

Active Design Strategies in Urban Landscapes for Fostering Public Health and Physical Activity

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Abstract

The increasing prevalence of inactive lifestyles around the world emphasises the urgent need for urban environments that naturally encourage physical exercise and good health. Modern cities frequently make inactivity the default option, restrict access to green and blue spaces, and promote cars over people. While organisations like the Centre for Active Design have issued recommendations, a unified framework specifically designed for landscape architecture that connects public health concepts with design interventions at various scales is needed. This study addresses this gap by examining how Active Design principles can be applied across spatial scales to support physical wellbeing through physical activity. Using a literature-based and analytical methodology, the research reviews wellness practices across cultures and times, such as forest bathing, care farming, and blue-green engagement, alongside international Active Design frameworks from New York, Hong Kong, Sweden, and the United Kingdom. Comparative analysis and case studies were used to identify recurring spatial strategies, including connectivity, inclusivity, and environmental comfort.

The finding is that using these techniques at various scales, from street to neighbourhood, park, and city, can produce settings that organically support social interaction and mobility. The Multi-Scalar Active Design Matrix (MSADM), a framework that connects different types of physical activity with design principles and spatial features, is the outcome of the research. This framework offers actionable guidance for designers and policymakers aiming to create healthier, more inclusive, and resilient urban landscapes.

Keywords: Active Design, Healthy Cities, Urban Landscapes, Public Health, Physical Activity, Landscape Architecture

1. Introduction

Urban environments strongly influence levels of physical activity. Sedentary lifestyles have increased globally as cities prioritise vehicular movement, indoorised living, and built forms that discourage pedestrian engagement. The will to be active exists, but the spaces and opportunities often do not. The design of streets, parks, neighbourhoods, and cities therefore plays a critical role in shaping public health outcomes.

Active Design emerged as a response to rising inactivity rates, linking urban planning, public health, and environmental design. The Center for Active Design (2010) defines Active Design as an approach that uses the built environment to promote physical activity as part of everyday life. Global evidence demonstrates that walkability, access to nature, compact urban form, ecological networks, microclimatic

comfort, and inclusive public spaces significantly influence behavioural patterns related to movement and wellbeing.

Despite such frameworks, landscape architecture lacks a unified, multi-scalar model that directly connects physical activity science with spatial design interventions. This research addresses that gap by analysing how Active Design principles can be interpreted and applied across four spatial scales:

- Street / Linear Corridor
- Neighbourhood / Community
- Park / Recreational Landscape
- City / Urban Systems

The study culminates in the Multi-Scalar Active Design Matrix (MSADM), a tool linking human activity types, design principles, spatial elements, and degree of engagement.

2. Methods

This study uses a literature-based, analytical, and case-study driven methodology, as shown in Figure 1.

