Tzesika Iliovits, Inclusive Design Consultant

tzesika@inlineconsultancy.com

Tzesika has over seven years of experience in inclusive design. She holds a Master's degree in Interior Architecture from Boston, USA, with a strong academic focus on inclusive design. Her master's research focused on improving the lives of people affected by Alzheimer's through inclusive design solutions. Her professional experience in the United States includes contributing to several impactful projects aimed at improving accessibility standards across both municipal and private sectors.

In the UAE, Tzesika co-led the development of an accessibility-focused certification system and has managed and delivered large-scale accessibility assessments across hospitality, residential, and public realm. She is supporting Expo City Dubai, where she conducts existing built environment assessments, develops and delivers trainings on accessibility and inclusive design, and provides design reviews across ongoing projects. Her work also includes master-plan-level accessibility reviews in Abu Dhabi and Expo City, in Dubai.

ISSN: 2582 – 8304

The Role of Biophilic and Universal Design in Inclusive Master Planning.

Tzesika Iliovits, Inclusive Design Consultant

Abstract

At the master plan level, accessible and inclusive biophilic design integration is important to enhance community wellbeing and provide meaningful opportunities for all users. Biophilic design connects people to nature within the built environment, supporting mental and physical health, reducing stress, and alleviating sensory overstimulation. When inclusive design principles are integrated from the earliest stages. All users, regardless of age, ability, or background can benefit fully from these environments. Combining biophilic and inclusive design can take many forms, including enclosed or private garden areas, engaging experiences such as gardening, accessible pathways in public spaces, and barrier-free layouts, ensuring that the restorative and social benefits of nature are available to everyone.Without universal design principles, biophilic environments risk becoming exclusionary oroverwhelming rather than soothing.

Figure 1: Bosco Verticale, Milano

Introduction to biophilic design

Biophilic design is the connection between human and nature, integrating natural elements into physical spaces through architecture and design. (Neumann Monson Architects, 2022; Prasoon, 2023). It offers three key advantages: improved and enhances physical and mental well-being and enhances sustainability (Peverelli, n.d.). "Biophilic design can reduce stress, improve cognitive function and creativity, enhance overall well-being, and expedite healing" (Terrapin, 2014). Exposure to natural settings has been shown to enhance attention, memory, and cognitive performance, supporting both learning and everyday task execution. When thoughtfully designed, biophilic environments can also improve air quality and reduce noise pollution. (Peverelli, n.d.)

This article positions biophilic design as a complementary level to universal design, where nature-based elements enhance comfort and wellbeing when accessibility, sensory regulation, and legibility are addressed.

Figure 2: Isabella Stewart GardenFigure 3: Restaurant, Miami

Implementation of biophilic design

Biophilic design must be planned from the early strategic stages to create spaces where natural elements are fully integrated into a community's architecture and urban design. Design decisions are influenced by factors such as the local climate, which help determine the most effective solutions for the region (Terrapin, n.d.). These elements may include natural light, sustainable materials, and water features.

Figure 4: Expo City Dubai

"Indoor plants and organic materials may enhance indoor aesthetics and offer psychological benefits, but not all greenery is created equal." (Synktect, 2025). From an inclusive design perspective, the selection of non-toxic, and allergen free plant species is critical to ensuring that biophilic environments remain safe, usable, and welcoming for all users.

When carefully selected and integrated, these natural elements not only enhance aesthetics and well-being but also support a healthier,

more comfortable environment for all users. "Biomaterials such as wood, stone, and clay can be used in the design of structures in biophilic architecture.

These materials can create a warm and welcoming environment while also providing a link to the natural world"(Prasoon Design,2024).

Figure 5: Zoe Modern Greek Kouzina, Abu Dhabi

Benefits of universal and biophilic design

Universal and biophilic design must be studied hand in hand, considering the public realm and architecture simultaneously, and should be integrated from the earliest stages of master planning. "Inclusive biophilic design merges two fundamental approaches to human-centric spaces: the innate human connection to nature and universal accessibility" (Garden on the wall, 2025).

Environments that integrate natural elements and accessible design improve not only physical activity but also social interaction, fostering restorative experiences for all users. When these principles are embedded at early stages it creates a barrier-free community that is well connected with inclusive activities and circulation.

