the mouldable foam surfaces suggested in Test section 8 Test Case 1.

7.4. Furnishing

Various furniture types are suggested through the test cases in Part 4 Section 8 of this guide and are illustrated with respect to their use scenario. Their general characteristics included:

- Acoustical Performance

Many of the furniture suggestions included in this report help create a micro-climate of acoustical control around the single individual or small group of users occupying its composition. Such furniture can help support the provision of escape from sensory overload in large open plan spaces, as well as within single activity spaces. They are some of the easiest and most

3 https://www.architects-of-air.com/luminaria accessed January 2021

cost-effective ways to introduce support of autistic needs within a space. Suggested furniture types include but are not limited to, for the individual user: cocoon chairs, seating pods, egg chairs, hammocks- and for the small group of users: free-standing acoustical couches, alcove seating and high-back booth seating. The acoustical performance of existing movable furniture can be improved with sound absorbent padding or quiet casters to allow for easy and soundless reconfiguration of furniture arrangements.

- Tools of Compartmentalisation

Furniture can be an effective tool to provide compartmentalisation of a space, providing flexibility and adaptability, without the need for disruptive construction and permanent delineation of space. Elements such as linear seating, bookcases and flexible free-standing partitioning systems are ideal for this purpose. The latter additionally can provide acoustical separation and support the creation of acoustical microclimates. Bookcases, free-standing shelving systems and other storage systems can also provide easy access to sensory support materials such as sensory kits with items such as stress balls, tactile supports, ear plugs etc., for autistic users throughout spaces. Using lightweight, easily adaptable furniture will allow agile user-driven reconfiguration of spaces.

Furniture elements themselves can become micro-environments, providing support for escape and transition throughout campus at various locations and scales. An example of this is built-in alcove seating, as illustrated in the sensory alcove and student commons test cases. In this case the furniture element itself in it is entirety is considered a compartment.

Working in conjunction with compartmentalisation and furniture arrangements, doors can be important features to connect and separate spaces. Revolving doors can be stressful to autistic users and are not recommended. Doors should provide acoustical separation while still being light enough to open easily for all users.

- Material

As indicated previously, natural materials are preferable, with a recommendation of neutral textures wherever possible. Tactile stimulation can be provided through sensory kits, as well as the addition of loose soft furnishing such as tactile swatches, cushions and area rugs. Although more suited to social spaces and study spaces, these tactile surface supports can also be provided in classroom environments.

- Contour

Full body tactile stimulation from soft furnishing surfaces can be a powerful support for sensory overload and the need for escape. Contour chairs and couches can help provide this support, particularly in escape and transition spaces.

- Dynamics

The level of stability and fixedness of furniture for the autistic user can vary. Again variety, flexibility and customisability are helpful to provide choices for students. In educational spaces such as classrooms, although chairs on casters may provide layout flexibility, they can be distracting for

autistic students, who may be tempted to spin and fidget, distracting them from tasks at hand. Other supports for fidget energy may be provided such as elastic fidget bands that can be fixed between the legs of almost any standard classroom chair. These can help provide for students' movement needs.

Alternatively, designated fidget, bounce or spin furniture can be made available in some classrooms, particularly when instruction is less structured, and students can move more independently in small working groups and discussion spaces. This can allow for short breaks within the learning space to provide for movement needs, proprioceptive stimulation and vestibular readjustment, that in turn can support better focus.

Some research has also supported that balance chairs, such as therapy balls or balance stools, may help focus student attention[1] . The theory is that this allows for proprioceptive engagement and consequently facilitates focus and interaction and more effective learning.

7.5. Wayfinding and Navigation

One of the important guiding principles of this guide is independence as the ultimate objective. Not only at the level of the campus through their university years, but this principle will hopefully help support skill development in students that can be generalised outside of the physical domain of campus to everyday life and hopefully beyond graduation into the workplace and an independent life.

Central to this independence is supportive wayfinding and navigation support. The following criteria can help achieve independence on this front:

- Clarity and Continuity

Movement through a complex built environment such as a university campus can be extremely stressful, particularly for autistic students for whom the complex sensory and social environment of campus can be overwhelming. The identification of clear, distinct and continuous circulation pathways can help alleviate this anxiety and support navigation. This clarity can be achieved through the use of a specific continuous paving material for new builds or through indicating a circulation path by applying colour to an existing paving material. These pathways should flow seamlessly across campus along the major pathways connecting all important destinations. They should be continuous and unambiguous.

- Geometry and Spatial Relationships

A sense of orientation is key to reducing the autistic user's anxiety within space, particularly those of larger scale. Orientation is also key to help support independent navigation and wayfinding.

1 Schilling, D. L., & Schwartz, I. S. (2004). Alternative seating for young children with autism spectrum disorder: Effects on classroom behavior. Journal of autism and developmental disorders, 34(4), 423-432.

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Although curvilinear circulation systems may seem to provide a soft flow and gradual sense of movement, they do not allow for the sense of orientation afforded by orthogonal systems, which may support an internal image of location within the larger space and cardinal directions, particular in internal spaces with no external visual anchoring. Such flowing, organic curvilinear geometries can be used in outdoor spaces, where visual connection to anchoring context elements such as identifiable landmarks, may help compensate for the lack of geometric orientation. Internally, orthogonal systems are likely to be more effective, in order to support a sense of location within space and orientation. The rectilinearity of internal navigation allows a sense of orientation with and subconscious connection to, the outside world. A continuous linear and orthogonal datum- clear edging details, paving pattern or wall delineating the circulation path- is also helpful to allow for visual tracking. This allows for for visual anchoring and could help reduce vestibular issues and proprioceptive challenges. Access to external views, particularly of identifiable landmarks, may also help support this sense of orientation. When providing this access however, backlighting should be mitigated, to prevent glare along the length of circulation pathways, which may distract and prevent the clear view of oncoming traffic and users of the space. (Figure 4)

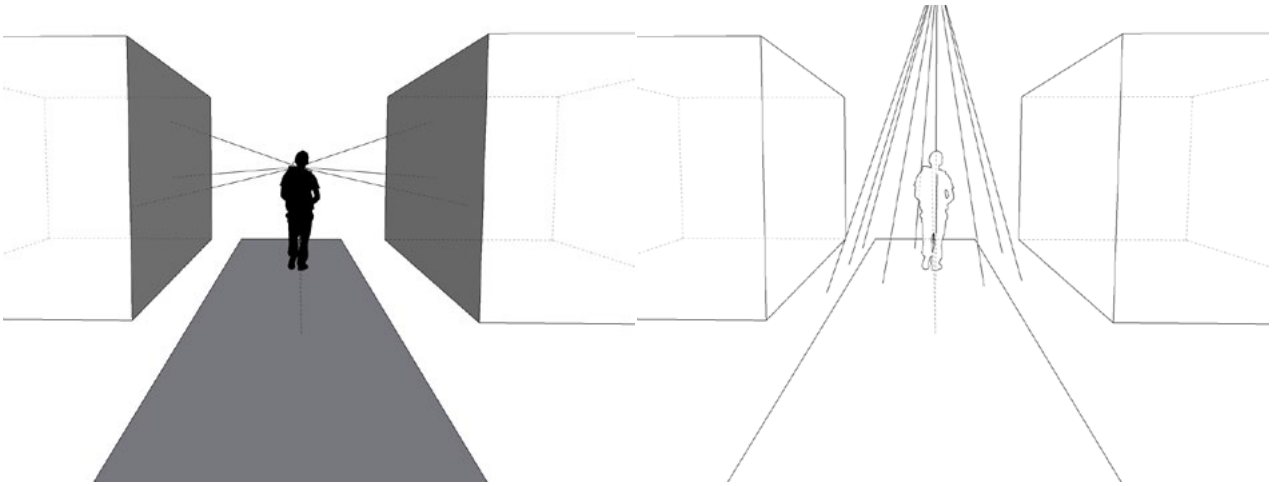

Figure 4: Backlighting

Open, wide intersections and soft corners allow for anticipation of on-coming users and help reduce anxiety around the possibility of coming face to face with other users unexpectedly (Figure 5). Colour coding may also be helpful, particularly in buildings with symmetrical compositions, where circulation spaces may look identical in different wings or levels of the building. Depending on the function of the building, this coding can correlate with function or location, or both.

Pattern should be used prudently to avoid visual distraction, in all surfaces of the circulation space. When used it should help reinforce directionality and flow and work with the tendency to visually track, particularly on the ground plane. It may also be used to delineate gathering spaces vs flow and circulation spaces.

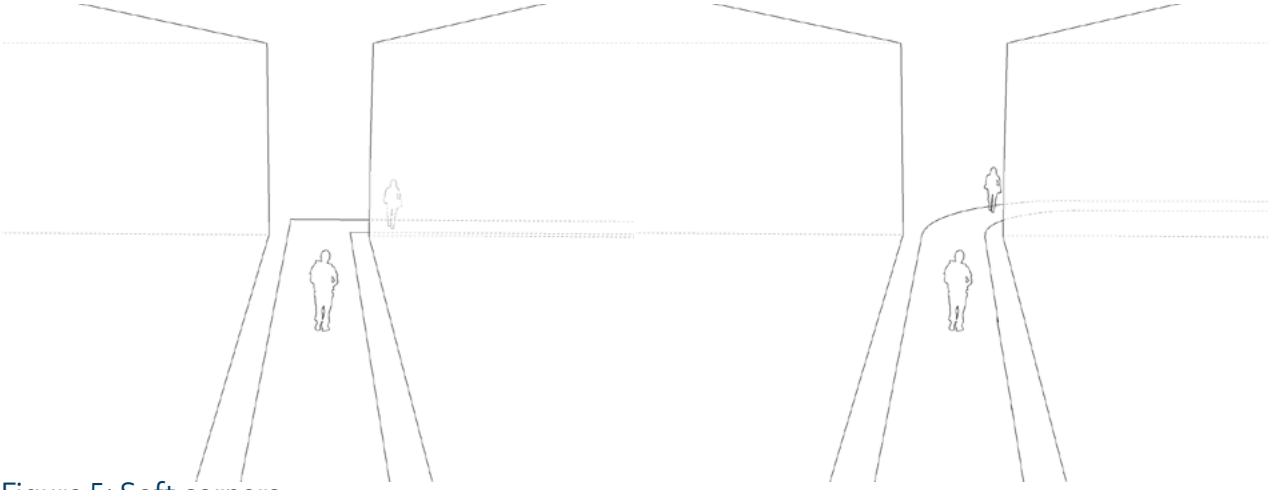

Figure 5: Soft corners

- Direction

One-way circulation strategies have recently been adopted at DCU campus during the Covid-19 pandemic in order to reduce face to face interaction between students and avoid crowding. Multiple autistic participants in the design thinking workshops held as part of the participatory research for the creation of this guide, supported the additional success of these strategies for autistic users in reducing anxiety and fear of crowding, with requests for these practices to be extended beyond the pandemic campus strategies. This one-way circulation can be particularly effective at major congestion nodes such as campus entrance points and access to major buildings on campus such as the cafeteria, student center and library.

- Identification, Signage and Orientation

Signage should be used clearly across campus to identify all major buildings, entrances and spaces. Both text and icons should be used to indicate both the name of the building as well as its function, in order to support the autistic user's need to anticipate what they will encounter when they enter. This signage should be large in scale and clearly visible from the farthest points of campus when possible, in order to support orientation and destination planning. (Figure 6)

Orientation "you are here" maps should be used at every entry point and generously throughout campus at all major nodes and circulation path intersections. These maps can be visual, tactile and/or digital, and should help support both a sense of orientation within the larger campus, as well as allow for pathway planning within a building to reach a specific destination. These maps need to be illustrated within the campus context and reflect the reality of the indoor/outdoor seamlessness of campus, rather than an abstract illustration of building plans unrelated to the context around them and their arrival from campus. This seamless indoor/outdoor navigation concept will be supported by advanced technology in the proposed SmartDCU digital navigation tool for campus. This tool can be supplemented with real-time data from smart sensors throughout campus that can help track crowding, temperature, lighting levels and acoustics- forming a comprehensive sensory mapping and navigation system for all users of campus.