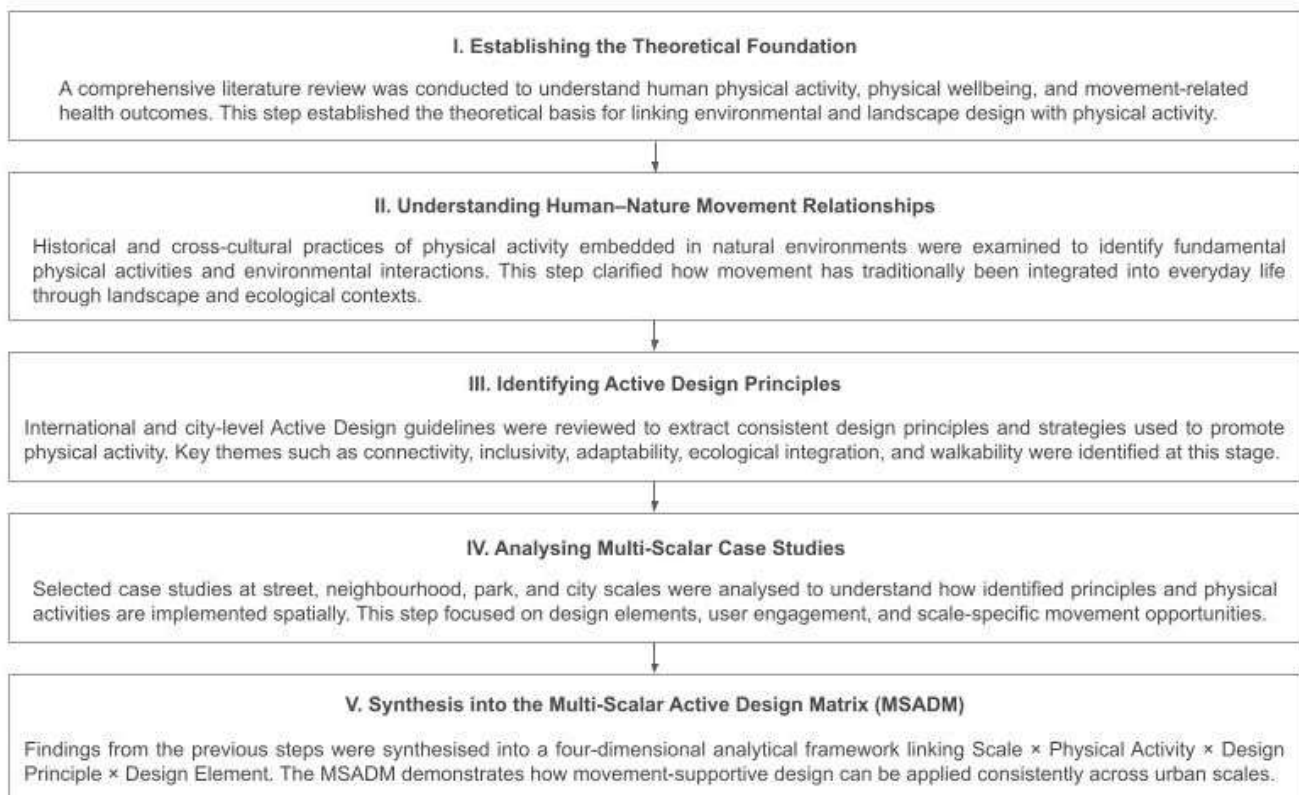


Figure 1: Methodology Chart

3. Literature Review

Physical activity is shaped significantly by environmental conditions, and extensive public health literature such as World Health Organization (WHO) global guidelines, American College of Sports Medicine (ACSM) recommendations, and environmental behaviour studies demonstrates how everyday movement depends on the design of surrounding spaces. Fundamental forms of physical activity such as walking, running, climbing, balancing, stretching, and restorative movement correspond to both health-related

components (endurance, strength, flexibility) and skill-related components (balance, coordination, agility), as outlined in Table 1. These relationships highlight the need for landscapes that provide varied terrain, sensory cues, and comfortable microclimates to support different movement intensities.

Table 1: Fundamental Physical Activity Types and Example Movements

Category	Type of Physical Activity	Example Activities (Everyday + Recreational)	Key References
Health-related Components	Aerobic Endurance	Walking, brisk walking, jogging, cycling, swimming, dancing, hiking, stair climbing	WHO (2018); Warburton & Bredin (2017)
	Muscular Strength	Carrying groceries, lifting, climbing playground frames, bodyweight exercises, and outdoor gym workouts	ACSM (2021); Corbin et al. (2004)
	Muscular Endurance	Gardening, low-resistance cycling, yoga flow, household chores, long-distance walking	ACSM (2021); WHO (2018)
	Flexibility	Stretching, yoga, tai chi, dance, and bending during planting or maintenance activities	Lowry et al. (2007); Corbin et al. (2004)
	Balance	Trail walking, stepping-stone paths, walking on uneven terrain, and balance boards	Zhou, Yuan, & Ma (2022)
Skill-related Components	Coordination / Agility	Ball games, skipping, skateboarding, playing catch, cycling in shared spaces	ACSM (2021); Corbin et al. (2004)
	Speed / Power	Sprinting, jumping, hill runs, short bursts of play or sport	ACSM (2021); Warburton & Bredin (2017)
	Restorative / Mindful Activity	Relaxation & Recovery Gentle stretching, mindful walking, breathing exercises, and forest bathing	Li et al. (2009); Song, Ikei, & Miyazaki (2016)

