PAS 6463:2022
Design for the mind – Neurodiversity and the built environment – Guide
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Foreword

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It has been assumed in the preparation of this PAS that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Presentational conventions

The guidance in this PAS is presented in roman (i.e. upright) type. Any recommendations are expressed in sentences in which the principal auxiliary verb is “should”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. “organization” rather than “organisation”).

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0 Introduction

0.1 What is neurodiversity?

Neurodiversity is the term used to describe the variation in neurocognitive profiles across the whole population\(^1\) and the guidance in this PAS is about us all. It is not about one condition, difficulty or difference. The term recognizes the variety in the way we speak, think, move, act and communicate; that human brains are diverse and vary. Each one of us has a unique set of different connections with our billions of nerve cells. As a consequence, the way we interact with our environment can vary from person to person. It is dynamic and might change over time, for example, due to an incident such as brain injury, trauma, disease, stroke, an age-related condition or a change in mental wellness.

Neurological profiles can sometimes be collectively grouped as:

a) neurotypical (someone fitting a majority neurological profile and is not neurodivergent);

b) neurodivergent (someone who fits outside majority neurological profile and is commonly associated with autism, attention deficit hyperactivity disorder, dyslexia, dyspraxia, dyscalculia, dysgraphia and Tourette’s syndrome – there is no definitive list of conditions associated with neurodivergence); and

c) neurodegenerative (whereby sensory processing differences develop over time through brain diseases, such as different forms of dementia or Parkinson’s).

However, many people have not had their neurological profile formally assessed, or do not fall tidily into one group, such as sensory processing sensitivity (SPS) trait or highly sensitive person (HSP), learning disability and mental health difficulties and there is a very wide spectrum of how each individual is affected by the built environment. Neurotypical people can be affected by some elements of the built environment for reasons seemingly unconnected to neurology. For example, where sensory stimulation such as audible or visual noise causes dizziness or triggers headaches, or some other form of discomfort or anxiety is experienced. These effects are not yet fully researched and understood and there are always new medical conditions and effects emerging. For example, the severe alterations in smell perception experienced in many cases of long Covid. For this reason, “sensory and/or information processing difference” is a term frequently used throughout this PAS.

\(^1\) This clarification is made in acknowledgement that the term Neurodiversity has been strongly associated with particular neurodivergent conditions, such as autism spectrum condition (ASC).
Sensory processing is how information is perceived, processed and organized when received through the senses, i.e. hearing, sight, smell, touch, taste and movement. To have a sensory and/or information processing difference, is to react through the senses in a different way to the majority. Someone might experience atypically high response to a sensory stimulus (hypersensitive) or atypically low response (hyposensitive). This can sometimes result in stimulation being actively sought out, also known as “sensory seeking”. Sensitivity might vary so an individual may be hyposensitive to light but not noise, for example, or might be highly sensitive to a wide range of stimuli. However, it should be noted that all of our senses work together rather than in isolation, so it’s important to consider the multisensory impact and balance of how they combine when designing and managing the built environment.

In some cases, a design intervention to improve the environment for one type of sensory difference might be to the detriment of another – where this might be the case, choice of provision, such as alternative spaces or the ability to adjust the environment is necessary. It is very important, where possible, to engage with stakeholders representing a range of neuro profiles to confirm all needs can be reasonably met.

Diagnosed conditions and labels are generally avoided within this PAS, as it is impossible to provide an exhaustive list. The focus of this PAS is to provide design and management guidance which can reduce negative sensory experiences. A few examples are cited for better awareness, where a particular feature is known to adversely affect one specific group. However, this is not to be interpreted as having an effect on everyone within that group, or that it would only be people identifying with these neurological profiles that might be affected.

The majority of features that are generally associated with physical and mental wellbeing can also be beneficial to people who experience sensory differences. In particular, connection with nature through all the senses, biophilic design principles, applying the golden ratio to replicate in design the proportions commonly found in nature, or use of fractal patterns; such measures should reduce visual noise.

Designs that offer visual legibility, clarity and simplicity, can be calming and reassuring for people who experience differences with visual, proprioceptive (from muscles and joints) and vestibular (from inner ear) integration.

NOTE Designing environments without due regard for neurodiversity are likely to contribute to poor mental health and impaired wellbeing for people with sensory processing differences.

Whilst the impact of the environment can vary significantly from one individual to another, there are numerous elements of the built environment that have potential to contribute to sensory overload or “sensory shut down”, including:

a) sounds, of various types, including intermittent or continuous, from loud to very quiet and particularly when unexpected;

b) visual “noise” which may be caused by light, glare, shadows, colours, patterns, movement, proximity, technology or clutter;

c) spatial and layout considerations; and
d) unwanted or extreme sensory feedback through smell, touch, taste or temperature.

Further reading on sensory and multisensory processing is recommended for a greater insight and understanding of the guidance set out in this PAS.

0.2 Purpose of PAS 6463

This PAS is believed to be the first standard that has been developed by a national standards body that provides built environment guidance for multiple sensory processing differences and conditions. It aims to help with the design, creation or management of intuitive environments which readily accommodates the neurological variations in the way people perceive, process and organize sensory information received through hearing, sight, touch, smell, taste or movement.

The content of this PAS is aimed at buildings, external spaces and environments for public and commercial use, as well as residential accommodation for independent or supported living. The content of this PAS is equally applicable to any organization anywhere in the world, irrespective of location, size, type, or sector.

The guidance is, however, unlikely to cover all of the complex and deeper requirements that might arise in care settings or many schools or facilities designed specifically for Special Educational Needs and Disability (SEND) in England and Northern Ireland, Additional Learning Needs (Wales) and Additional Support Learning (Scotland).