Figure 6: GSR autism friendly communal spaces signage example

- Compartmentalisation

External circulation pathways, particularly those that support multimodal transportation flanking the university at the interface of the campus with the city, could benefit from a level of compartmentalisation that delineates the different activities, zones and speeds of its users. Typically, these spaces allow for pedestrians, joggers, cyclists, scooters flanked between the building line and the vehicular road. A level of compartmentalisation of these users into linear zones can help alleviate anxiety for all users, but particularly autistic users, as well as increase safety. This should be coupled with regularly spaced and easily accessible escape spaces, located within a transition zone or soft sensory landscape located in the interstitial space between the sidewalk and the building line on the one side; and a line of low, regularly spaced distinctly coloured posts to create a delineating between the pedestrian domain and the vehicular domain. Additionally, lanes may be created within the sidewalk space for different speeds of pedestrians, and for those using mobility supports such as strollers, walkers, wheelchairs and low speed scooters. Faster mobility vehicles such as high-speed scooters should be moved to the cycling lane, which should also be clearly delineated. This is illustrated in Section 6.10 Figure 2.

- The Sensory Pathway

All these concepts can converge in the designation of a parallel but equally accessible sensory pathway. Inspired by the use patterns of DCU autistic students themselves, where an alternative pathway was appropriated out of a combination of secondary footpaths and interstitial spaces to create a sensory mitigated more serene system of navigating campus, a full expansion of this concept is proposed. This appropriation is illustrated in fiigure 7. We suggest that a complete alternative sensory mitigated pathway be extended in a continuous flow around campus, with intermittent links and bypasses to the main circulation. This sensory pathway can include a continuous visual datum along the ground plane, be surrounded by natural vegetation, be offset from buildings to allow wider views around corners to avoid unpredictable encounters with other pedestrians and be interspersed with escape spaces and protected seating to allow respite and refuge from the sensory overload of the main circulation artery of campus.

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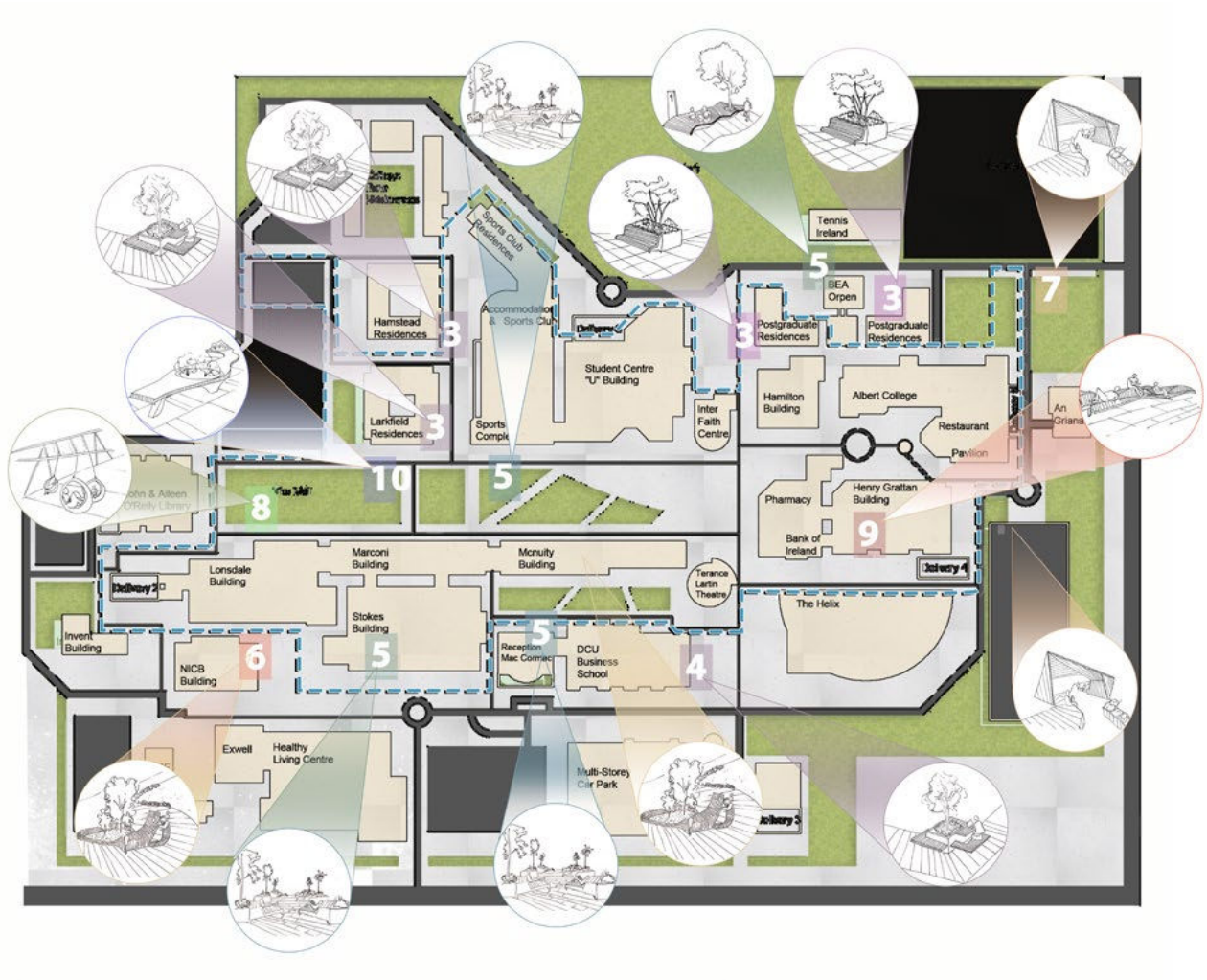

Figure 7: Sensory Pathway across campus

7.6. Technology

As part of its commitment to providing the best state of the art support to all of its students, DCU recently launched its Smart DCU initiative[1]. Intersections with this initiative and the Autism Friendly University Design Guide include:

- Supporting Transitions and Promoting Predictability

Digital virtual environments can provide an important provision for new autistic users of space to support their transition to new spaces and help support predictability once inside the space. Four groups of autistic users in particular can benefit from access to these digital twins of campus- prospective students and staff to allow virtual navigation of campus to showcase the autism friendliness of the built environment of campus; new freshmen who are yet unfamiliar with campus; currently enrolled students and staff when accessing new buildings or unfamiliar sections of campus; autistic visitors to campus. Access to this virtual digital twin of campus in a seamless indoor/outdoor setup will allow as close to a realistic experience in campus as possible. To enhance the reality of the experience, this virtual environment can be supplemented by real-time audio-video from key points on campus, such as entrance points, large public spaces and gathering spaces to help the autistic user anticipate crowd intensity, flow of movement and general sensory landscape.

In this spirit, DCU already operates these types of strategies, primarily around Open Days and Orientation days when prospective students and their families are invited to campus to familiarise themselves with the DCU experience. These events are live-streamed, creating a parallel digital experience without physical presence. Other physical supports are available: making available quiet spaces on campus to retreat to, information on environmental adjustments ahead of time and the availability of sensory friendly furniture in the student hub.

- Sensory Flagging

This provision would create a crowd-sourced real-time sensory map of campus by allowing autistic users of campus the ability to flag sensory hotspots or problem zones. These could include crowded spaces, areas with excessive noise, locations of smells, flickering lights etc. Not only would this alert the autistic community, but it could feed into customised pathfinder technology to help autistic users navigate from point a to point b while avoiding these hotspots. This system could also quickly inform facilities teams of needed maintenance and safety issues.

- Sensory Spaces Network and Real-Time data

As part of the ASPECTSS criteria requiring the provision of escape spaces at different scales and locations across campus, a sensory spaces infrastructure network was developed and proposed to be deployed across campus. Technology can help support both the effective and accessible utilisation of this network, but smart systems can also help gather post-occupancy data to help refine future builds and the scaling up of the network. The

1 https://smartdublin.ie/smart-districts/smart-dcu-3/

> "One should be mindful that autistic users would benefit from navigational access to a full spectrum sensory spatial map, of both sensory seeking spaces- to fulfil the need for self-stimulation and sensory modulation, as well as sensory-avoiding spaces- to fulfil the need to escape, focus and adjust."

network of escape spaces should be made available on the digital navigation tools, and autistic students should be able to easily find the closest available escape space, with support to navigate to it as easily as possible. One should be mindful that autistic users would benefit from navigational access to a full spectrum sensory spatial map, of both sensory seeking spaces- to fulfil the need for self-stimulation and sensory modulation, as well as sensory-avoiding spaces- to fulfil the need to escape, focus and adjust. Each autistic individual may have different sensory needs, but each individual autistic- like anyone else, may themselves have different needs for different activities, on different days, under different circumstances.

Ideally this physical network of spaces would be built out over phases, and the usage data collected at the first phase can help inform the second. This data can include usage patterns- most popular times of day, day of week, and duration of use- using smart sensors. Additionally, some form of survey can be deployed to users to collect data such as triggers resulting in need for escape, and impact of access to the escape space after its use. Should a larger post-occupancy research study be planned for DCU, vital sign tracking monitors can be used with wearable technology for physiological effects of not only the escape space network, but other autism friendly design interventions across campus. All necessary privacy and ethical human subject research standards would of course first need to be met, with the ultimate goal of continuously learning from autistic users themselves what built environment work best.

- Customised Timetabling around Autism Friendly Spaces and Classes

As this guide is implemented across campus, we envision a series of autism friendly designated learning, socialising, studying and working spaces well distributed across all DCU campuses. Technology can help support the smart scheduling and allocation of these space around autistic student and staff needs, with smart solutions as data evolves around use patterns. If for example certain disciplines are more popular with autistic students, more autism friendly classrooms can be allocated in these specialised spaces. Also schedules and classroom allocations can be customised and optimised using technology, to ensure that all the autistic students' classes are scheduled in the autism friendly spaces, and staff are given office assignments in autism friendly office spaces.

- Calculation and Auditing of Sensory Spatial Operational Capital

Although space is commonly used as a metric for design, it is actually in time and use of that space where the value of that space lies. In educational spaces in particular, the blocks of time of accessible space for the autistic population is the true value of the Autism Friendly Initiative. Spaces, particularly scheduled learning spaces that are autism friendly will generate this operational capital, and this must be reviewed regularly in light of the actual need, particularly as demand increases.

The network of autism friendly scheduled spaces generates not only a square meterage of autism friendly space across campus, but more importantly generates a certain number of learning or working hours in these autism friendly spaces. Called Sensory Spatial Operational Capital, this number indicates the usable autism friendly time available for the autistic community across campus. Again, technology can help generate those numbers and audit them against current and future growing need. With the customised timetabling and scheduling recommended above, technology can also optimise the most efficient utilisation of these spaces, help identify gaps or over provision, and plan future needs for additional autism friendly designated scheduled spaces.

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"It is recommended that DCU increase and invest in its sensory spatial assets to maximise its autistic operational capital. This means creating the built environment infrastructure that helps best support and position autistic students and staff to be happy, included and consequently productive."

7.7. Sensory Economics

In addition to the calculation and auditing of the sensory spatial operational capital of campus, it is recommended that DCU increase and invest in its sensory spatial assets to maximise its autistic operational capital. This means creating the built environment infrastructure that helps best support and position autistic students and staff to be happy, included and consequently productive. Research shows that investing in this type of infrastructure can help significantly improve important learning facilitators such as attention span, response time and behavioural temperament [1]. In addition to all the recommendation of this guide.

DCU is encouraged to address the sensory economics of campus by:

- Investing in sensory safe spaces- quiet zones/ de-escalation landscape, as a network of well-distributed, easily accessible across campus
- Investing in sensory landscape features- water features, aromatic gardens, natural weather protection
- Investing in navigational technology
- Investing in sensory supports in learning spaces
- Investing in sensory mitigated circulation spaces- with quiet alcoves and acoustical mitigation, and optimal lighting

1 Mostafa, M. (2008). An architecture for autism: Concepts of design intervention for the autistic user. International Journal of Architectural Research, 2(1), 189-211.

7.8. Programming and Operation

As the most dynamic elements of the design process, planning space programming and the subsequent operation of spaces can have tremendous impact on the efficacy and realisation of design intent. Key elements of the ASPECTSS and ASPECTSS 2.0 criteria can only be fully realised with aligned programming and operation.