Human movement has long been intertwined with natural environments across cultures and historical periods. Practices such as Japanese Shinrin-yoku, horticultural therapy, blue-space engagement along coasts and rivers, wilderness immersion, and pilgrimage walking demonstrate that sensory richness, contact with vegetation and soil, and long-distance pathways inherently foster physical and psychological wellbeing. These traditions illustrate how ecological immersion through shade, texture, water, topography, and seasonal variation acts as a behavioural stimulus, encouraging spontaneous and intentional activity.

Contemporary Active Design can draw from these ecological precedents to reintroduce intuitive movement into urban settings.

A comparative review of global Active Design frameworks further reinforces shared design principles across regions. The NYC Active Design Guidelines (2010) emphasise walkability, compact urban form, and access to parks; Sweden’s “Healthy Communities” framework (2012) highlights density, proximity, and green-blue networks; and Hong Kong’s 2021 and 2023 guidelines prioritise climatic resilience, shaded pedestrian routes, and ventilation corridors. Sport England’s 2023 framework accentuates inclusivity, co-located facilities, multifunctional open spaces, and long-term community stewardship. Despite differences in climate and density, these frameworks converge around recurring principles: connectivity, accessibility, environmental comfort, equitable access to nature, and integrated networks that support daily physical activity. Together, they provide a theoretical foundation for understanding how urban landscapes shape health-supportive movement patterns across scales.

Table 2: Fundamental Physical Activity Types and Example Movements

Framework	Scale of Application	Key Principles	Focus Areas	Outdoor Landscape Strategies
NYC Active Design Guidelines (2010)	Street, Neighbourhood, City	Walkability, accessibility, connectivity, safety, inclusivity	Urban form, transport, parks, public space	Street trees, sidewalks, cycling networks, and park accessibility
Sweden – Towards Healthy Communities (2012)	Neighbourhood, City, Regional	Density, diversity, proximity, green-space access	Mixed-use urban form, active transport	Compact development, green corridors, blue-space integration
HKIUD Active Design Recommendations (2021)	Site, Street, City	Connectivity, climate resilience, and inter-agency collaboration	Pedestrian and cycling networks, thermal comfort	Covered walkways, waterfronts, and ventilation corridors
Hong Kong Feasibility Study (2023)	Street, Neighbourhood, District	Microclimate design, integration, inclusion	Urban comfort, active loops, mixed mobility	Shaded pedestrian loops, airflow design, green buffers
Sport England Active Design Guide (2023)	Site, Neighborhood, City	Inclusivity, flexibility, quality, and long-term management	Multifunctional open spaces, active transport	Co-located facilities, adaptive landscapes, community programming

4. Case Study and Insights Across Scales

Four international precedents were examined to understand how spatial design shapes both the type and quality of physical activity across varying urban scales. Together, these projects illustrate how movement is influenced not only by programmatic provision but by spatial continuity, environmental comfort, and sensory engagement.

The High Line in New York exemplifies the role of continuous linear pathways in promoting habitual, everyday movement (Figure 2). Its uninterrupted pedestrian routes, gentle gradients, shaded seating pockets, and layered planting transform a former elevated railway into a health-supportive public corridor. By encouraging slow-to-moderate walking, pausing, viewing, and informal social interaction, the project demonstrates how microclimatic comfort, sensory richness, and spatial sequencing can elevate routine mobility into a more engaging and restorative urban experience.

Superkilen Park in Copenhagen (Figure 3) illustrates the potential of neighbourhood-scale landscapes to support agility, coordination, informal play, and cultural expression. Its colourful surfaces, playful slopes, varied textures, and curated global artefacts create an environment that invites intuitive, multi-directional movement for all ages. The park demonstrates how inclusive identity-oriented design contributes to both social cohesion and everyday physical activity.



Figure 4: Spatial / Design Elements and Supported activities at The High Line, New York.

(Note. Base map adapted from Maps-NYC. Additional images adapted from NYC Economic Development Corporation and The High Line official website. Analysis and annotations by the author.)

