PLACES AND SPACES WITH EVERYONE IN MIND

DESIGNING FOR NEURODIVERSITY AND MENTAL HEALTH

A white paper from WSP

Though improvements are still needed, physical accessibility is often prioritised in design principles before psychosocial accessibility. We want to change that.

At WSP, we have a unique opportunity to influence the built environment, stimulate discussion at a policy level, and work with our clients to develop designs without barriers. We asked ourselves what we could do to build on this momentum and help drive the change required.

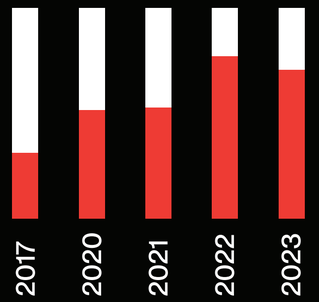
This paper highlights the importance of Designing Places, Spaces and Infrastructure for the full range of human diversity. Differences in human mental processing can be caused by neurodivergence, mental health conditions, learning disabilities and neurodegenerative conditions.

It is estimated that 15-20% of the world's population is considered neurodivergent [1], [2], [3]. Over 70% of neurodivergent persons experiencing mental health issues; two-thirds of those with ADHD have a mental health condition, and over 80% of those with ASD are statistically likely to have a mental health condition also [5], [6], [7].

It has been suggested that poor mental health in neurodiverse candidates could be due, in part, to the barriers neurodivergent people face in their daily life, such as a lack of support, the pressure to act neurotypically and societal implications imposed on neurodiverse people due to neuro-inclusive design implementations [8], [9].

In preparing this paper, we spoke to people who consider themselves different in respect of human cognition, to better understand their experiences and the barriers they face. We sought to find out what they find easy and what they find hard and used these findings to produce some simple principles for design teams across the built environment. And we've highlighted arange of examples which work well for all.

Between 2017 and 2022, rates of probable mental health conditions increased from around 1 in 8 young people aged 7-16 to more than 1 in 6. For those aged 17-19, rates increased from 1 in 10 to 1 in 4 [4], [5].

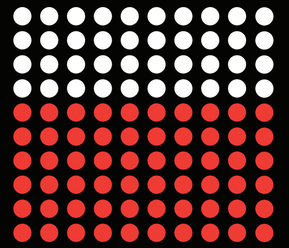


96% of those experiencing neurodiversity and mental health condition show no visible differences.

1 in 7 of the population are neurodiverse [10].

Fewer than 20% of neurodiverse people are in full-time employment [11].

There are currently around 982,000 people with dementia in the UK, which is projected to rise to 1.4 million by 2040 [12].



What do we mean by neurodiversity?

Neurodiversity is an umbrella term capturing thevastness of human cognition and the natural variation of human brains. Coined by Judy Singer in the late 1990s [13], it is thought that to be neurodiverse is to have a brain that computes information differently from neurotypical (non-neurodiverse) people [14].

Some neurodivergent diagnoses include; Autistic Spectrum Disorder (ASD), Attention Deficit Hyperactivity Disorder (ADHD), Dyslexia, Dyscalculia, Tourette's Syndrome, Auditory processing disorder, Dyspraxia and Dysgraphia. Neurodiversity can affect large portions of a person's life, from mood regulation, literacy, social interaction, sensory processing, attention span, and executive functioning to learning abilities, communication styles, and cognitive processing. These differences can impact daily life, including education, work performance, relationships, and overall well-being.

Neurodivergent individuals may experience unique challenges and strengths in time management, organisation, creativity, problem-solving, and emotional expression. Due to the intrinsic complexity of spectrum disorders, the effects of neurodiversity are highly individual and can vary significantly from person-to-person, highlighting the importance of personalised support and accommodations in various settings.

For some people, seeking a formal diagnosis is a meaningful way to recognise and name their experiences, find support, and access groups that may help them. Conversely, many people may not have any formal assessment, may not want to seek a formal diagnosis, and might not feel they fit into a clearly defined group. Because of the latter, we can only estimate that 1 in 7 people are neurodiverse, but this statistic could likely be higher.

