Activating Outdoor Recreation Space - People Connection Playbook

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SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN | Lee Kuan Yew Centre for Innovative Cities

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All photographs and illustrations in this playbook are from the LKYCIC team, unless otherwise stated.

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Introduction: What is This Playbook About

This playbook is about activating outdoor recreation space and people interaction to enhance its congruence or person-environment fit (P-E fit). P-E fit describes the compatibility between users (personal characteristics) and the outdoor recreation settings they are interacting with (environmental characteristics).[1] The notion of P-E fit is often defined as a key antecedent of user motivation, satisfaction, place attachment and wellbeing.[2] The suggestion is that a good P-E fit in outdoor recreation promotes wellbeing and can lead to increased enjoyment, motivation, and contentment, while a poor fit will result in unfavourable experiences such as stress, frustration, and even negative health outcomes.[3] Understanding and activating person-environment interaction is a foundational step in the provision of outdoor recreation spaces that can optimise people's outdoor recreation experiences and the development of place-based connections.

The potential of outdoor recreation space in urban life cannot be overlooked. Access to local greenspaces like parks, community gardens, rooftop gardens, are among the trends driving growth in urban areas.[4] This can be traced to a growth in outdoor recreation. The 2024 Outdoor Participation Trends Report reveals an increase in outdoor recreation participation base (across activities and demographics—older adults and women) in USA in 2023, to a record of 175.8 million participants or 57.3% of US population.[5]

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1 Tsaur, S.-H., Liang, Y.-W., & Lin, W.-R. (2012). Conceptualization and measurement of the recreationist-environment fit. *Journal of Leisure Research*, *44*(1), 110–130.

2 Kahana, E., Lovegreen, L., Kahana, B., & Kahana, M. (2003). Person, environment, and person-environment fit as influences on residential satisfaction of elders. *Environment and Behaviour,* 35(3), 434–453. https://doi.org/10.1177/0013916503035003007; Mishra, H. S., Bell, S., Vassiljev, P., Kuhlmann, F., Niin, G., & Grellier, J. (2020). The development of a tool for assessing the environmental qualities of urban blue spaces. *Urban Forestry & Urban Greening*, 49, 126575. https://doi.org/10.1016/j.ufug.2020.126575

3 Macques, B., et al. (2022). The importance of outdoor spaces during the COVID-19 lockdown in Aotearoa, New Zealand. *Sustainability*, *14*(2), 7308. https://doi.org/10.3390/su14127308

4 Playcore. (n.d.). 15 trends that are driving growing communities. *Placemaking, 7*. https://www.playcore.com/placemaking-15-trends

5 Outdoor Foundation. (2024). *2024 Outdoor Participation Trends Report.* Outdoor Industry Association. https://

The focus here is on outdoor recreation spaces in high-rise, high-density urban neighbourhoods, an understudied area in outdoor recreation. These neighbourhoods are increasingly acknowledged to offer urban advantages such as more efficient infrastructure, walkability, and sustainable growth.[6] But high-rise, high-density neighbourhoods are not without challenges. These include, e.g., potential social isolation and lack of green spaces, necessitating careful planning and design to maintain urban liveability.

Drawing on empirical evidence from Singapore, across five types of outdoor recreation space in three planning areas, and using mixed methods research, the playbook offers information on the spatial nuances and social needs of high-rise, high-density neighbourhoods. Focus is with understanding and responding to residents' lived recreation experiences—a crucial yet often overlooked aspect of outdoor recreation. The analysis is informed by study findings on when, who, where, how, why, and which outdoor spaces are used or avoided in residents' daily life within high-rise, high-density neighbourhoods. Singapore with over 80% of resident population living in high-rise, high-density public housing (the tallest at 50 storeys while the tallest private housing is 70 storeys) is often cited as a compelling case study of biophilic urbanism.[7]

In addition, international case studies are included to illustrate the approaches and strategies presented in the playbook. The intent is to provide a range of leading examples and good practices that illustrate innovative ways to provide for and engage the community. The playbook identifies four key principles to activate person-environment connection and P-E fit in outdoor recreation spaces:

- People-centric design.
- Diverse provision and spaces.
- Varied programming.
- Placekeeping for long-term sustainability.