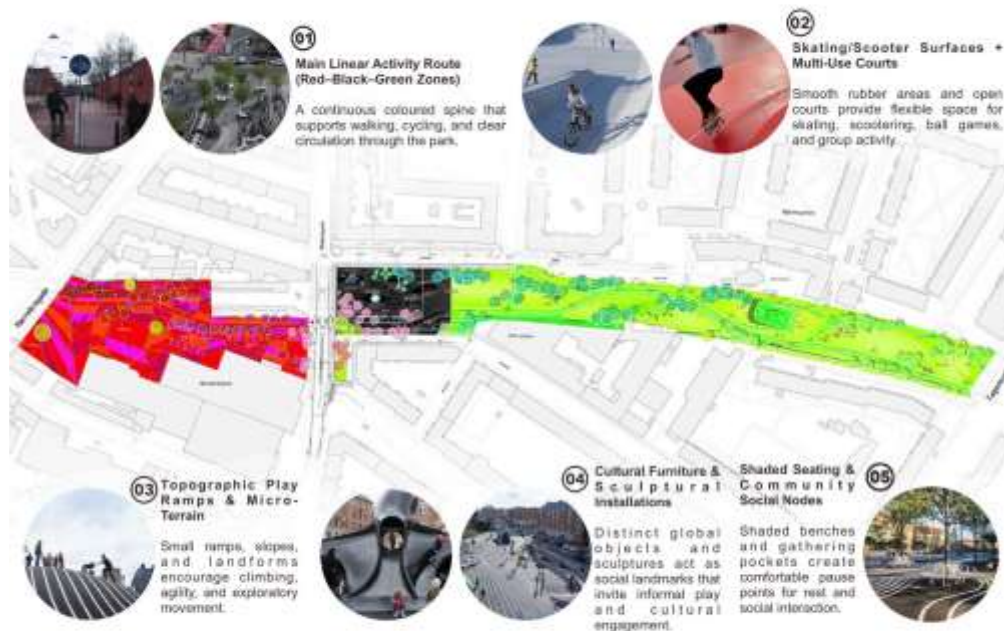


Figure 5: Spatial / Design Elements and Supported activities at Superkilen Park.

(Note. Base map adapted from Wikimedia Commons Additional images adapted from Landezine Dezeen and ArchDaily. Analysis and annotations by the author.)

The Athletics Exploratorium in Odense (Figure 6) highlights how parks can foster unstructured physical literacy through sculptural topographies, looping tracks, climbing elements, and expansive lawns. By integrating terrain-led movement opportunities rather than segregated sports zones, the landscape supports endurance, balance, strength, and exploratory play simultaneously. It demonstrates the role of open, adaptable environments in sustaining intergenerational activity.



Figure 7: Spatial / Design Elements and Supported activities at Athletics Exploratorium, Odense.

(Note. Base map adapted from Instagram. Additional images adapted from Keingart Architects and LOA Foundation. Analysis and annotations by the author.)

At the city scale, Queen Elizabeth Olympic Park in London (Figure 8) integrates long-distance walking and cycling loops, riverside trails, sports venues, playgrounds, and biodiverse gardens into a comprehensive movement network. By linking residential areas, ecological corridors, and recreational destinations, the park transforms physical activity into a city-wide experience. Its connectivity, accessibility, and variety of spatial programs exemplify how urban systems planning can embed movement into daily routines.



Figure 9: Spatial / Design Elements and Supported activities at Queen Elizabeth Olympic Park, London.

(Note. Base plan adapted from Green Flag Award – Olympic Park Executive Summary Management Plan. Additional images adapted from Queen Elizabeth Olympic Park official media and Inhabitat Analysis and annotations by the author.)

Across these four scales, common spatial themes emerge: continuity, sensory interest, microclimatic comfort, accessibility, and multifunctionality. Landscapes that incorporate these qualities tend to support a broader range of activities spanning light, moderate, and vigorous intensities and appeal to diverse age groups and abilities. These case studies affirm that well-designed public landscapes can transform physical activity from a structured effort into an effortless and enjoyable part of everyday life.