- As Enablers of Spatial Sequencing

Spatial sequencing in its static form involves the planning of spaces in a flow and hierarchy of spatial adjacencies that mirrors the intended temporal flow of activities. For example, in educational spaces, a Sciences building can be organised so that students enter a transitional space which allows sensory adjustment and spatio-temporal orientation, at the beginning of the daily schedule, and move from low stimulation- for example focused instruction classrooms- to gradually higher stimulation- experimental spaces and labs in as direct and smooth a circulation sequence as possible. Transition spaces should be introduced where sensory jumps are unavoidable, and escape spaces should be available and accessible for moments of sensory overload. This scenario cannot be achieved without aligned programming of activities and operational strategies such as aligned scheduling and student/space/instructor allocations.

- As Enforcers of Escape Space Accessibility

This guide recommends the establishment of a network of escape spaces, a sensory infrastructure across the entire campus, to allow for respite for autistic users at moments of sensory overload. Although a need all users may have, these spaces should be operationally prioritised for autistic users. Implementing this however may be difficult. Any strategy would involve a certain level of disclosure and use of the space in and of itself would be a form of public disclosure of diagnosis. In addition, an operational strategy should be put in place that would minimise stigma around the use of these spaces. A strategy of awareness, respect and celebration of the sensory autistic perspective should be developed in close coordination with Student Services and the Autism Friendly University offices. Programming around these spaces can be hosted to shed light on the

> "The design of this space should be seen as a showcase, a storefront for the power of the autistic perspective in shaping architectural space. The sensory qualities it will provide the autistic users of campus and their non-autistic peers and fellow community members are powerful messages of the value of the autistic perspective- one that resonates with all users."

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sensory need for escape for autistic users, and the invitation to the larger population to utilise the spaces- but with priority for their autistic colleagues. The recruitment of autism friendly ambassadors from the neurotypical population of students and staff could provide support for this and other awareness programs across campus.

- As Enablers of Sensory Zoning

Like Spatial Sequencing, Sensory Zoning has a static form with dynamic implementation, and consequently operational implications. In its static form, Sensory Zoning involves the organisation of spaces in as close as possible accordance with their sensory stimulation levels, into low stimulation and high stimulation spaces, with transitions in between. Spaces, however, also have operational stimulation levels. While a space may have a low stimulation neutral physical composition, and be part of the low stimulation zone, activities carried out within may be high stimulation, and produce noise, movement and/or crowds. Careful programming of spaces, and their consequent operational strategies, should be coordinated to align with the low stimulation and high stimulation allocation of spaces. This may entail that a sensory audit be performed to allocate stimulation zones and form the basis of the programming and operational strategies.

- As Tools to Raise Awareness, Showcase and Celebrate the Autistic Perspective and Reduce Stima:

Spaces built with the autistic perspective in mind can be powerful spaces for everyone, and although intended to prioritise the autistic user, their broader benefit to the larger population can be an effective tool for awareness raising and stigma mitigation around autism. This is not to say that autism friendly spaces should be appropriated for the benefit of the general population, but a balance can be struck to cast a light on its values, while still preserving its priority for the autistic user.

An ideal location for this type of programming is the planned Test Case yy the Autism Friendly Student Commons (figure 11). The design of this space should be seen as a showcase, a storefront for the power of the autistic perspective in shaping architectural space. The sensory qualities it will provide the autistic users of campus and their non-autistic peers and fellow community members are powerful messages of the

value of the autistic perspective- one that resonates with all users. This space is an experimental environment, that poses the hypothesis that a space built from the autistic perspective can be inclusive of all needs.A sensory mitigated space has the potential to not only provide much needed respite, control and organisation of the sensory experience for the autistic user, but it can provide an alternative to the general community to the overwhelming, multifunctional, sensory overloaded spaces of the neurotypical world. I envision this space clearly branded as an Autism Friendly Space, with agency and ownership granted clearly to the autistic community, but one that all students want to be in and enjoy, that allows them to better understand, appreciate and value the autistic perspective and its sensory needs, and carry that understanding over into their daily lives both on campus and off.

Accessible built environments can have tremendous impact on reducing stigma. By making social spaces more autism friendly and making autistic spaces more social, a network of seamless universal spaces where are students are all welcome, included, safe and have their needs met can be created, greatly reducing the isolation, separation and segregation that currently creates and propagates stigma around autism.

“A sensory mitigated space has the potential to not only provide much needed respite, control and organisation of the sensory experience for the autistic user, but it can provide an alternative to the general community to the overwhelming.”

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PART 4- APPLICATIONS

8.0 Test Cases

8.1. Glasnevin Student Residences (GSR) Autism Friendly Student Commons

As part of its current projects, DCU is building a 1240 bed student residence complex on the main Glasnevin campus. The complex consists of clusters of 3-7 room apartments, with most comprised of 6 rooms with a shared living/dining and kitchen space. The complex includes provision for 6 mobility accessible rooms and hopes to expand this provision to include a number of Autism Friendly rooms as well. In addition the complex provides shared amenities on the ground floor including social spaces in the form of multipurpose common rooms; ancillary services such as laundry, visitors facilities; management suite; parking etc. The following is a test case application of the design recommendations outlined in this guide in the form of a concept design outline for one of the Student Common Rooms, as an Autism Friendly Student Commons.

The selected location of this test case is in the central Student Common room in block V7 on the lower ground floor overlooking the main central campus open space, the central mall.

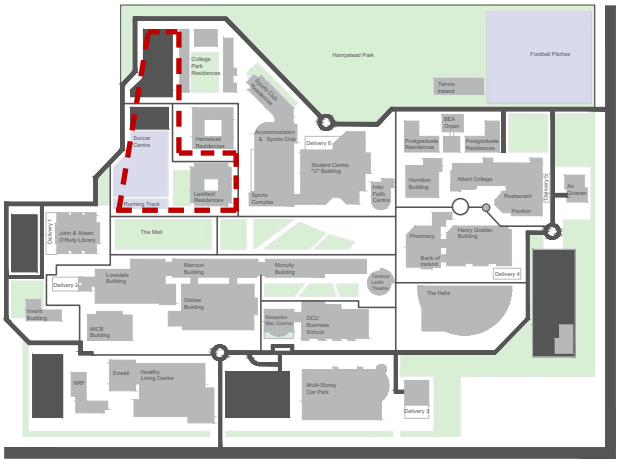

Figure 8: New GSR location

Figure 9: Autism friendly student commons location

The role of this space is to showcase the value of sensory mitigated design, and the impact the autistic perspective of the built environment can have on the effective design of space. This space is conceived as a beacon of sensory design, autism friendliness and value of this perspective- first to facilitate and support autistic students, but also to highlight this value to a larger population. This space will hopefully demonstrate that a sensory- friendly space is a more comfortable space not only for autism, but for all- with a caveat to ensure the appropriation of the space to typical users is avoided through operational strategies. In doing so it will hopefully take a small step towards raising awareness and alleviating stigma around autism.

The theme of the space, as illustrated in figure 10 is a the creation of a series of discrete sensory zones in logical sequence and with commensurate multi-sensory experiential environments- acoustical, visual, tactile and organisational. This sequence is reinforced by a parallel sequencing of activity that moves from high stimulation to low stimulation with strategic transition, through a series of play, socialisation, escape, transition, work, study and engagement with a culminattion in opportunity for relaxation, isolation, recharging and escape.

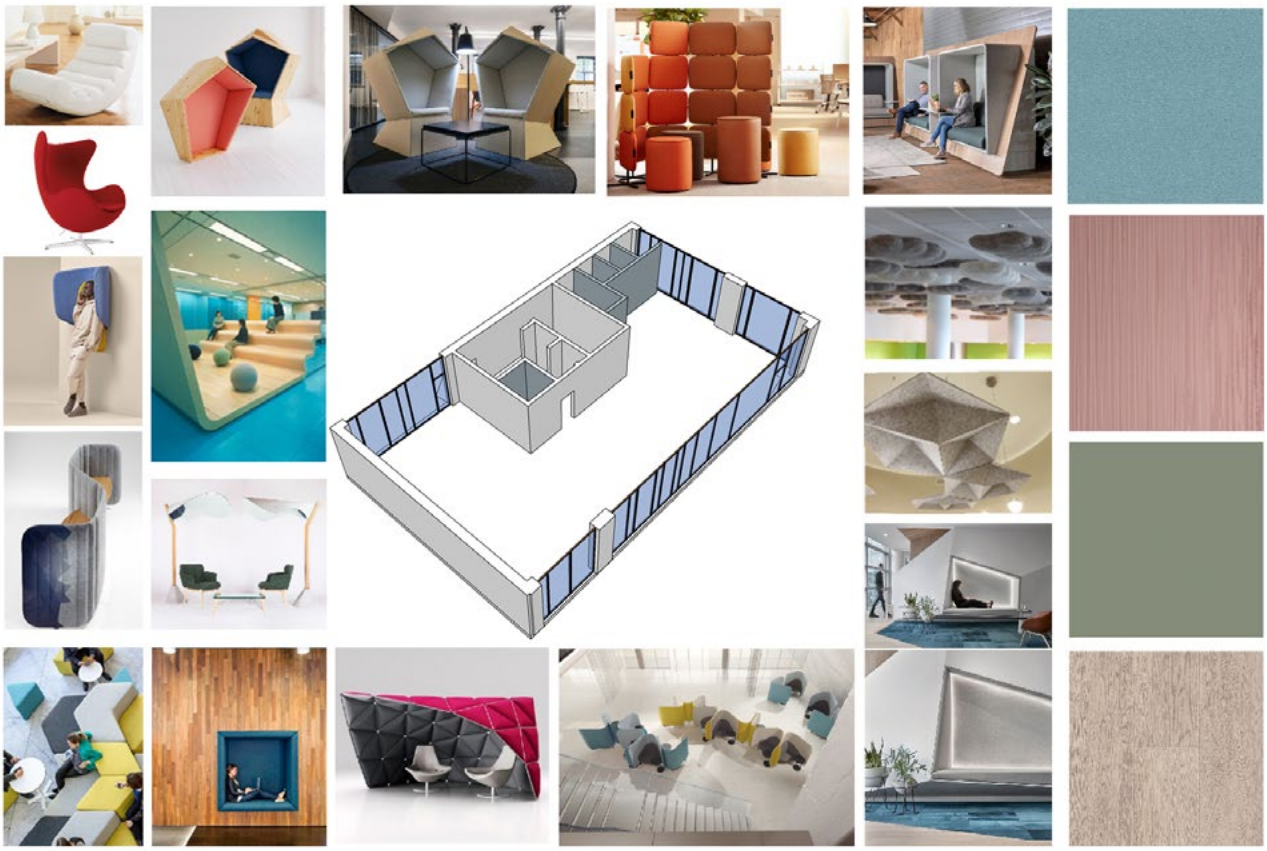

Figure 10: GSR Autism Friendly Communal Space Moodboard

1 **GSR**
General concern with common spaces: the sense of open space can be very overwhelming, feeling stuck in a space and needing to escape the sensory overload but having to go through crowded spaces to do so.

2 Things that could make the social space more inviting: having a clear safe corner that one can allocate quickly upon entering a space. Having a sense of safety while overviewing the space around you.

3 The three original entry points: it's good to have more than one option for entering/exiting the space as it would help users experience the sequence of the experiences in different orders, or enter directly to the zone they want to avoid other spaces if they want to.

4 Having a transition space from high to low stimulation areas to adjust gradually

5 Flow of pathways: Having a clear pathway leading to different zones to get to the place you want easily

5 Courtyards: users need a sense of where they need to go; path, steps, lines, something that guides them through space. It would be great to replicate the transition idea into the courtyard so as not to be overwhelming

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The space is conceived along a fluid one-way circulation path, beginning from sensory interface spaces in the mall in the form of a sensory movement playground proposed with additional sensory social pods in the outdoor space immediately adjacent to the main entrance. As users enter the space, they are given the option of direct access to the main amenities or an opportunity for sensory/social/visual adjustment in a sensory mitigated transition space immediately adjacent to the entrance. This transition space will have ambient white noise focused on the entry point. The circulation then flows fluidly through 3 sensory zones within the space described in detail below, progressing gradually from high stimulation to moderate stimulation to low stimulation in a logical spatial sequence that mimics proposed use patterns.