Rooms to provide sensory stimulation have not been included but quiet rooms and restorative spaces are covered comprehensively and their careful design and provision is encouraged in all building types.

A significant number of people find certain aspects of the built environment uncomfortable, distressing or a barrier to their use. This includes but is not limited to, use and display of information in accordance with information processing, working memory and interpretation. Stress and anxiety, often referred to as “sensory overload” results from what feels like a bombardment of sensory stimuli experienced without the ability to filter, or from spatial perception difficulties due to proprioception differences. There is variation in the amount of space that people feel they need to have between themselves and others (the proxemics), due to cultural and/or neurological differences. The increased demand on an individual of the associated increased cognitive load unsurprisingly leads to increased anxiety, fatigue and, in some cases, potential behavioural changes and/or poor mental health. Examples include trying to filter out unwanted environmental distractors or noise, maintain focus, trying to control impulsive urges to fidget or stop the mind wandering, or to contain internal restlessness.

However, with awareness of these variations in need, many of the potential negative impacts can be eliminated, reduced, or adjusted. Thoughtful design and management can create places where everyone can flourish equally, and people are provided with an equal opportunity to work, live, and socialize comfortably.
Good sensory inclusive environments provide a range of environmental, economic and social advantages, for example:

a) attraction of new customers or tenants;
b) enhanced employee and customer retention;
c) reduced absence due to mental ill health;
d) improved wayfinding and learning;
e) enhanced wellbeing – reduction in fatigue, stress (including post-traumatic stress disorder triggers) and anxiety;
f) improved performance of many occupants – increased focus, creativity, productivity;
g) enable people to socialize comfortably and safely, with positive communication; and
h) create a more enjoyable environment where people can feel empowered and in control.

0.3 Application

For new buildings, it is beneficial to consider all elements of the guidance from concept stage, with organizations applying recommendations that reflect their circumstances and user needs. For existing buildings, a large proportion of the guidance is practicable when refurbishing, redecorating or renewing.

It can be noted that the impact of the environment on the senses is cumulative and might be compounded by multiple causes so a holistic approach that considers a combination of interventions across the different components of design and management are likely to be more successful than improving one factor in isolation. However, every strand potentially contributes to the sensory load and even individual components can make a difference to some people.

The content of this PAS can be reviewed alongside established relevant guidance for the design of an accessible and inclusive built environment, such as the BS 8300 series.

Whilst this PAS covers topics that address common features in mainstream buildings and their surroundings open to the public, similar principles might be applicable to housing and home modifications/adaptations.

0.4 Management

Whilst there are many measures that can be taken during design development to improve places for people with sensory and/or information processing differences, to achieve an inclusive, sensory-friendly environment, management in both the day to day running of the building and interventions around specific activities, roles or practices for staff and visitors has equal significance.

For many new buildings, the management team are not able to contribute and inform the design process, either because they have not yet been appointed, or because their views are overlooked. The facilities management team should be represented and have input into the building design.
Many recommendations in this PAS also relate to arrangements that might require long-term monitoring and maintenance; the management of facilities is not to be underestimated in meeting the needs of users.

Throughout this PAS, design and management measures are often inseparable and are grouped together in the text. Additional management considerations are provided in Annex A.

A primary aim of this guidance is therefore to influence design and management to:

• reduce the potential for sensory or cognitive overload or distress from features within the built environment;
• to provide flexibility, choice and control to meet a spectrum of requirements; and
• to offer places for recovery and respite when needed.

Until recently, design standards for the built environment have been developed to accommodate our diversity in form, size and physical ability, alongside variations in motor skills, vision and hearing. However, there remains a profound need to also meet our neurological diversity to prevent exclusion or discomfort to a significant section of the population. It is hoped that this PAS can be widely evaluated in use by designers, planners, specifiers, facilities/workplace management professionals (also known as estates management or asset consulting) and decision-makers. Over time case studies and research can build upon this initial guidance and give opportunities to engage with and design for people with a wide range of cognitive, social, communication and sensory requirements.

0.5 Legal

Whilst this PAS does not include references to any specific law or regulation, organizations can find that following the guidance is relevant to legal and social obligations, such as:

• the fulfilment of duties under the Equality Act 2010 [1] relating to disability;
• the preparation of Autism Strategies (which are a requirement for some public bodies under the Autism Act 2009 [2]);
• SEND and Ofsted requirements; and
• the adoption of practices to meet dementia-friendly initiatives (such as the Greater London Authority’s Dementia Friendly Venues Charter [3]).

Attention is also drawn to Article 9 in the UN Convention on the Rights of Persons with Disabilities [4], which states that appropriate measures can be taken to confirm that disabled people have access on an equal basis with others to the physical environment, transportation, information and communications, and to enable them to live independently and participate fully in all aspects of life.

NOTE Where a sensory difference has a substantial impact on day-to-day basis, it is very likely that the individual meets the definition of Disability as defined under the Equality Act 2010 [1].
1 Scope

This PAS gives guidance on the design of the built environment to include the needs of people who experience sensory/neurological processing differences.

NOTE This includes neurodivergent, neurodegenerative, hypersensitive and other neurological differences which can affect sensory processing and mental wellbeing.

The PAS gives guidance on buildings and external spaces for public and commercial use, and residential accommodation for independent or supported living. The PAS covers:

- lighting;
- acoustics;
- décor;
- flooring;
- layout;
- wayfinding;
- familiarity;
- clarity;
- safety;
- thermal comfort;
- odour;
- preview of an environment; and
- other sensory design considerations.

This PAS does not cover:

- user requirements for special education environments, dementia, or complex care settings; and
- detailed guidance on sensory room design.

This PAS is for use by designers, planners, specifiers, facilities managers and decision-makers on design and management considerations to make places more inclusive for everyone, by reducing the potential for sensory overload, anxiety or distress.