We believe that to build equitable, resilient, sustainable, and Future Ready™ places, we should view neurodiversity as an asset. Neurodiversity brings broader perspectives, innovative problem-solving abilities and diverse workplace talents. By embracing neurodivergence, it may be possible to tap into a broader range of viewpoints, fostering creativity and driving innovation through various industries. This approach may not only enhance the productivity, efficiency and experience for all but also create a more neuro-inclusive environment that reflects the diversity paradigm of the broader population.

> "Neurodiversity is the term used to describe the variation in neurocognitive profiles across the whole population... it is not about one condition, difficulty or difference. The term recognises the variety in the way we speak, think, move, act and communicate; that human brains are diverse and vary.."
>
> British Standards Institute, Design for the mind - Neurodiversity and the built environment

The principles and interventions on a page

Conducting our research highlighted the nuanced and intricate differences in the needs of neurodiverse individuals, revealing that these needs can sometimes be in tension or even conflict with one another.
This compound complexity underpins the importance of adopting a multifaceted and inclusive approach to understanding neurodiversity, encompassing shared traits across conditions and distinct characteristics unique to individuals or groups. While acknowledging these challenges, a core principle of our WSP Future Ready approach is to move beyond simply recognising preferential and necessary changes for neurodiverse persons and provide practical, actionable guidance for all stakeholders to encourage change.

Human-centred Design

Collaborate

Conduct field studies, observations and listen deeply to what people say they want and need

Research

Identify and address the root issues, not just the symptoms, turning raw data into clear and focused statements

Ideation

Continulously refine solutions, gather integrated feedback from users

Hollistic perspective

Consider the entire user experience and system

Choice and agency

Give users a variety of options that consider different physical and sensory experiences, with options that are more or less stimulating.

- A variety of routes
- A choice of places to sit, to work, to meet, to relax in offices
- The option to choose decor at home

01 QUIET

- Audio and visual.
- Clearly identifiable quiet zones in busy areas.
- Sound-absorbing materials and insulation.
- Consider sensory pods and specialist features / software.

02 NATURAL

- Plants, wildlife, and water.
- Natural form and elements; stone, wood, and textiles.
- Natural light supported by indirect, consistent, dimmable lights.
- Matte, neutral, consistent finishes.

03 INTUITIVE

- Logical design, using zones to support easy, clear wayfinding.
- Simple and consistent symbols and pictures for signs and design features.
- Information delivered in more than one way and available to use for planning (ahead of a journey or experience).
- Don’t assume social rules or expectations are obvious; be explicit about social rules and keep them simple.

04 SAFE

- Designing out catastrophic impulsive risks.
- Safety features, like CCTV and lighting.
- Installing refuge areas and the means to access help or support.

We’ve used five different personas to explain different experiences

These personas are based on interviews and research. They represent a cross section of experiences and barriers that people can face when navigating the built environment. Our personas aim to bring these experiences to life and explore potentially beneficial changes indesign. We recognise that these experiences may not reflect everyone’s experience –rather, they intend to highlight commonalities in experience.

Persona 01
Alex - Autism

Alex (she/her)

Alex is a vibrant 28-year-old woman who is on the autism spectrum. She lives in a cosy apartment in the city and works as a data analyst for a tech startup. Alex has a passion for astronomy and classical music, which she eagerly shares with her friends and colleagues.

Alex thrives in her job, where her attention to detail and analytical skills are highly valued. She has a diverse group of friends who appreciate her authenticity and depth of knowledge. Alex volunteers at the local planetarium in her free time, sharing her love of astronomy with visitors. She’s also learning to play the violin, finding joy in the structure and beauty of classical music. While Alex sometimes faces challenges in social situations, she’s developed strong self-advocacy skills and isn’t afraid to communicate her needs. She’s proud of her neurodivergent identity and sees it as a fundamental part of who she is, bringing both strengths and occasional difficulties like anyone else.

“I don’t like sudden transitions in light and sound”

“I’m often playing catch-up with my brain”

What common barriers may Alex experience?

- Difficulty navigating unspoken social rules and expectations.
- Challenges in picking up on subtle non-verbal cues or body language during interactions.
- Potential sensory overload from noise, fluorescent lighting, or other environmental factors.
- Struggles with unexpected changes to her work routine or tasks.

What design features may help Alex?

- Designated quiet zones with adjustable lighting and comfortable seating, providing a retreat for sensory overload from stimuli.
- Clear wayfinding using colour-coded paths and visual cues to help navigate.
- Acoustic design elements such as sound-absorbing materials.
- Flexible options and services to allow her to be comfortable with the environment and acclimatise to her surroundings.