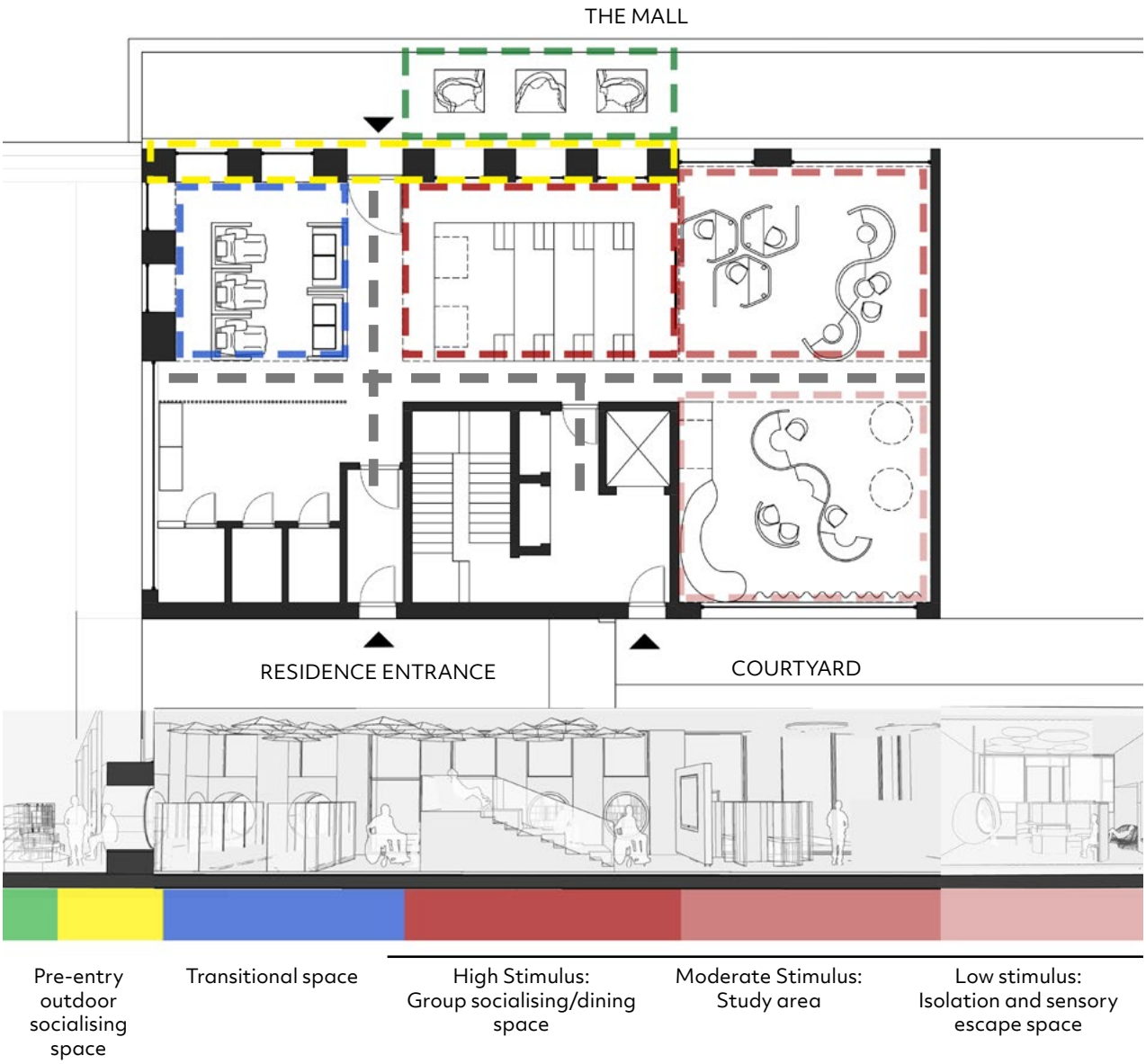

Figure 11: GSR Autism Friendly Communal Space patial sequencing and sensory zoning Diagram

This one way circulation is supplemented with secondary entrances and exits that, although supporting the main one-way sensory sequenced circulation, still allow for bypass circulation as well as direct access from the student residence core or courtyard directly in or out of specific zones.

Throughout the space the acoustical qualities are managed, with carpet tiling throughout and different levels of ceiling baffling, where each sensory zone has a level of acoustical mitigation commensurate with its sensory zoning- with higher performance acoustical treatment in the low stimulation, more private and individual zones; and more moderate performance acoustical treatment in the high stimulation more social and interactive zones.

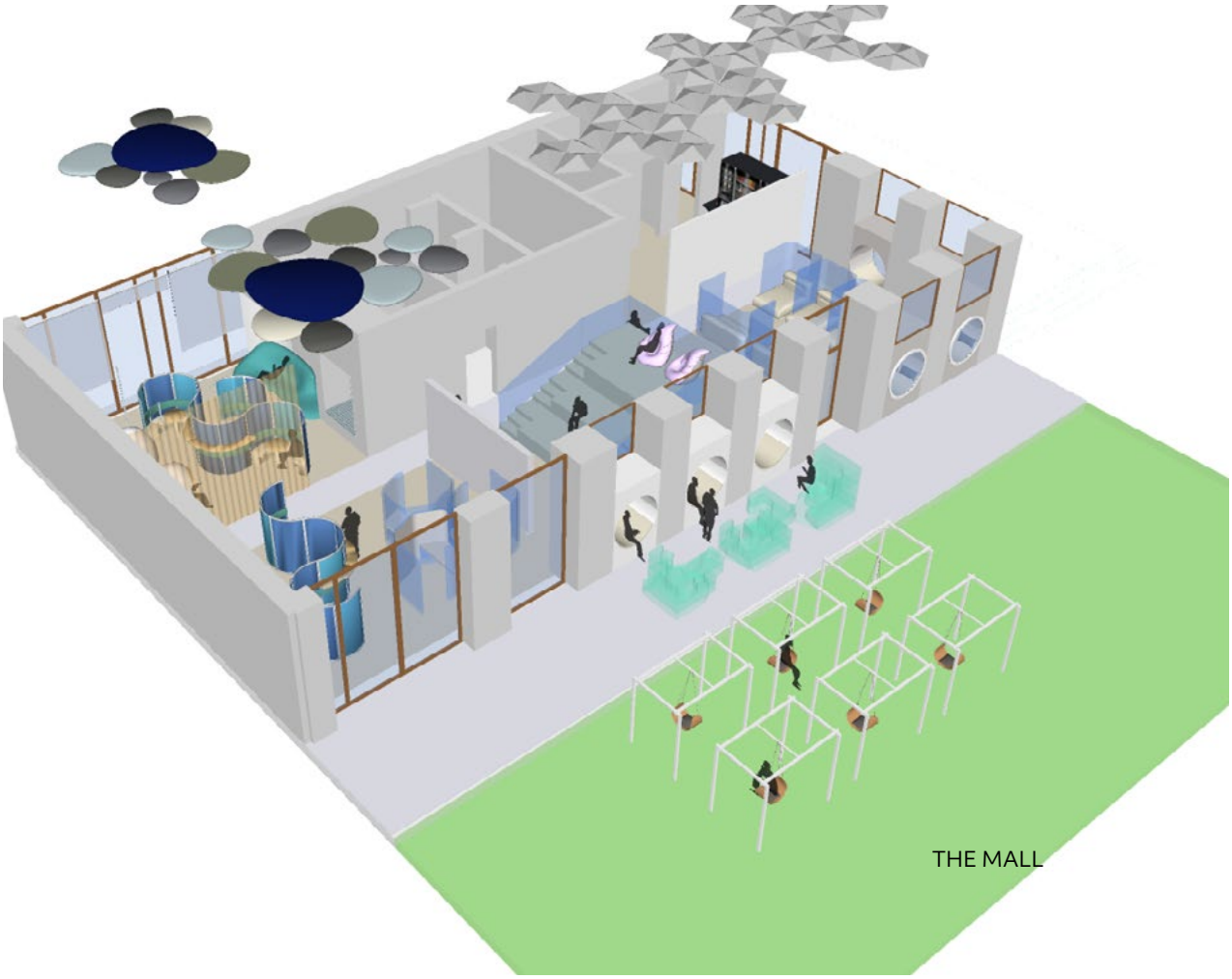

Figure 12: GSR Autism Friendly Communal Space

The sensory zones are:

- Outdoor Sensory Interface Space

The space is conceived as a storefront, a transparent showcase, and the conceptual sensory design of the space extends to the outdoor space immediately in front of the Commons, spilling out and expanding its sensory design to the entrance approach. This spaces include a sensory playground of proprioceptive seating in the form of swings or hammock in the mall; sensory pods immediately adjacent to the entrance to allow small groups of contained social interaction protected from the weather as part of the larger campus network of sensory escape and sensory transition spaces; and sensory social alcoves embedded in the façade of the building in configurations for individuals or small groups, or oriented as extensions of the larger social groups in the sensory pods.

Figure 13: GSR Autism Friendly Communal Space: outdoor interface space

- Transition Space

In addition, an internal sensory transition space is designed immediately to the right of the entrance. This allows a fluid entry directly into the main space, with a fluid option to transition first and allow for a sensory adjustment of visual/psychological orientation to the physical configuration of the space as well as the activities within it at any given time. This transition space is comprised of an acoustically controlled zone with sensory escape alcoves on the periphery in the form of built-in alcoves as well as upholstered free-standing high back alcove couches. Carpet tiles or a high pile area rug help dampen noise further, and both dimmable and color adjustable LED lights are proposed in each of the wall alcoves to allow sensory control at the micro-level of space. On the macro level, LED lighting should be similarly adjustable to control the lighting of the overall zone if needed. Built-in storage is proposed in the wall build-outs, where sensory kits and other assistive technology such as tablets and noise cancelling headphones can be checked out.