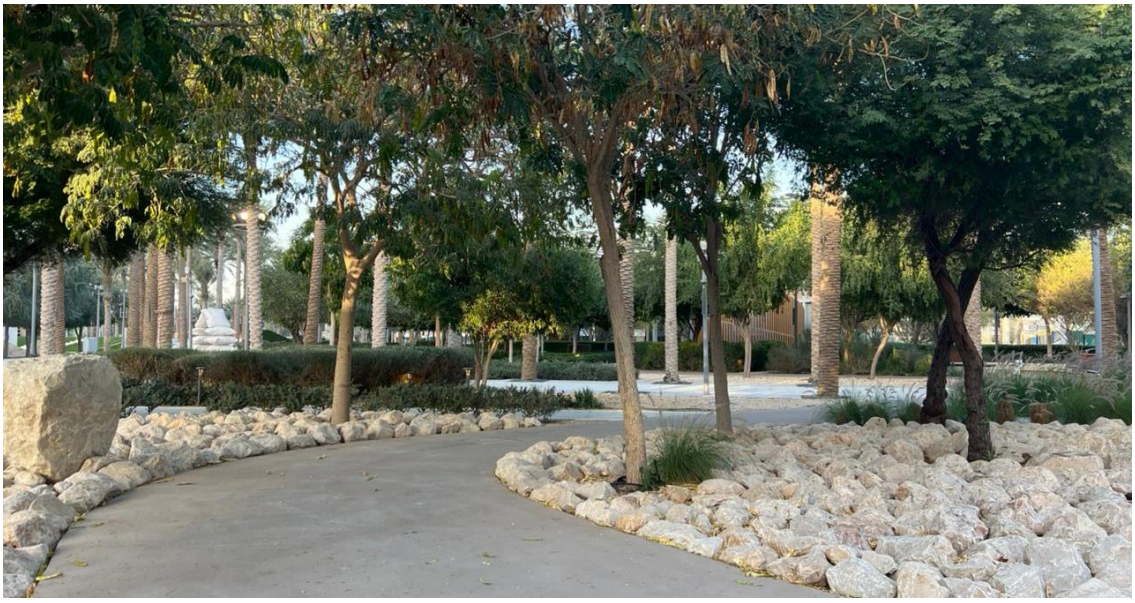

Figure 6: Expo City Dubai

Accessible communal gardens and outdoor areas are prime examples of spaces that enable individuals to participate in activities, stay active, and strengthen community bonds in a safe and natural environment. A clearly defined layout separating harvesting areas, work zones, and rest points supports spatial orientation for neurodivergent users (DCU, 2021). Design features such as operable elements within reach that can be used with closed fists, wide accessible paths, slip-resistant surfaces, raised garden beds with integrated seating, and appropriate toe and knee clearances for wheelchair users allow people of all ages and abilities to participate equally.

"Features like vegetation, water, sunlight, and natural materials create a more pleasing visual and tactile experience" (Neumann Monson Architects, 2022). Access to these spaces provides a restorative break from a busy world, enhancing both physical and mental well-being (Peverelli, n.d.).

When designing an inclusive biophilic space it is important that users can connect to their senses. (IJLAR, 2020) "Spaces around us are not just places to live and work; they deeply impact our thoughts, emotions, and overall well-being. Neuroarchitecture studies this interaction, revealing that certain designs can calm us down, make us happier, or even more productive." (Garden on the Wall,2024).

Figure 7: Expo City DubaiFigure 8: Don Carlo, Milano

The spatial layout is important to ensure minimum maneuvering clearances are maintained, while avoiding cluttered areas that could cause overstimulation for some individuals or hinder circulation for those with visual impairments.

Figure 9: Devocion Cafe, New York

The choice of materials plays a crucial role in shaping the mood and atmosphere of a space. "Colour perception is one of our senses that is directly related to our emotions" (IJLAR, 2020). Designing sensory-rich environments that allow all users, including those who are visually impaired, to explore, touch, and connect can include incorporating natural finishes, varied textures, and plants or greenery. These elements influence people's emotions and overall experience within the space. Research also shows that the sound of water has restorative and calming effects, fostering a sense of safety while reducing overstimulation (IBPA, n.d.). "Just as the sound emitted by the rain differs according to its intensity, the feeling it creates in the interior changes the atmosphere in the environment" (IJLAR, 2020).

Benefits of universal and biophilic Design on a master plan level

"Universal design is a significant social movement with the potential to liberate disabled people from disabling design and, in doing so, to contribute to broader objectives related to the eradication of disablism in society" (Steinfeld & Maisel, 2012). When inclusive biophilic design principles are embedded at the master-planning level, the integration of natural elements, such as trees and water features, further strengthens this approach by fostering connections with nature and local ecosystems. Features that attract birds and other wildlife contribute to positive sensory experiencessupport the creation of walkable communities that empower individualsto be active by enabling them to move independently in a barrier free public realm.