By distributing opportunities for movement across multiple scales and contexts, these landscapes enable users to engage in varied physical activities throughout daily routines, reinforcing long-term participation and behavioural consistency.

Table 3: Correlation of Physical Activities and Design Elements Across Case Studies.

Scale	Case Study	Supported Physical Activities	Spatial / Design Elements Enabling Activity
Street / Linear	The High Line (New York City)	Walking-based movement: walking, brisk walking, slow/mindful walking, long-distance walking.	Uninterrupted elevated walkway, gentle gradients, and shaded seating pockets.
		Vertical movement: stair climbing. Light mobility: stretching, leaning, resting.	Frequent staircases, accessible elevators, and terraced seating.
		Sensory & social: viewing, pausing, social strolling.	Viewing platforms, amphitheatre steps, and planting-rich edges encourage pausing, observing, and informal social gathering.
		Children’s play: climbing/balancing in play beams.	Pershing Square Beams integrate embedded play features.
Neighbourhood / Community	Superkilen Park (Copenhagen)	Active mobility: walking, jogging (light), cycling.	A clearly defined linear route through the park, supported by wide, colour-coded surfaces.
		Agility + play: skating/scooter, balance play, playground climbing.	Rubberised surfaces, sculptural play objects, and playful slopes create an intuitive terrain.
		Social sport: informal ball games, skipping.	Open paved courts and flexible plazas enable informal ball games and group play by providing generous flat surfaces and culturally themed furniture that accommodate a variety of social activities.
		Flexibility: stretching, light mobility.	Shaded, comfortable pockets with smooth surfacing support stretching and light mobility exercises.
		Restorative: socialising, cultural engagement, mindful pausing.	Clusters of shaded seating, artwork, and culturally expressive objects within the larger activity landscape.

Scale	Case Study	Supported Physical Activities	Spatial / Design Elements Enabling Activity
Park Recreational	/ Athletics Exploratorium (South Bend / Landscape Forms)	Endurance: walking, jogging, running, sprinting.	Looped tracks with varied gradients that maintains visual openness and supports continuous movement across the park.
		Strength: climbing frames, bodyweight workouts, outdoor gym elements.	Integrated climbing frames, nets, and bodyweight stations are positioned within open clearings.
		Agility: balance beams, stepping features, micro-ramps.	Balance beams, stepping features, and small ramps embedded in the landscape.
		Flexibility: stretching zones, yoga on lawns.	Calm, open lawns and soft-surfaced pads at the park edges.
		Play: full-body exploration for kids.	Multi-level terrains and tactile surfaces encourage exploratory, full-body play.
		Wheeled activity: beginner skating/scootering.	Smooth continuous paths with gentle curves without conflict with other users.
City Regeneration	/ Queen Elizabeth Olympic Park (London)	Aerobic: walking, cycling, jogging.	Extensive pedestrian and cycling routes, woven through riverside corridors and promenades.
		Endurance: long-distance walking loops.	Multi-kilometre loops connected through terraced landscapes and open lawns providing varied scenery and rest points.
		Play: children's play, informal running/jumping.	Dedicated play areas like Tumbling Bay combine natural materials and varied topography to support climbing, running, and active exploration.
		Flexibility: stretching, yoga (informal), meditative use.	Quiet green pockets and soft-grassed zones away from high-intensity areas.
		Restorative: riverside trails, garden walks.	Riverside boardwalks, planting-rich gardens, and wetland edges.
		Sport (formal via venues): cycling (Velopark), swimming (Aquatics Centre).	Purpose-built facilities such as the Velopark and Aquatics Centre are linked by accessible pedestrian routes, enabling event-based physical activity within a cohesive movement network.

5. Synthesis and Conclusion

To translate these findings into a practical tool for designers, the Multi-Scalar Active Design Matrix (MSADM) was developed, synthesising the relationships between activity types, design principles, and spatial elements (Table 4).