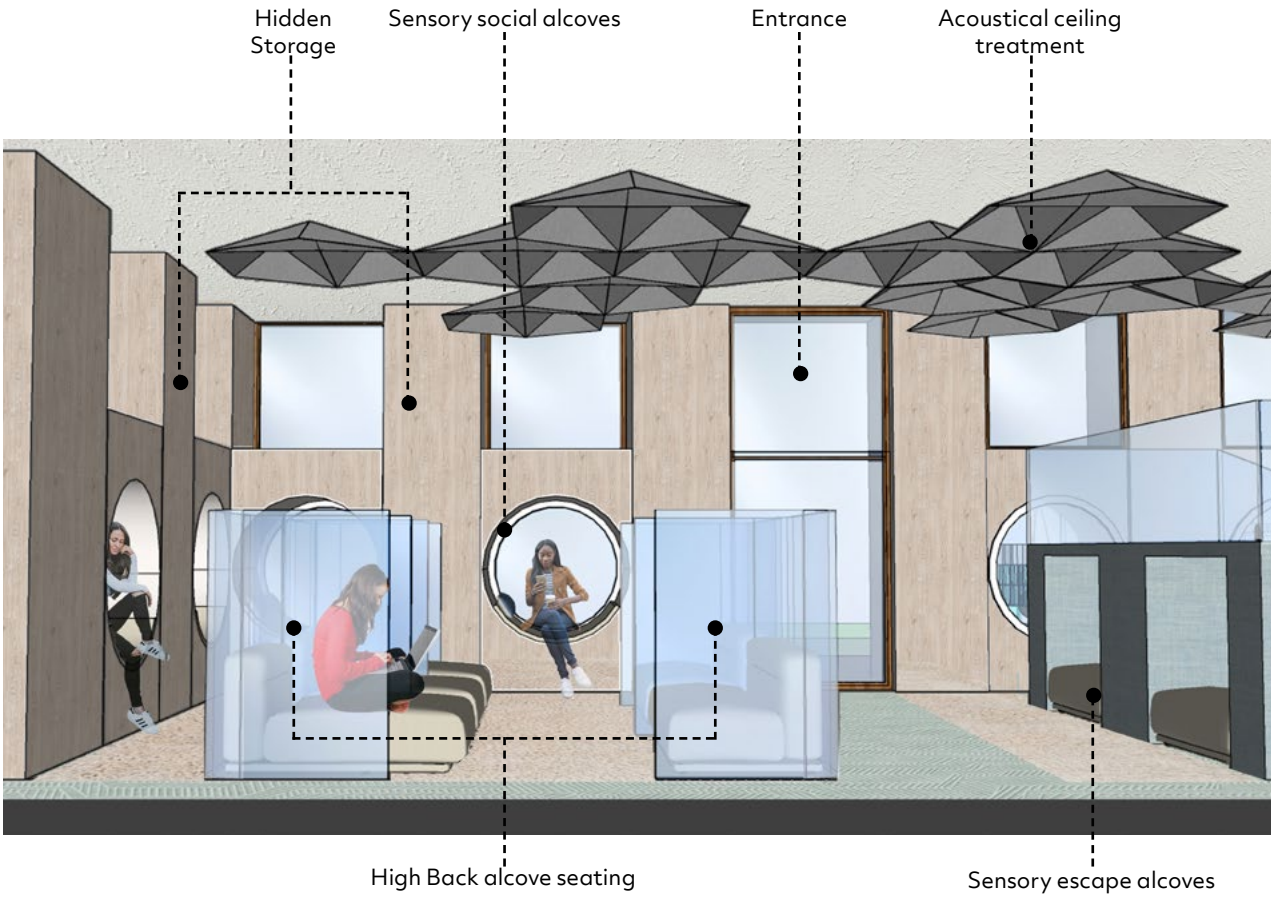

Figure 14: GSR Autism Friendly Communal Space: Transition space

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• Sensory Spatial Sequence Zone A: High Stimulation- Collective Space Work|Study|Engage
This zone provides a tiered seating configuration for large group discussions and engagement, as well as for individual and small group configurable seating. This can be used for discussions within the autistic student community, as well as for awareness building and sharing with the larger DCU community. It also provides an ideal stage for larger community discussions around the power of autism friendly design, and should be seen as a potential space to host events that help disseminate the importance and impact of the initiative. Using a set of memory foam or soft loose cushions, different seating arrangements can be customised on the tiers which are accessed by built-in stairs to either side. The first row also allows for accessible seating for wheelchair users. A lightweight movable LCD screen faces the tiers and can be used for larger group discussions or small group events. This screen also provides partitioning from the adjacent zone. Acoustical baffling in the ceiling will help absorb sound and limit its transfer across the space, while the soft furnishing will also help absorb more localised noise.
The entire configuration is free standing and is conceived to float in space, parallel to the external façade allowing for free circulation around it from all sides. This allows access to additional built-in storage space found behind the external transition alcoves on the main façade overlooking the mall. Again. This storage can be used for sensory kits and assistive technology. It also allows the introduction of low and consequently wheelchair accessible sensory escape alcoves flanking the main entrance point. Like with all zones of the space, LED lighting should be independent and adjustable.

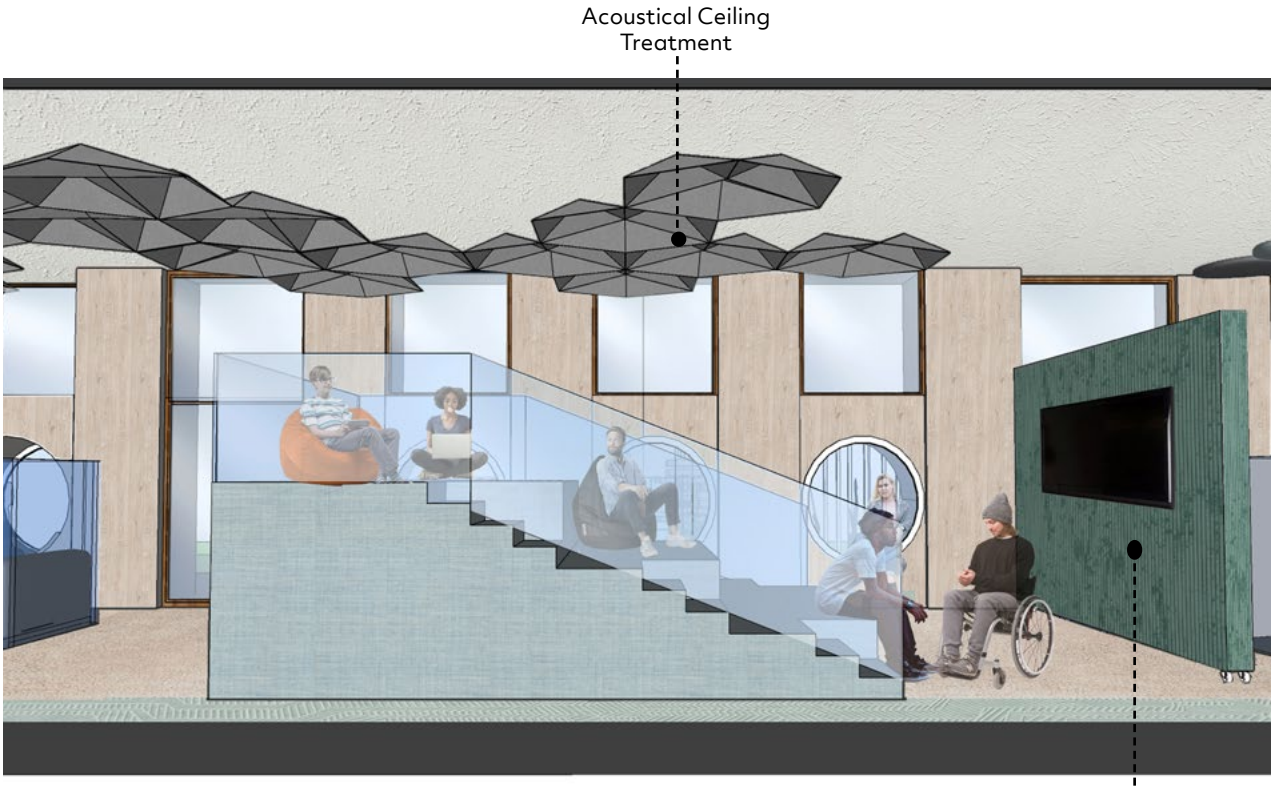

Figure 15: GSR Autism Friendly Communal Space: sensory spatial sequence zone A

- Sensory Spatial Sequence Zone B: Moderate Stimulation- Small Group and Individual Work|Study|Focus

This zone allows for small group and individual work, study and quiet socialising. Conceived as a series of free-standing cells in various geometric and fluid configurations, this allows for work stations, comfortable upholstered seating and individual loose pod seating such as egg chairs and focus pods. All partitioning is acoustical and flexible to allow for multiple configurations and maximum sound absorption. Moderate acoustical ceiling baffling creates a controlled acoustical micro-environment, and additional ceiling mounted acoustical cones can help control sound travel from the larger group pods. Carpet tiles continue through this space to further support sound absorption.

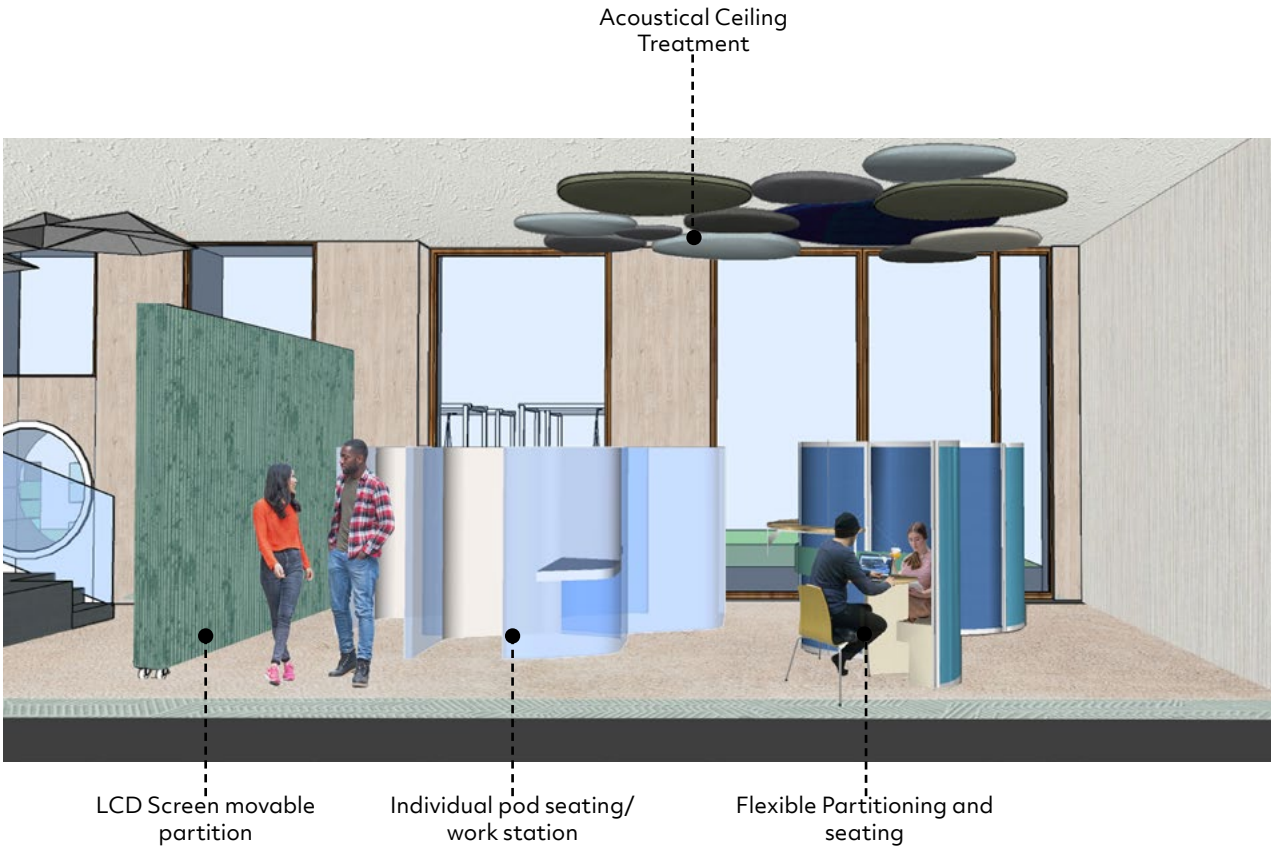

Figure 16: GSR Autism Friendly Communal Space: sensory spatial sequence zone B

- Sensory Spatial Sequence Zone C: Low Stimulation- Individual Relax|Isolate|Recharge|Escape

Accessed through a retractable soft curtain of silk threads or ribbons this group escape space provides a crucial sensory haven and is considered the heart and spatial sequence terminus of the autism friendly space. Intended also to be a possible destination in and of itself for quiet individual isolation within a larger social space, and a provision of opportunity to relax and recharge when needed, this space can also be accessed directly from both the student residential floors above through the building's central core and directly from the building's courtyard. It is comprised of a variety of primarily individual seating including: ergonomically moulded alcoves with individual colour adjustable and dimmable LED lighting and soft upholstered sides on memory foam fill; an assortment of neutral texture beanbags; and a series of ceiling mounted hanging hammock swing seats with cushions. Sensory kits will be available in concealed storage spaces as well an assisted technology point for students to check out noise cancelling headphones and tablets for individual use within the space. This can be managed through an automated system for students enrolled with the student support office. High performance acoustical baffling is mounted in the ceilings and carpet tiles continue, but with minimal pattern and neutral texture. Heavy sound absorbent and controllable window treatments should be available to allow control of daylight in the space to be adjusted to the user's needs and the qualities of daylight. Artificial lighting should be controlled in as individualised zones as possible throughout the space.