We’ve used five different personas to explain different experiences

Persona 02
Marcus - ADHD

Marcus (he/him)

Marcus is a 32-year-old man with Attention Deficit Hyperactivity Disorder. He works as a freelance graphic designer from his home office, which allows him to manage his fluctuating energy levels and attention span. Marcus is married and has a 5-year-old daughter.

Marcus thrives in dynamic environments and enjoys the variety that his freelance work provides. He utilises a range of organisational tools and apps to effectively manage both his professional and personal life. As an enthusiastic and energetic parent, Marcus is known for his out-of-the-box thinking, which often leads to unique design solutions that his clients appreciate. Although he sometimes finds time management to be a challenge, he has developed effective strategies to harness his high energy levels and creativity, making him a vibrant and purpose-driven individual.

“I find it difficult to concentrate on monotonous tasks for an extended period of time”

What common barriers may Marcus experience?

- Difficulty maintaining focus during long, monotonous tasks.
- Challenges with time management and meeting deadlines.
- Struggles with organising and prioritising multiple projects.
- Tendency to become easily distracted in his home office environment.

What design features may help Marcus?

- A flexible workspace with standing desk options to accommodate his fluctuating energy levels.
- Visual organisation systems, such as color-coded calendars and task boards, to aid in project management.
- Designated quiet zones with minimal visual clutter to enhance focus during critical work periods.
- Incorporation of fidget-friendly tools and sensory elements to help channel excess energy productively.

We’ve used five different personas to explain different experiences

Persona 03
Jacob - Down syndrome, David - Carer

Jacob (he/him) & David (he/him)

Jacob, 17, has Down’s Syndrome and is assisted by his carer, David. When out and about, Jacob is accompanied by David who will navigate, but they like to make as many of their decisions together as possible as Jacob is learning to travel independently. Jacob has a supported internship working 3 days a week via a Workfit scheme.

Jacob experiences several sensory challenges, which impacts how he interacts with his environment. For example, sometimes objects can be difficult to use, or sounds can either appear muffled or overly loud. Jacob tends to respond better to visual forms of communication, rather than verbal or written, as images tend to be easier to recall and form into memorable patterns. Jacob can sometimes feel stressed, agitated and upset in situation or environments where he feels out of control or hasn’t been before. Travelling with David is really important to Jacob, as he is able to assist him in becoming a confident, independent traveller. This is being made a lot easier by mobile technology and apps, where Jacob is supported in developing navigational and decision-making skills.

“Having a human presence will always be helpful”

“If Jacob becomes stressed and overwhelmed when we’re out and about, sometimes I do too”

What common barriers may Jacob & David experience?

- Jacob struggles with depth perception using stairs or following narrow pathways - especially if there’s large crowds travelling in different directions.
- David likes to teach Jacob how to use public transport while they are out. This can be difficult if maps are hard to read, or information is text-heavy.
- Finding space for Jacob and David to sit together on the train and bus.
- Jacob may find it hard to work out himself how long a journey may take or deal with unexpected events by himself.

What design features may help Jacob and David?

- Wider walkways or sections of pathways without changes in levels.
- Clearly marked directions from a way out.
- Open, quiet areas full of greenery and seating.
- Transport information delivered in more than way.
- Simple, colourful and consistent symbols or pictures for directions.
- One-way systems to reduce impact of crowds.

We’ve used five different personas to explain different experiences

Persona 04
Carole - Dementia

Carole (she/her)

Carole, 72, was diagnosed with dementia two years ago. Carole is active, enjoys her independence and attends weekly art classes at her local community centre. She currently lives with family, but as her condition is still in the fairly early stages and is sometimes asymptomatic, many people often do not realise she has dementia.

Carole can experience frequent and sudden changes in short term memory, often when she is out and about. She sometimes feels nervous about making mistakes, or appearing incapable to others, so will often seek out places, objects and people that are familiar to make her feel safe again in times of feeling insecure, confused or disorientated. Carole is also likely to do things herself and maintain as much independence as possible, so may become stubborn at times.

“Don’t just assume a design will speak for itself - offer clear instructions and pictorial guidance”

What common barriers may Carole experience?