Cities often vary in their context, circumstance, and development. There is no one-size-fits-all outdoor recreation space development. Readers are advised to adopt and adapt the principles, strategies, and examples as appropriate.

outdoorindustry.org/article/2024-outdoor-participation-trends-report/

6 Jenks, M., & Burgess, R. (2010). *Compact Cities: Sustainable Urban Forms For Developing Countries.* Spon Press.

7 Newman, P. (2014). Biophilic urbanism: A case study on Singapore. *Australian Planner*, *51*(1), 47–65. https://doi.org/10.1080/07293682.2013.790832

Playbook Structure

Following this Introduction, the playbook is structured into eight chapters.

Introduction

What is this playbook about

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CHAPTER 01

Why Outdoor Recreation Space

Why Outdoor Recreation Space

Outdoor recreation space supports numerous city goals including facilitating a wide range of outdoor recreation pursuits, attracting talent and visitors, delivering health benefits, fostering social cohesion, improving quality of life and urban resilience.[8] Rapid urbanisation, population ageing and the recent COVID-19 pandemic have sharpened the need for outdoor recreation space in urban areas.[9]

1.1. Enhance Recreation Value

Outdoor recreation spaces offer settings for a wide range of outdoor recreation (Figure 1.1), from active (e.g., exercise, biking) to passive (e.g., sitting, people watching), and individual (solitude reflection) to group (socialisation) activities (Box 1.1). Outdoor recreation brings many benefits including personal enrichment, health, social and economic value. Economic data by the US Department of Commerce Bureau of Economic Analysis show that outdoor recreation continues to be a major driver of US economy, jobs, and local communities. In 2023, outdoor recreation generated US$1.2 trillion in economic output (2.3% of GDP), and 5 million jobs (3.1% of employment).[10]

8 Fok, K. W. K., & Law, W. W. Y. (2018). City re-imagined: Multi-stakeholder study on branding Hong Kong as a city of greenery. *Journal of Environmental Management*, *206*, 1039-1051; Fagerholm, N., Eilola, S., Arpin, I., Karjalainen, H., Broberg, A., & Samuelsson, K. (2022). Analysis of pandemic outdoor recreation and green infrastructure in Nordic cities to enhance urban resilience. NPJ *Urban Sustainability*, 2(1), 1–14. https://doi.org/10.1038/s42949-022-00068-8; Jennings, V., Larson, L., & Yun, J. (2016). Advancing sustainability through urban green space: Cultural ecosystem services, equity, and social determinants of health. *International Journal of Environmental Research and Public Health, 13*(2), 196. https://doi.org/10.3390/ijerph13020196

9 Holmes, E. A., O'Connor, R. C., Perry, V. H., Tracey, I., Wessely, S., Arseneault, L., ... & Bullmore, E. (2020). Multidisciplinary research priorities for the COVID-19 pandemic: A call for action for mental health science. *The Lancet Psychiatry*, 7(6), 547–560. https://doi.org/10.1016/S2215-0366(20)30168-1

10 Outdoor Recreation Roundtable. (2024). *New Data Shows Outdoor Recreation Is A $1.2 Trillion Economic Engine, Supporting 5 Million American Jobs.* https://recreationroundtable.org/news/new-data-shows-outdoor-recreation-is-a-1-2-trillion-economic-engine-supporting-5-million-american-jobs/

Figure 1.1. Variety of outdoor recreation activities

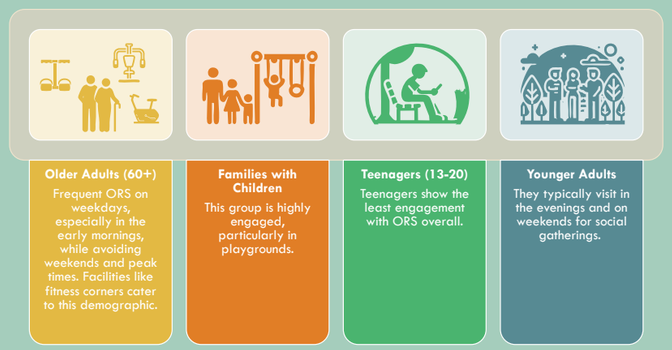
Source: Various sources[11]

Box 1.1. Various usage of outdoor recreation space in Singapore

Findings from our 2023 Outdoor Recreation Space population survey in Singapore show that residents visit outdoor recreation space, near and far from home, for a range of activities. Walking is the most common activity, followed by sitting, socializing, cycling, and jogging. Taking a break and mental health are the most cited reasons of visit, highlighting outdoor recreation space as a key space for stress relief.