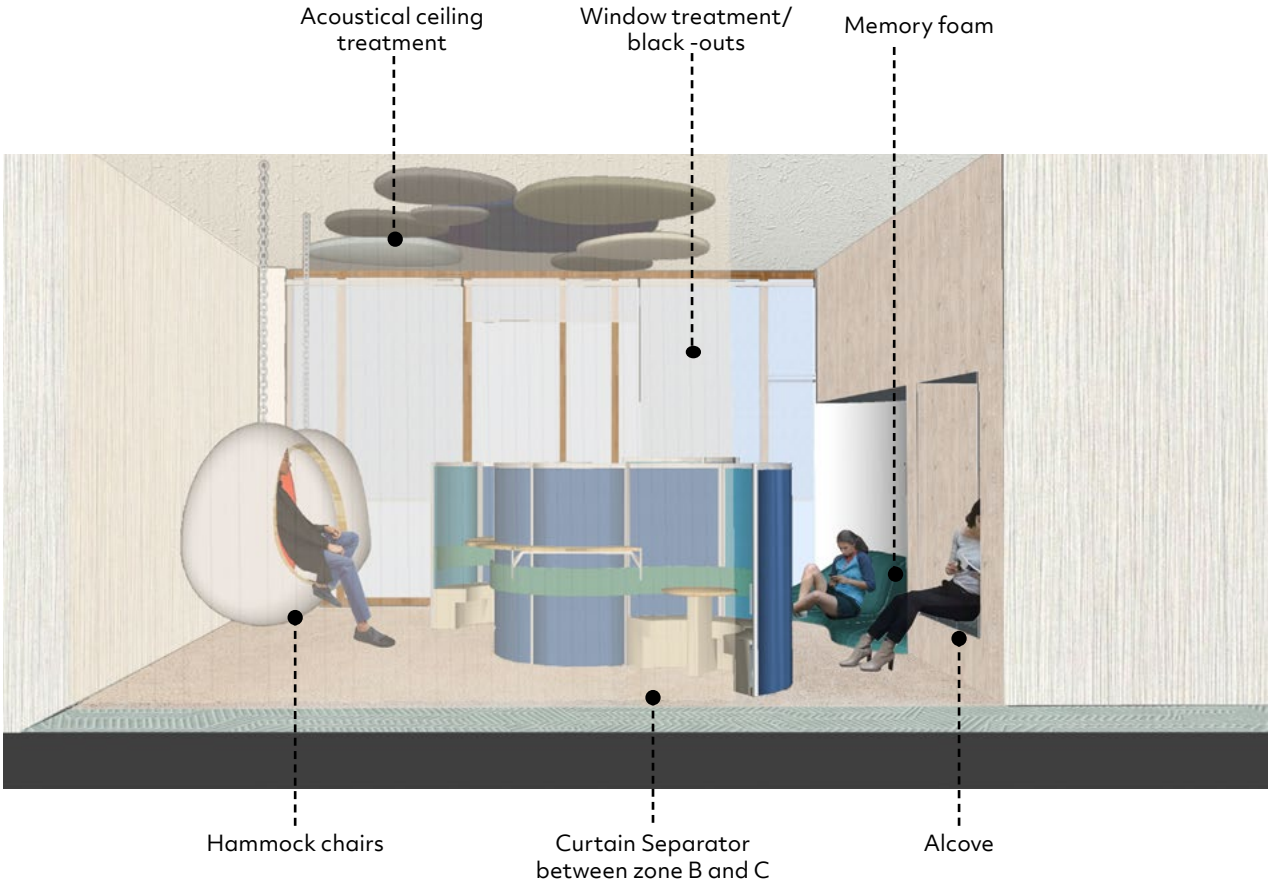

Figure 17: GSR Autism Friendly Communal Space: sensory spatial sequence zone C

8.2. Glasnevin Student Residences (GSR) Autism Friendly Student Room

The following is a test case application of the design recommendations outlined in this guide in the form of a concept design outline for these autism friendly rooms. As part of the commitment of DCU to be accessible and autism friendly, it is recommended that a number of rooms, commensurate with the demand of on-campus housing for autistic students, be allocated and designed as autism friendly. This demand can be greater for autistic students given their elevated need for easily accessible personal space to retreat to throughout the day, as well as the anxiety and sensory burden of commuting daily to campus. This should be carefully balanced however, as is the case with the provision of an autism friendly social space in the student commons, with the need to engage in social interactions and be productive and included members of the student body and campus community.

The general conceptual design objective of the autism friendly student room is to create a sanctuary, a harbour from the campus environment that is a balance between a refuge and a space for productivity. It should be a space of soft palettes and a neutral canvas over which students can layer their sensory preferences. It should support the effective primary functions of the room- sleep, study and self-care- with discrete compartmentalised spaces so each activity is performed without the influence of the other. This is illustrated in figure 20

The following outlines the proposed conceptual design of these autism friendly rooms within GSR.

- Locations

A variety of locations should be made available to provide a selection of proximity to social space, distance from external noise sources, proximity to the building core and entrances and exits. This will allow for different personal preferences and sensory tolerances among the autistic students to be catered for. Generally, however, these rooms should be located as far as possible from sources of smell- such as the group kitchen- and sources of noise- such as utility rooms, elevator cores, air handling units and other HVAC machinery.

- Acoustics

In addition to strategic location, an acoustical micro-environment should be managed within the room itself. Acoustical blockwork is preferred for the walls of these rooms, and ceiling sound insulation should be installed such as sub-floor sound insulation in rooms immediately above. Portable white noise machines may be installed in each room or made available for students who are in need of them to help mask sounds and aid with sleep. The material choices within the room, as well as systems noise mitigation will further help minimise noise sources.

- Materials and Finishes

As per the recommendations of the guide, natural materials of neutral texture should be used throughout the room. Natural light-coloured wood for flooring and furniture, natural linen or

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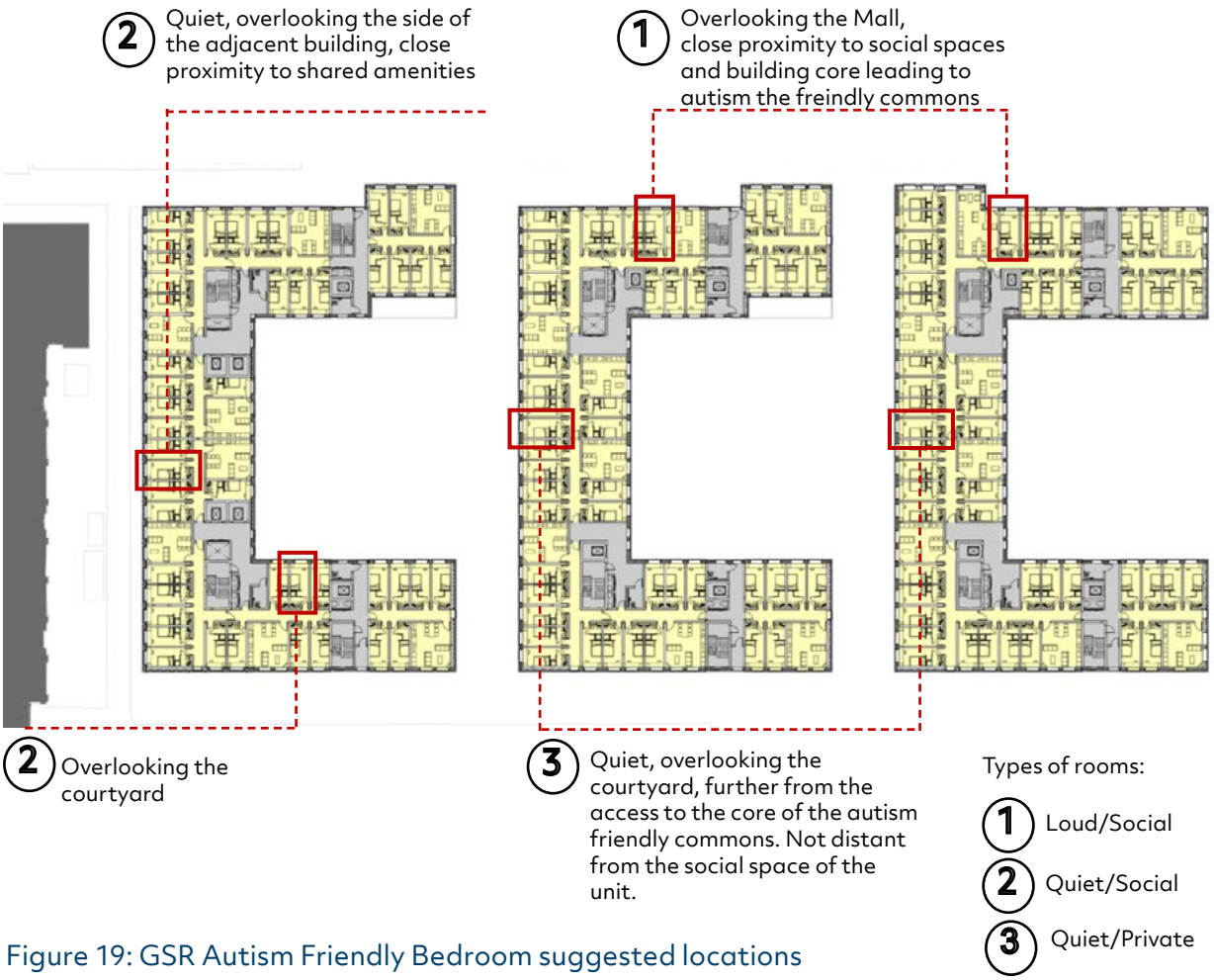

Figure 19: GSR Autism Friendly Bedroom suggested locations

cotton fabrics for upholstery and natural soft wool or cotton mix medium pile area rugs, will form the base to be customised and personalised by each student. Sound absorbent tiling should be used in the wet areas to minimise echo and soft flow water fixtures will minimise noise and water consumption.

- Colour Schemes

Again a neutral base palette with minimal introduction of colour in pastel shades of blue and warm tones should be used, with students allowed to customise their colors with personal bedcovers, throws and wall hangings.

- Furniture

Within the constraints of the efficient use of available space in the room, a compartmentalised scheme is proposed, creating a level of delineation of space each for the primary functions of the room- sleeping and studying. As described in the general guideline of compartmentalisation this will help, not only with spatial delineation, but mental delineation as well. By creating separate but accessible spaces for each activity, the student is hopefully able to leave studying behind when they choose to sleep, and vice versa. This separation is achieved by creating a bed alcove with a ceiling height partition at the foot of the bed. Given the importance of time management and a healthy sleep cycle for students in general, this is of particular concern for autistic

Figure 18: GSR Autism Friendly Bedroom Moodboard

1		The sleeping zone should be separated from the working space
2		Having the sleeping space enclose like an alcove
3		Adjustable, dimmable light that changes color. LED circadian lighting, works with the natural biological rhythm to mimic natural lighting throughout the day
4		Temperature should be adjustable, the heater in the old rooms is placed under the desk which is uncomfortable while working.
5		Good thermal and acoustical insulation.
6		Carpets and area rugs are a good idea to help with the acoustics as well

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students who will benefit from the spatial support to make this separation and distinction. The absence of individual entertainment in the form of a TV in the room, will encourage further delineation of socialising activities for all students to take place in the social spaces in the apartment outside of the room, and encourage social engagement at a manageable scale with their flatmates within the cluster.

- Systems- lighting, heating, ventilation and air conditioning (HVAC)

All systems in the room should be used to reinforce the micro-environments of bed and desk. Separate and adjustable LED lighting should be used for each zone, with an additional task light for the desk. As discussed earlier, an automated circadian rhythm control, with manual override can be used throughout the space to adjust color temperature to support sleep patterns. In addition, the bed alcove can have a lighting element with color adjustability to customise color within the sleeping space. Similarly, the rooms should have individual temperature controls to allow customisability. Motion sensors should not be used in these rooms, particularly for extraction fans in wet areas, which should be as quiet as possible and have separate switches and not be wired to open automatically with lights. Students should be able to activate the extraction fan as needed manually. Rooms should be located as far as possible from an HVAC ducting and handling units, and air outlets should be tightly installed with sound insulation to avoid any rattling or vibration noise.