- May become confused or embarrassed if she forgets where she is, where she is going or why she is there.
- She finds signs, information boards, descriptions and directions increasingly difficult to read.
- Often finds pushing buttons difficult, especially if she is not quite sure what they are for.
- Change in floor texture, colour or feel may cause her to become disorientated.
- No staff available or trained in order to provide support and guidance.
- New technology or design features that are unfamiliar.

What design features may help Carole?

- Natural features like plants and water, together with regular seating.
- Intuitive way finding such as lighting, trees or paths.
- Simple, colourful and consistent symbols or pictures for directions.
- Use of the same colours for the same parts of an interior to enhance depth perception.
- Designated shopping hours, assistive services or staff training.
- Shorter distances to walk.

We've used five different personas to explain different experiences

Persona 05
Charlie - Anxiety and Depressive disorder

Charlie (they/them)

Charlie, 30, has mixed anxiety and depressive disorder; experiencing symptoms of both conditions that vary in intensity. They have a fast-paced, high-stress job, and commute into the city daily for work.

Charlie will often ruminate on past experiences that caused them difficulty or anxiety. They often find their concentration drifting away and will feel like they're in a constant daze, which sometimes makes it hard to make a decision on the spot. Feeling physical symptoms of their condition when out and about, such as nausea and dizziness, is quite common. They'll often become intensely anxious before a journey and will plan ahead down to the detail and will consider the ways in which things could go wrong. Charlie may become forgetful, disorientated and anxious when faced with unexpected situations, lots of clashing sounds or lights or when in big crowds.

"I am constantly worried I have done something wrong and there will be negative consequences, even if I know otherwise"

What common barriers may Charlie experience?

- Being overwhelmed with either an abundance or lack of available information and options.
- Feels anxious when parking their car, especially in a busy area.
- Overcrowded places, or areas where groups of people gather without a clear flow of movement.
- Loud noises, and environments with different overlapping and clashing noises.
- Environments where they feel claustrophobic and cannot see a clear exit or route away from crowds.
- Likely to completely avoid using a given transport service if they feel stressed, rushed, disorientated or anxious as a result of using it.

What design features may help Charlie?

- Maps that show floor and route layouts of places, available in central, easy to access locations and online.
- Online or simple ticket sales such as tap in and out.
- Real time service information.
- Calm, quiet spaces.
- Natural features like plants and water.
- Visible safety features – like lighting and CCTV.

The spaces and features we like

There are few places explicitly designed with the full range of human cognition in mind, but here's a selection of places that we've found in our research which could make life easier for all.

BIRMINGHAM NEW STREET STATION

An oasis of calm in a busy environment – natural light, neutral finishes, a quiet space. Less clear for wayfinding, but it's the calmest railways station we visited.

The spaces and features we like

TRANSPORT FOR LONDON'S DIRECTION POSTS

Simple, clear consistent signs that give regular, easy directions. Useful for everyone!

The spaces and features we like

COVENTRY STATION

Upgrading an existing 1960's railway station to be calmer, more open and easier to access.

- Avoiding overcrowding through greater capacity
- Adding in seating at different heights through the station. Adding shading to the glass on the main platform bridge to help people who suffer from vertigo.

The spaces and features we like

SYDNEY METRO

A new metro line connecting Greater Paramata to the Sydney CBD, with WSP as a key design partner.

- Our WSP team tested the intuitive nature of the design by asking customers to navigate through a virtual model in different circumstances. With no signage to test the intuitive nature of the design. To ask customers how they were feeling as they navigated through the model to help the design team design out complexity.
- Natural light used to help alleviate anxiety on long escalator runs and feelings of claustrophobia underground. Long, open sight lines used together with open platforms.
- A special focus on the entry / exit to stations as our focus groups showed that these were key ‘moments’ for the journey both as they entered the metro and also travel onwards to their destination.

The spaces and features we like

BBC CYMRU WALES NEW BROADCASTING HOUSE

BBC's new Wales HQ is regardeda s a showcase building for neurodiversity. Key elements included are:

- Use of virtual reality through the design process.
- Use of landmarks, colour and texture to help with wayfinding.
- Thought for colours and contrasts in the fitout.
- Non-flickering LED lamps and lower lighting levels – when compared to BCO (British Council of Offices) standards – are more welcoming and easier on the eyes.
- Quiet and calm spaces on each floor.