Participation in activities differ across different demographic groups. Older adults (age 60+) would mostly walk and relax, while younger groups socialise, cycle, and jog in outdoor recreation space. People aged 30–44 are more likely to accompany children. Although sitting and walking are common across all age groups, younger people (age 15–44) tend to prioritise exercise and nature, while people aged 45+ focus more on physical and mental health related pursuits. Women prefer walking and relaxing, while men engage in more vigorous activities.

Age-specific usage patterns



Source: Kato, Y., Chan, F., Wang, J., & Yuen, B. (2024). *Outdoor Recreation Space Community Survey Technical Report* (Unpublished technical report).

11 Ministry of the Environment Government of Japan (n.d.). *Chichibu-Tama-Kai National Park.* Ministry of the Environment Government of Japan. Retrieved from https://www.env.go.jp/en/nature/nps/park/chichibu/guide/view.html; Kayden, J. S. (2011). *Privately owned public space.* Advocates for Privately Owned Public Space. Retrieve from https://apops.mas.org/pops/m010004; City of Melbourne (n.d.). *Birrarung Marr*. City of Melbourne. Retrieved from https://www.melbourne.vic.gov.au/community/parks-open-spaces/major-parks-gardens/Pages/birrarung-marr.aspx

1.2. **Create Attractive City**

Outdoor recreation spaces can be used to enhance the public image and identity of the city. Urban greenery and outdoor recreation spaces feature prominently among many cities including global cities and liveable cities, forming unique places. Cities and countries have utilised green infrastructure and outdoor recreation spaces in liveability branding efforts. These include, e.g., adaptive reuse of disused railway infrastructure (Box 1.2) and garden city initiatives (Box 1.3). These strategies not only enhance city identity and tourist visitation but also promote urban resilience and sustainability.[12] Research shows that visitors often associate parks and greenspaces with a city's aesthetic appeal, while residents view them as essential for improving quality of life.[13] This dual perception can sometimes lead to tension, requiring city branding through outdoor recreation space to balance aesthetic appeal with practical functionality such as recreation and relaxation.[14]

Box 1.2. High Line, New York City

The High Line in New York City, USA, a 1.54-mile public park, transformed an abandoned railway into a vibrant urban space. Originally a street-level rail line in the mid-1800s, it became the West Side Elevated Line before falling into disuse. Facing demolition, Friends of the High Line launched a campaign to preserve it. In 1999, CSX Transportation sought reuse proposals. A 2003 international competition drew 720 ideas from 36 countries. Zoning changes from 2004–2006, supported by Mayor Bloomberg and the City Council, enabled park development. The first section opened in 2009, with later expansions, e.g., at the Rail Yards and the Spur. The park concludes at Hudson Yards with seating steps offering views of the city.

High Line blends history and design with gardens, art installations, and public spaces

Source: Friends of the High Line. (n.d.). *Park Features.* High Line. Retrieved from https://www.thehighline.org/park-features; Friends of the High Line. (n.d.). *History*. High Line. Retrieved from https://www.thehighline.org/history

12 Chan, C. S., & Marafa, L. M. (2017). How a green city brand determines the willingness to stay in a city: the case of Hong Kong. *Journal of Travel & Tourism Marketing*, *34*(6), 719-731

13 Chan, C. S., Peters, M., & Marafa, L. M. (2015). Public parks in city branding: Perceptions of visitors vis-à-vis residents in Hong Kong. *Urban Forestry & Urban Greening, 14*(4), 1157-1165.

14 Chan, C. S., Peters, M., & Marafa, L. M. (2015). Public parks in city branding: Perceptions of visitors vis-à-vis residents in Hong Kong. *Urban Forestry & Urban Greening, 14*(4), 1157-1165.

Box 1.3. Garden City, Singapore

With rapid urbanisation and industrialisation, Singapore has implemented the garden city vision since 1967 to improve quality of life, cool buildings, reduce outdoor temperatures and make Singapore a more attractive destination for tourists and foreign investment as well as more sustainable. Implementation strategies involve,

- Tree planting (over 55,000 new trees were planted by the end of 1970).
- A widening range of outdoor recreation and greenspaces, green walls, community involvement (e.g., adopt-a-park, community gardens).
- Incentives like green plot ratio, and Landscaping for Urban Spaces and High-rises programme to encourage private developers to include sky terraces, gardens, greenery and plants with a higher leaf area index in tall building projects.

Source: Er, K. (2021). *Transforming Singapore into a City in Nature.* Centre for Liveable Cities.; National Parks Board. (n.d.). *City in Nature Vision.* Retrieved from https://www.nparks.gov.sg/who-we-are/city-in-nature-key-strategies.