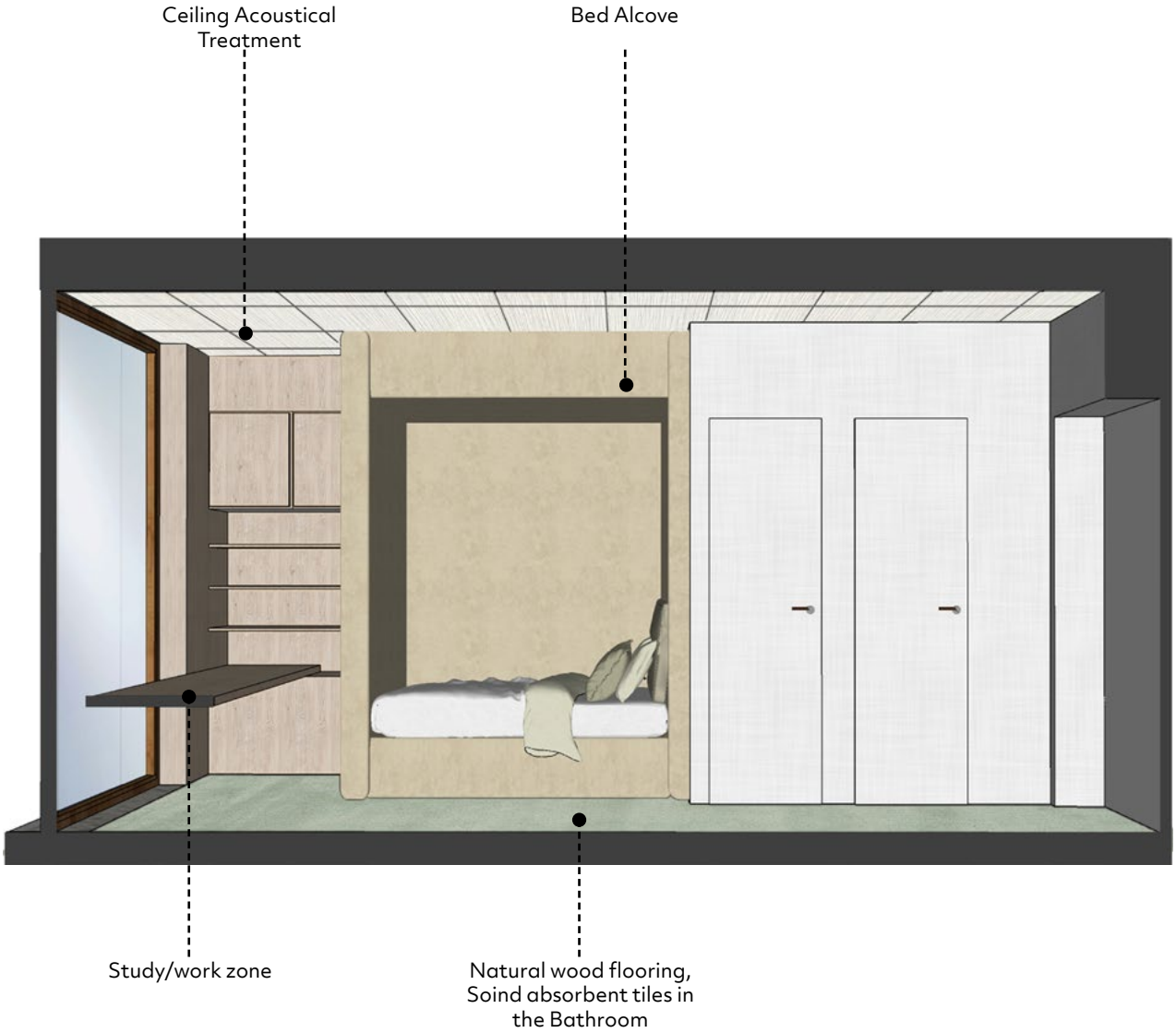

Figure 20: GSR Autism Friendly Bedroom Section

8.3. Henry Gratton Student Services Building Escape Space

One of the most effective and implementable of the recommendations included in this guide is the introduction of a network of escape spaces, at different scales and various locations throughout campus, as illustrated in Section 6.9 Figure 1. These would create a system of sensory reprieve spaces, accessible primarily to autistic students, staff and visitors, to provide sensory alignment and modulation support for instances of sensory overload.

The conceptual design thrust behind the configuration of this space is the creation of a sensory refuge, a space of sensory quiet, that provides the tools and support for sensory customisation and balance. It is designed to provide a variety of sensory escape needs, from sensory avoidance in the quiet, dim, calming design elements, to sensory seeking in the availability of sensory kits which may contain a variety of textures, music and visual stimulation aids and customisable digital screens for customisable experiences. The philosophy behind this space is to create a neutral canvas of neutral natural materials, over which customised sensory experiences can be adjusted- through dimmable lights, adjustable colours, available textures and digital art. This is illustrated in figure 22.

The following provides conceptual design guidance for the testing of such a space strategically located in an existing alcove space, along the main circulation corridor of the Henry Gratton building where Student Services are located.

The proposed design would be more enclosed, with a build-out of a blockwork wall with a circular alcove seat embedded within it. This niche seating would be completely upholstered along the entire circumference of the circular profile with soft edging, in a neutral tone soft natural fabric. Lighting within the niche would be user-controlled, dimmable and colour adjustable concealed LED lighting. The entry to the escape space proper would be immediately adjacent to this composition, and of a width that is fully accessible and allows full wheelchair and other mobility assisted access. The interior of the escape space is comprised of two zones with a LED lit green living vegetation wall immediately in front of the access point. To the left of the entrance is a moulded/mouldable memory foam floor upholstered in easily washable and durable fabric. Flanking two sides of this floor seating area are wrap-around digital screens which can project soothing digital art on a loop, with access permissible to personal user devices for their own customised visual stimulation, or possible other allowable digital escape uses. Concealed storage built in below the LCD screens can house IT control devices for the screens. On the third side of the sensory floor seating are two ceiling height concealed storage cupboards for storage of sensory kits- which can possibly be personalised to each student enrolled in the program and using this space- or ones for generic use. In addition this storage space can house assistive technology docking/charging/check-out points where tablets and noise-cancelling headphones can be made available, using technology enabled systems. The second zone to the right of the entry point, and tucked behind the curved wall of the alcove, houses free standing escape chairs- a proposed egg chair and/or escape pod chair, which allow the user to be somewhat isolated from the other occupants of the space. Ceiling mounted neutral coloured wave-form

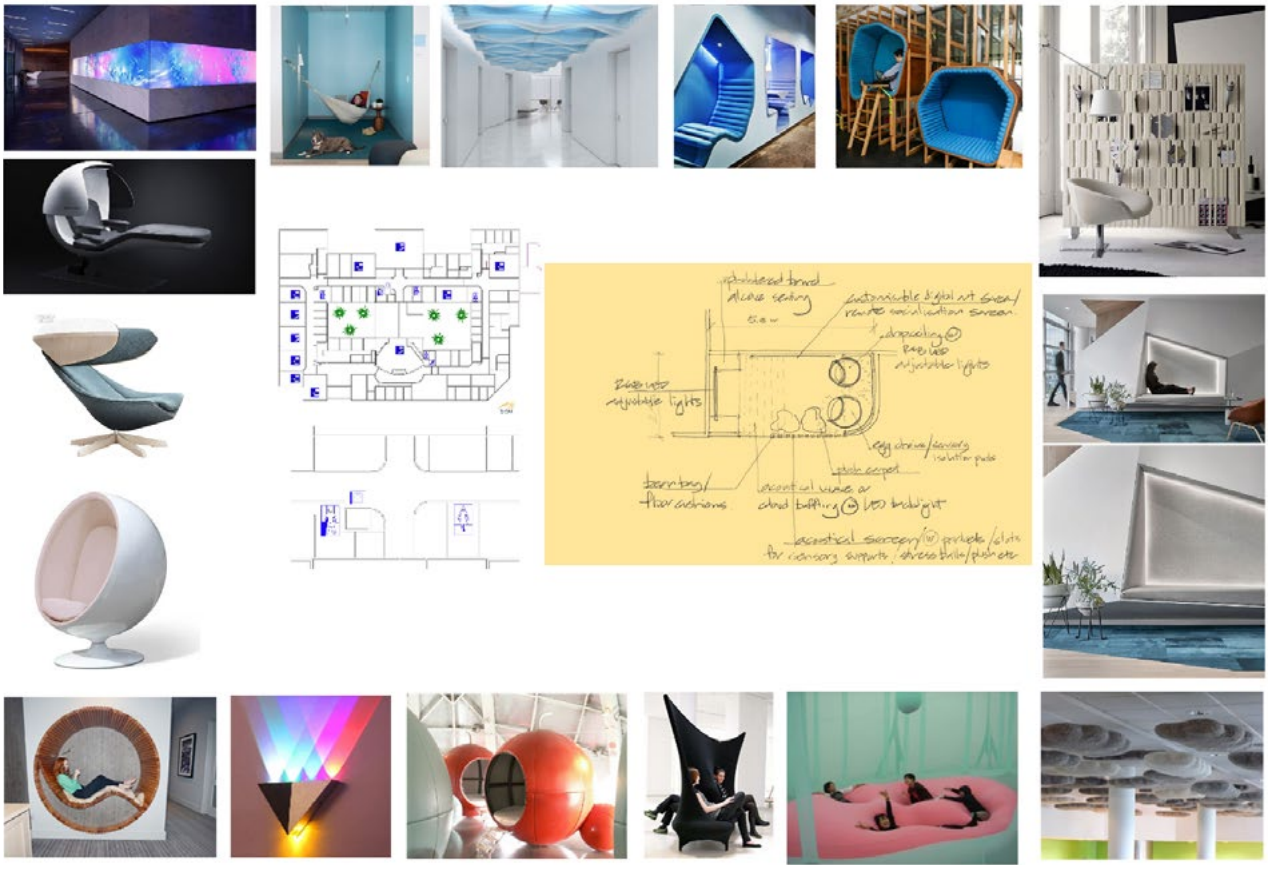

Figure 21: Henry Gratton Student Services Building Escape Alcove Moodboard

1		Digital screen: digital relaxation art, also hooked up with speakers and a mic to help users maintain their social life online
2		Moldable memory on the flooring or walls, and biophillic walls. might be an issue with maintenance and hygiene if they will need to be replaced regularly
3		Sensors to know know what kind of sensory environment before going into the space
4		Sleeping chairs are a good idea to turn off completely.

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baffling with dimmable, color adjustable LED back lighting help provide acoustical and lighting support for the space. Temperature control should be independent of the surrounding spaces and customisable by the users of the space. The flooring is neutral tone and minimal pattern carpet tiling with a low pile of soft texture to minimise resistance for wheelchair users and facilitate mobility, while providing sound absorbency without textural or visual sensory overload.

Sensors can be installed in the space to monitor temperature, acoustics, lighting and occupancy, and be linked to the smart system of campus. This will help with data provision linked to the real-time campus navigation tool that provides sensory information about escape spaces to those seeking them, as well as possibly provide post-occupancy evaluation data that may help inform and calibrate the design of further similar escape spaces across campus. Depending on campus privacy policies, this and other spaces intended for individual use of autistic students, may be monitored with cameras for safety purposes.

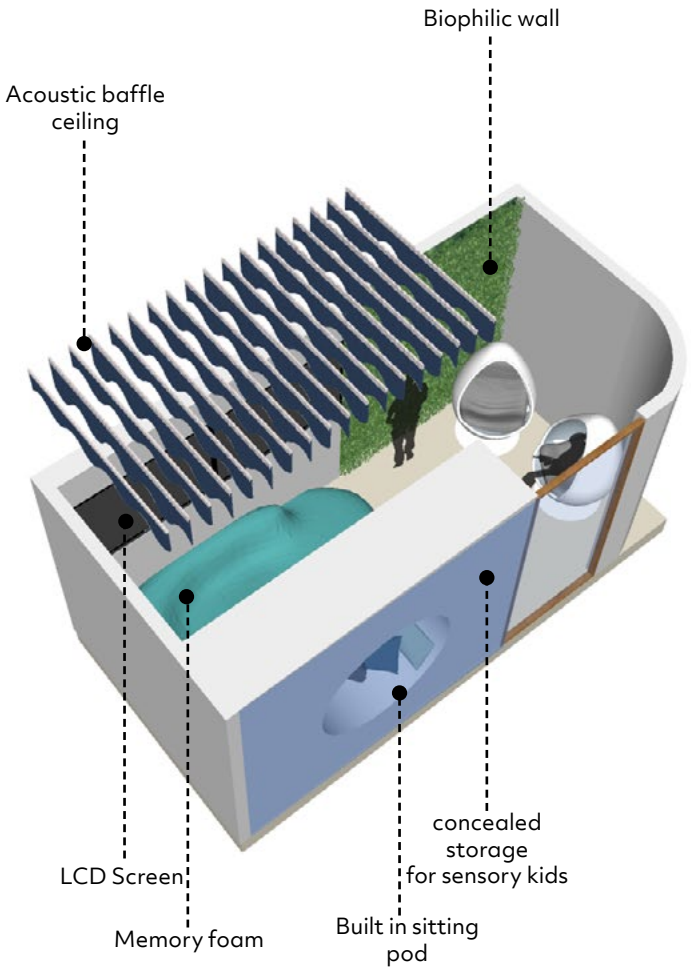

Figure 22: Henry Gratton Student Services Building Escape Alcove

PART 5- THE FUTURE OF THE AUTISM FRIENDLY UNIVERSITY

9.0 Future of the Autism Friendly University's Built Environment: Next Steps

9.1 Continuous assessment and improvement

9.1.1 Dissemination and replication

It is the intent of this guide, that it be used broadly to inform both existing and future designs of higher education campuses across Ireland, Europe and globally. It is an open-access document intended to catalyse design processes at different scales and across different functions of the higher education campus, but also other typologies. It is intended to be replicated across the higher education landscape but also scaled up and across different typologies.