The matrix organises supported activities across four scales:

- Street scale: prioritises walkability, shading, visual continuity, and incidental flexibility.
- Neighbourhood scale: supports agility, play, social gathering, and cycling through permeable grids, playful topography, and interactive furniture.
- Park scale: focuses on endurance, strength, balance, and exploratory movement using varied terrains, multifunctional stations, and open lawns.
- City scale: enables long-distance walking, cycling, formal sport, and restorative activity through green–blue corridors, distributed sports hubs, and accessible large parks.

A key contribution of the MSADM lies in its emphasis on the degree of engagement distinguishing whether activities are core, supported, or incidental at each scale. This distinction allows designers and planners to assess whether environments actively encourage movement or merely permit it, informing targeted improvements in spatial configuration, material selection, and microclimatic design.

Table 4: Multi-Scalar Active Design Matrix (MSADM).

Supported Physical Activities	Active Design Principles	Key Design Elements / Strategies	Degree of Engagement
STREET / LINEAR CORRIDOR SCALE			
Walking & Jogging	Walkability & continuity	Continuous shaded paths, clear sightlines	High
Balance & Coordination	Sensory engagement	Tactile paving, ramps, elevation changes	Medium
Flexibility / Stretching	Accessibility & comfort	Railings, seating edges, widened pockets	Low
Play (Incidental)	Informal engagement	Embedded play beams (e.g., Pershing Beams)	Low
Restorative / Social Strolling	Comfort, microclimate	Shaded seating, viewing decks	Medium
NEIGHBOURHOOD / COMMUNITY SPACE SCALE			
Walking / Cycling (Local Mobility)	Permeability & accessibility	Connected grids, shared streets, slow streets	Medium
Agility & Coordination	Inclusivity & participation	Playable topography, micro-ramps	High
Play (Organised & Free)	Cultural identity as engagement driver	Cultural artifacts, interactive furniture	High

Strength & Flexibility	Adaptability of use	Climbing frames, soft-surface rest zones	Medium
Social / Restorative Gathering	Community cohesion	Shaded edges, social pockets	High
PARK / RECREATIONAL LANDSCAPE SCALE			
Running / Jogging / Walking	Spatial adaptability	Mixed-surface tracks, gradient variation	High
Strength & Endurance	Multi-functionality	Sculpted terrains, fitness stations	High
Balance & Flexibility	Age inclusivity	Tactile materials, open lawns	High
Play (Exploratory)	Sensory-rich environments	Multi-level play terrain	High
Restorative Walking	Biophilic integration	Wetlands, nature loops, shaded groves	Medium
CITY / URBAN SYSTEMS SCALE			
Long-Distance Walking / Cycling	Connectivity across networks	Green–blue corridors, district links	High
Strength & Team Sports	Universal accessibility	Distributed sports hubs, transit-supported venues	Medium
Flexibility / Restorative Activities	Ecological integration	Large parks, waterfront trails, shaded promenades	High
Play (District-Wide)	Distributed opportunity	Formal & informal play nodes across districts	Medium
Social Mobility / Gathering	Integrated public realm	Plazas, transit plazas, event spaces	Medium

This study demonstrates that embedding physical activity into urban landscapes requires a multi-scalar understanding of movement and environment. Streets, neighbourhoods, parks, and cities each support distinct but overlapping activity types. When connected through continuous networks and designed with comfort, inclusivity, and biodiversity in mind, these environments transform physical activity from a deliberate action into an effortless daily habit.

The MSADM provides a structured yet flexible tool that translates human activity needs into design principles across scales. It reinforces that active cities are not produced through isolated interventions but through layered, interconnected landscapes where movement is supported at every step. Future research may strengthen this work through behavioural studies, microclimatic performance analysis, and application in varied climatic and socio-cultural contexts.

6. Acknowledgement

It is with gratitude that I submit this article. The research process has strengthened my academic understanding and contributed meaningfully to my personal and professional growth.

I sincerely thank the School of Planning and Architecture, Vijayawada, for providing a supportive academic environment. I am especially grateful to my dissertation guide, Dr. Shanmuga Priya G, for her guidance, insightful feedback, and encouragement throughout this work.

I also thank my family and friends for their constant support and belief, which have been invaluable during this journey.

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