Figure 10: Expo City Dubai

Considering a master plan through the lens of biophilic and universal design at the earliest stages not only helps identify physical barriers but also supports recommendations that create a community beyond basic accessibility. "The intersection of biophilic and inclusive design represents a powerful opportunity to create environments that not only connect people with nature but ensure this connection is accessible to everyone."(Garden on the Wall,2025). This includes accessible routes connecting all buildings and outdoor areas, activity areas, playgrounds, nature elements as well as rest point pockets for users seeking privacy or quieter spaces.

Figure 11 Dubai Hills Park, Dubai

Inclusive play areas with accessible play components, green areas, and structured activities in a community allow children of diverse abilities and neurodevelopmenal profiles, including children on the autism spectrum, to explore, learn, and develop social and cognitive skills (Elsevier, 2019).

"Research shows that exposure to natural elements can reduce stress levels by up to 60%, enhance cognitive function by 20%, and significantly improve overall well-being – benefits that should be accessible to all occupants of designed spaces." (Garden on the Wall,2025)

Figure 12 Inclusive Playground, Massachusetts

Common issues when designing biophilic features on a master plan level

Although extensive research supports the benefits of universal and biophilic design, best practices and exemplary case studies are often neglected during implementation. Universal Design is frequently addressed at a late stage of the design process, rather than being embedded from the outset. Delayed integration of accessibility in planning leads to higher margin of errors, inaccessible design solutions, limit design flexibility, and often result in costly and complex corrective measures, particularly when infrastructure is already in place.

Beyond physical accessibility, sensory and material considerations also play a critical role in the success of biophilic environments. While visual and sensory connections to nature can enhance focus and well-being, excessive or poorly controlled stimuli such as dense planting, or layered natural soundscapes may lead to distraction or cognitive fatigue, particularly in learning, work, or high-use public environments (Synktect, 2025). This underscores the importance of balance in the selection and placement of amenities and natural features.

Figure 13: Restaurant, Beirut

Material choice further influences both inclusive and sensory experience. Natural materials such as wood, stone, and natural fabrics are recommended as they tend to reduce visual clutter and create calmer, more legible environments for autistic individuals. "The texture of the material not only affects the atmosphere of the space with its naturalness, but also every material used in the

interiorcontributes to the atmosphere with its effect on acoustics" (IJLAR, 2020).

Figure 14: Devocion Cafe, New York

Poorly selected surfaces and discontinuous pathways directly limit mobility and participation for diverse users, diminishing the potential physical, social, and mental health benefits of nature features in buildings and outdoor spaces.

Another overlooked issue in biophilic master planning is the insufficient provision of shade along paths and rest points, particularly in regions with extreme summer temperatures. Beyond thermal comfort and protection from heat stress, the absence of shaded pedestrian paths represents a missed opportunity to introduce layered vegetation that can also function as acoustic buffers, reducing noise impacts from the public realm to adjacent buildings and infrastructure while enhancing overall environmental comfort.

Biophilic and accessible design implementation on a master plan level

To successfully implement inclusive biophilic design at the master-plan level, several coordinated best practices must be applied from the earliest stages. Continuous, wide, and slip-resistant accessible routes should connect buildings, green areas, and community amenities, ensuring uninterrupted movement for users of all abilities.

Figure 15: Little Island, New York

Along these routes, rest points and viewing areas should be strategically integrated to support individuals who require pauses, quieter environments, or opportunities for recovery.

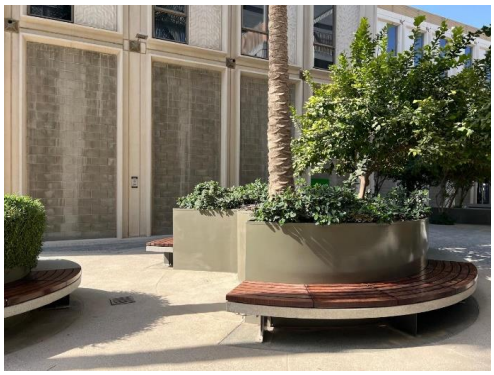

Figure 16 Rest Point Along An Accessible Route

Activity zones located along accessible routes such as inclusive play areas, gardening spaces, and adaptable outdoor facilities support participation across ages and abilities, promoting social interaction, learning, and engagement with nature (Prasoon Design, 2024; ScienceDirect, 2007).

Figure 17 Inclusive Playground, Boston

The integration of natural light along interior pathways and within communal spaces further enhances safety, visual comfort, and orientation, while supporting circadian rhythm regulation, which is particularly important for older adults (Neumann Monson Architects, n.d.). Carefully designed transitions between natural and artificial lighting reduce glare and high-contrast shadow patterns, ensuring environments remain legible, comfortable, and safe for all users.