Read more at:
BBC Cymru Wales Broadcast Centre - Neurodiversity

Jackie Davies - stock.adobe.com

The spaces and features we like

SENSORY VIEWING ROOMS AT SUNDERLAND AFC

We love the inspiration behind Peter and Kate Shippey's campaign to provide a safe and inclusive place for their son, Nathan who wanted to watch live football. Nathan has autism and as a consequence struggles with the noise and crowds, so needed an appropriate environment to watch a live match in.

Peter and Kate Shippey innovated the concept of Sensory Viewing Rooms in sporting stadia providing a quiet space to watch the match. Since the first room opened at the Stadium of Light's room, it's been joined by similar facilities af clubs including Arsenal, Liverpool, Middlesbrough and Watford.

Read more at:
The shippey campaign

The spaces and features we like

ORFORD WAY, WALTHAM FOREST, LONDON

London Borough of Waltham Forest trialled an integrated set of measures to reallocate road space to public space. A high proportion of vehicles using Walthamstow Village were exploiting it as a cut-through between surrounding main roads, often at high speed.

The objectives were to:

- Reduce the amount and speed of through-traffic using residential streets.
- Improve the look, feel and safety of Walthamstow Village for all road users.
- Encourage environmentally sustainable travel choices.
- Create a ‘living consultation’ to enable residents and businesses to experience the changes in real life.

The completed scheme is a calmer place, easier to walk and with green spaces suitable for all to relax in.

The spaces and features we like

BONNINGTON SQUARE, VAUXHALL LONDON

The creation of the ‘piazza’ in Bonnington Square was a resident-led project born out of a highly collaborative partnership with Lambeth Council.

The community helped to transform the area’s derelict and vacant houses and central square, creating a garden and café, run by local people.

Residents proposed a scheme to slow traffic and provide space for outdoor dining and social activity. Complementary surfacing materials define the space and link the café area to the communal gardens opposite.

The transformation of this once traditional local street has created a focal point for the local community, which is used for different activities during the week and year.

It also provides an oasis of calm in a busy area.

The spaces and features we like

MUSEUM OF LONDON'S SENSORY MAP

The Museum of London's website has a comprehensive summary of what to expect for all visitors' needs.

We especially like the sensory map that allows customers or parents of children with sensory needs to prepare for any likely experiences of locations that might cause distress.

NEW RIVER COLLEGE ISLINGTON, LONDON

New River College was designed for pupils not able to attend mainstream schools.

- The school is a light, airy design which makes the most of natural light and ventilation.
- It uses natural finishes with plenty of greenery to provide a natural space.
- WSP, as the acoustics consultant, designed the space to be quiet – using sound adsorbent materials throughout, designing the walls and ventilation system to cut down noise from different parts of the building and carefully modelling likely sound levels throughout the design.

As the Head Teacher says "The auditory environment for these guys is critical. We don't notice any noise from outside. These rooms are used for lots of different functions as well as for calming and quiet spaces. It works really well."

VILLAGE LANDAIS HENRI EMMANUELLI, FRANCE

Village Landais is a community designed for people with dementia. It has 120 residents.

- Designed as a place for living rather than a medical institution.
- Extensive access to green space and nature.
- Natural lighting throughout.
- Simple design and layout.
- Designed and operated to be a part of the community of Dax, free for all to come and go.
- Accessible, recognising that it's often older people who have dementia.

Read more at:
Village Alzheimer

CHRIS AND SALLY'S HOUSE IN WATFORD

Chris and Sally's House is a project to develop and test design solutions that are supportive of an ageing population staying in their own homes. The 100m2 Victorian house has been adapted to cater for different types and stages of Dementia.

We specifically liked the colour palette used in the project, led by Dulux who have also produced a colour guide for people with dementia.

See this here.

The spaces and features we like

ALFRED PLACE GARDENS, LONDON

Located next to Tottenham Court Road in central London, Alfred Place Gardens provides a green, oasis of calm in a busy part of the city. This area gives places for children to play in a safe space, and also provides a calm place to unwind and also for everyone to relax, sit and enjoy tranquility.

WAYFINDING IN WALTHAMSTOW LONDON

While simpler than the TfL fingerboards these signs provide simple, clear directions alongside place signs.

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This white paper is just the start of the process. We're keen to learn more and to exchange views. So if you've ideas, examples of great places, or any feedback on our paper, do tell us.

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