A university campus, with its multiple user groups and activities intersects with many other common architectural and urban typologies. It is a learning space at its core, and many of the recommendations in this guide can be scaled across to elementary and primary education spaces. It is also home to many of its students, and concepts outlined here can inform autism friendly housing and residential design of various formats and scales. A university campus is also very much an urban space with qualities of a small city- and many frameworks outlined in this guide related to wayfinding and navigation, street prototypes, landscaping and the sensory environment afforded by all these spaces are scalable to the autism friendly city.

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This guide is very much also a catalyst for conversations and continued discourse. The ideas and design guidelines it presents should be seen as starting points and possible alternative solutions to the complex question of "what is an appropriate architecture for autism?". I invite users of this guide to have conversations around its recommendations, particularly with an intersectional lens as we view these design solutions through the complex lens of the human condition- gender, ability, age, sensory perception, neurodiversity and mental health. An integral part of the design solutions proposed in this guide, is to create space on campus for such discourse. The Glasnevin Autism Friendly Student Commons, with its variety of event, socialisation and dialogue spaces, is the ideal location to host such conversations and their associated events.

And finally, as the first guide of its kind, for the first university of its kind, this guide is intended to be aspirational, inspirational and a starting point towards a non-prescriptive, ever-evolving built environment. A built environment that is continually layering with more deeper understanding of its accessibility, usability and welcoming of all users, across the entire spectrum of the human condition.

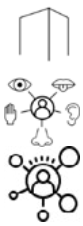
9.1.2 The Autism Friendly Design Audit

As a starting point, this guide proposes the piloting of various solutions and test cases across campus spaces. To amplify the efficacy of these pilot designs, they should be iterative, and continuously assessed, with the first phase informing the second informing the third, as solutions are scaled up across campus.

Various mechanisms and multiple sources of data should inform this iterative process, including design workshops and focus groups as outlined in the methodology section of this guide, as well post-occupancy evaluation data.

This process may broadly be guided by the following Autism Friendly Design Audit, which can help assess existing environments, evaluate pilot designs and provide gap analysis to help prioritise facilities and design decisions.

Autism Friendly Design Audit
1- Never
2- Rarely
3- Most of the time
4- Almost all of the time
5- Always

	Item	1	2	3	4	5	N A	Notes
	General							
	1. Community Integration and Space as a Source of Stigma Reduction: Spaces are fully inclusive and not segregated for autistic and non-autistic use							
	2. Reverse Inclusion: Space is made available where autistic needs are prioritised							
	3. Site Planning and Building Design as a tool for Mediation| Layering: The indoor/outdoor relationship of buildings is articulated to create environmental/ spatial/experiential and sensory transition opportunity							
	4. Site Planning and Building Design as a tool for Mediation | Introverted Design: Buildings are designed with internal refuge and sanctuary spaces							
	5. Site Planning and Building Design as a tool for Mediation | Creating Micro-Climates and Buildings within Buildings: buildings are organized in smaller manageable zones with discrete sensory qualities and transitional spaces in between zones							
	6. Integration of Natural Elements and Biophilic Design | Spatial Hierarchy: natural environments are woven throughout buildings at different scales							
	7. Integration of Natural Elements and Biophilic Design | Water and Organic Features: aramoatherapy, water and multi-sensory elements are included in these natural spaces							

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	Item	1	2	3	4	5	N A	Notes
	8. Universal Design| The Autistic Perspective: autism is included in the understanding, development and implementation of universal design solutions							
	9. Aglity,Flexibility and Adaptability: when design conflict occurs in the needs of different user groups in Universal Design, solutions are provided that are adaptable to different users, flexible and agile across needs							
	ASPECTSS							
☐	10. Acoustics | General: The acoustical environment aligns with the intended sensory stimulation level of the space/ spaces							
☐	11. Acoustics | Planning Level: acoustical mitigation is introduced when areas of different sensory stimulation levels are adjacent or in close proximity							
☐	12. Acoustics | Interiors/ Macro Level: acoustical treatments are used globally to mitigate noise across large multi-functional spaces							
☐	13. Acoustics | Interiors/ Micro Level: micro-acoustical environments are created around areas of high focus/low stimulation when found within large open multi-functional spaces							
	General							
☐	14. Acoustics | Interiors/ Geometry and Spatial Configurations: geometries of space are planned and managed to minimize unnecessary echo and reverberation							

	Item	1	2	3	4	5	N A	Notes
	15. Acoustics | Operational/ Personal Level: assistive technology is made available to students to mitigate acoustical sensory overload, locations are planned throughout the design of spaces to make this technology accessible and available							
	16. Spatial Sequencing: spaces are organized in a logical order, based on the typical use pattern of these spaces through logical sensory flow and using one-way circulation whenever possible							
	17. Escape Spaces: escape spaces are made available and accessible across different locations							
	18. Escape Spaces: escape spaces are made available and accessible at different scales and typologies							
	19. Compartmentalization: spaces are organized into discrete mono-utilitarian spaces with a clearly defined function and consequent sensory quality							
	20. Transitions: Transition zones are available at intersections between different sensory zones, particularly at the most dramatic shifts from high stimulation to low stimulation zones							
	21. Sensory Zoning: spaces are organized and consequently grouped in accordance to their sensory qualities into high stimulation and low stimulation zones							
	22. Safety: materials, security and control are all planned with the specific safety needs of autistic students in mind, and individual use of lockable spaces is closely observed							
	ASPECTSS 2.0							
	23. Colour: excessive use of vibrant colours, dramatic colour contrast and highly saturated colours are avoided							
	24. Colour: colour is used to help define spaces and support wayfinding							

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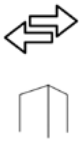
	Item	1	2	3	4	5	NA	Notes
	25. Lighting | General: flourescent and other flickering and sound-emitting lights are avoided, while stable quiet light sources are utilised; lighting is well distributed and consistent							
 	26. Lighting| Control and Adjustability: lighting in individual spaces intended primarily for autistic use are adjustable for intensity and possibly colour							
 	27. Lighting | Temperature: light temperature is adjustable for autistic users and helps support activities- focus in learning spaces, sleep in residences; and uses Circadian rhythm lighting whenever possible.							
	28. Lighting | Self-Stimulation and Sensory Regulation: natural and artificial lighting opportunities are made available for visual self-stimulation and sensory regulation of sensory seeking needs							
	29. Materials: materials are natural whenever possible, selected with safety in mind and are easy to maintain							
	30. Furnishing: furniture supports optimum acoustical performance, is utilized to support compartmentalization of space, is made of natural and neutral materials whenever possible, respects the contour and ergonomics of various postures and sizes of the human form and provides flexibility or configuration							
	31. Wayfinding and Navigation | Clarity and Continuity: circulation pathways are clear, distinct and continuous							
 	32. Wayfinding and Navigation | The Sensory Pathway: alternative sensory mitigated pathways are made available and accessible in parallel to the main-stream circulation network							

	Item	1	2	3	4	5	N A	Notes
	33. Wayfinding and Navigation | Geometry, Spatial Relationships and Direction: circulation pathways are designed in a manner that supports sense of orientation with open wide intersections and soft corners to allow anticipation of on-coming users, one-way circulation or separate directional lanes whenever possible							
	34. Wayfinding and Navigation | Signage: clear signage using both graphics and text help identify spaces, orientation maps are available throughout and technology is mobilized to help support this navigation							
	35. Wayfinding and Navigation | Compartmentalisation: multi-modal circulation paths are organized in discrete zones and lanes to allow the clear flow of different modes and speeds of travel							
	36. Technology: technology and smart systems are used to supplement physical design with solutions that can support the diverse needs of autistic users including: need to transition to new spaces; supporting predictability of space; sensory flagging of spaces; providing use date; smart facility management; smart calculation of sensory spatial operational capital							
	37. Sensory Economics: investment is made in creating sensory spatial assets to support autistic needs							
	38. Programming and Operation: spaces are managed and operated in a manner that aligns with spatial sequencing, makes escape spaces accessible, supports sensory zoning and showcases and celebrates the autistic perspective							

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Progressive Architects

EPILOGUE

Higher education campuses have throughout our modern history been the sites of contemplation, scientific discovery and paradigm shifting debate that has shaped our society and moved human progress forward. There is no doubt that such progress was not, nor will be possible without different ways of thinking- the kinds of ways of thinking that neurodiversity brings. It is diversity that provides the fertile ground for the critical discourse that drives this progress. It is diversity that provides the unique and innovative lenses through which the world can be observed, problems approached and solutions tackled to make often field-shifting discoveries. Without diversity our knowledge will stagnate, our academic minds will not be challenged to adapt, grow and develop to create the solutions for our unknown future. But such diversity cannot be effective and productive if it is not supported by a holistic ecosystem of support, facilitation and accommodation. DCU has taken strides towards creating this ecosystem of academic, social and operational support, and with this guide it has expanded those supports to include the built environment- it has now set the stage for that diversity to flourish. Our hopes our that this guide will help complete the holistic landscape for diversity to flourish, and for Neurodiverse and autistic students to find a home, to not only be included into, but to contribute to the paradigm shifting knowledge production needed in our future. We hope that this guide will provide a template to be scaled up to neighborhoods and cities and scaled across to other European nations and across the world, for an autism friendly world, where diversity can flourish everywhere.

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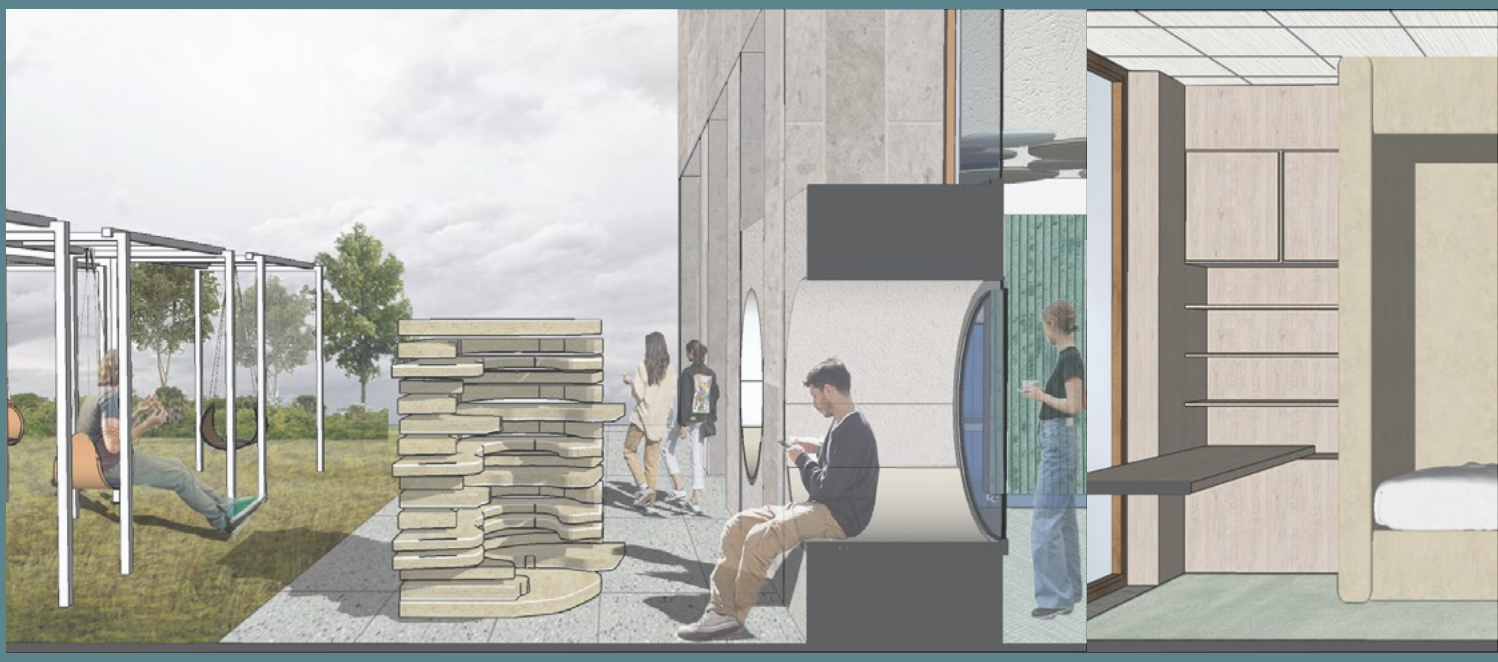

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