In addition to these elements, specific design considerations are essential to support neurodivergent individuals and enhance overall community usability. Public spaces should be legible, uncluttered, and intentionally organized, using considered color palettes, visual contrast, lighting, and material finishes to reduce sensory overload and support orientation (DCU, 2021). "Built environments can be designed to create experiences similar to these found in nature. This

means reflecting the potential for active play, transitional spaces, refuge and spatial organization encountered in nature" (World Economic Forum, 2024).

Figure 18: Domino Park, New York

Figure 19: Hotel, Beirut

Accessible bicycle parking and car or van parking spaces should be positioned close to accessible building entrances, and both parking areas and entrances should be shaded to enhance thermal comfort, particularly in hot climates. In addition, clear, intuitive wayfinding

and signage are critical to support independent navigation, reducing confusion and frustration for neurodivergent users, older adults, and first-time visitors.

Figure 20: Expo City Dubai

Conclusion

At a policy and planning level, the development of inclusive andsustainable buildings is essential for ensuring equitable access and improving quality of life for all users. Well-planned accessible and biophilic environments enable people of all ages and abilities to navigate public spaces safely, engage in social activities, and benefit from enhanced physical and mental well-being (Prasoon,2023). Integrating these features from the earliest stages allows architects and planners to create communities that are not only barrier-free but also restorative, inclusive, and socially engaging.

Accessibility and biophilic design should be embedded as core planning principles rather than supplementary considerations. When incorporated strategically from the outset, supported by policies and coordinated frameworks, these principles reduce the need for costly retrofits, foster equitable participation, and promote safer, healthier,

and more sustainable built environments. As cities expand and populations age, inclusive biophilic design must move from aspiration to actual planning requirement. Ultimately, designing communities with accessibility and nature in mind transforms public spaces into inclusive environments where everyone can thrive, enjoy all spaces, and fully participate in community life.

References

Garden on the wall. (2025). Biophilic Design for Inclusive Spaces: Creating Universal Nature Connections. ***https://www.gardenonthewall.com/blog/biophilic-design-for-inclusive-spaces-creating-universal-nature-connections***

Synktek. (2025). The Downsides of Biophilic Design: When Nature Isn't Always Beneficial. ***https://synktect.com/the-downsides-of-biophilic-design-when-nature-isnt-always-beneficial***

Terrapin. (n.d.). 14 Patterns of Biophilic Design Improving Health & Well-Being in the Built Environment. ***https://www.terrapinbrightgreen.com/reports/14-patterns/***

Newmann Monson Architects. (2022). The Six Principles of Biophilic Design. ***https://neumannmonson.com/blog/six-principles-biophilic-design***

Elsevier. (2019). Exposure to nature for children with autism spectrum disorder: Benefits, caveats, and barriers. ***https://www.sciencedirect.com/science/article/abs/pii/S1353829218305756?via%3Dihub***

ResearchGate. (2021). THE AUTISM FRIENDLY UNIVERSITY DESIGN GUIDE.

https://www.researchgate.net/publication/351936605_THE_AUTISM_FRIENDLY_UNIVERSITY_DESIGN_GUIDE

Prasoon. (2023). Making Nature Accessible Through Biophilic Architecture & Its Principles. ***https://www.prasoon.design/making-nature-accessible-through-biophilic-architecture-its-principles***

World Economic Forum. (2024). Biophilic design benefits for neurodivergent people. https://www.weforum.org/stories/2024/04/biophilic-design-benefits-neurodivergent-people

DCU. (2021), The autism Friendly University Design Guide. https://www.researchgate.net/publication/351936605_THE_AUTISM_FRIENDLY_UNIVERSITY_DESIGN_GUIDE

Garden on the wall. (2024). Designing for the Mind: Neuroarchitecture's Role in Creating Serene Spaces. https://www.gardenonthewall.com/blog/designing-for-the-mind-neuroarchitectures-role-in-creating-serene-spaces

IJLAR. (2020). THE IMPACT OF BIOPHILIC DESIGN ELEMENTS ON THE ATMOSPHERIC PERCEPTION OF THE INTERIOR SPACE. https://www.researchgate.net/publication/348150900_THE_IMPACT_OF_BIOPHILIC_DESIGN_ELEMENTS_ON_THE_ATMOSPHERIC_PERCEPTION_OF_THE_INTERIOR_SPACE

IBPA. (n.d.). The sound of water in biophilic design: crafting serene spaces with natural acoustics. https://www.biophilicproducts.org/biophilic-design-blog/the-sound-of-water-in-biophilic-design/

Image Credits

All photographs featured in this article are owned by the author.