1.3. **Deliver Multiple Health Benefits**

Outdoor recreation space can contribute to overall health and wellbeing, offering numerous physical, social, and mental health benefits (Figure 1.2). Several countries including Denmark have started to highlight the health value of urban greenspace utilisation—25% of health policies in Denmark state that urban greenspace has a positive impact on people's health and wellbeing.[15]

Figure 1.2. Health benefits of outdoor recreation space

15 Schipperijn, J., Ekholm, O., Stigsdotter, U. K., Toftager, M., Bentsen, P., Kamper-Jørgensen, F., & Randrup, T. B. (2010). Factors influencing the use of green space: Results from a Danish national representative survey. *Landscape and Urban Planning*, *95*(3), 130–137. https://doi.org/10.1016/j.landurbplan.2009.12.010

By promoting active travel, physical activity, exercise, and recreation opportunities, outdoor recreation space contributes to enhancing physical health.[16] In addition to amenities that support physical activity, offering healthy eating options within and around outdoor recreation space can amplify their health benefits (Box 1.4).

Box 1.4. Healthy eating options and outdoor recreation space

Our Nutritional Landscape Study of 15,614 adults in Singapore examined how outdoor recreation greenspace and local food environments impact overweight risk. Data from 2016–2021 linked built environment features, food outlets, and health indicators including BMI.

A geospatial analysis of 14,764 food outlets found that a one-unit increase in local availability of calories, carbohydrates, total fat, and saturated fat raised the risk of being overweight by 11%, 10%, 12%, and 11%, respectively. More greenspace in residential areas was linked to lower overweight risk. Compared to low greenspace, the odds of being overweight dropped by 47% for medium greenspace and 17% for high greenspace. After adjusting for saturated fat availability, the risk reduction increased to 99% and 88% respectively, highlighting the strong role of greenspace in mitigating overweight risk.

Source: Dickens, B. L. (2024). *Profiling the Role of Outdoor Recreational Green Space, Energy Density, and Macronutrient Exposure With Overweightness in 15,614 Adults in Singapore* (Unpublished technical report).

Outdoor recreation spaces also offer settings for socialisation—to meet people and participate in social and group activities. They are important social places, and a natural play space for children, youth, and adults to develop social skills, learn how to interact with others, and build competence and confidence in social situations. Many cities including Melbourne have leveraged the social function of outdoor recreation space to enhance environmental awareness and conduct outdoor education programmes for children and young people (Box 1.5).

16 Renalds, A., Smith, T. H., & Hale, P. J. (2010). A systematic review of built environment and health. *Family and Community Health, 33*(1) 68-78.; Abildso, C. G., Zizzi, S., Abildso, L. C., Steele, J. C., & Gordon, P. M. (2007). Built environment and psychosocial factors associated with trail proximity and use. *American Journal of Health Behavior, 31*(4), 374–383.; Berke, E. M., Koepsell, T. D., Moudon, A. V., Hoskins, R. E., & Larson, E. B. (2007). Association of the built environment with physical activity and obesity in older persons. *American Journal of Public Health*, *97*(3), 486–492.; Bertram, C., & Rehdanz, K. (2015). The role of urban green space for human well-being. *Ecological Economics*, *120*, 139–152. https://doi.org/10.1016/j.ecolecon.2015.10.013; Boulange, C., Gunn, L., Giles-Corti, B., Mavoa, S., Pettit, C., & Badland, H. (2017). Examining associations between urban design attributes and transport mode choice for walking, cycling, public transport, and private motor vehicle trips. *Journal of Transport & Health, 6,* 155–166. https://doi.org/10.1016/j.jth.2017.07.007

Box 1.5. Outdoor education programmes in Melbourne

A range of outdoor education are organised in Melbourne, Australia for children and young people:

- Park Rangers and Junior Rangers programmes offer valuable environmental education.
    - Park rangers conduct walks, field classes, and provide educational materials. They also take part in school holiday programmes, community festivals, and tree-planting events.
    - Junior Rangers programme, designed for children aged 5 to 10, introduces them to local wildlife through outdoor adventures in wetlands, teaching them how daily activities impact the environment.
- Nature Stewards Programme, launched in 2020, is a short, affordable ecological course for adults aged 18 and above. It provides hands-on experiences to help participants explore their environment, build confidence in nature, and engage more actively in conservation efforts.

Park Rangers/Junior Rangers (left), Nature Stewards Programmes (right)

Source: City of Melbourne (n.d.)

Source: City of Melbourne. (n.d.). *Park Rangers and Education Programs.* City of Melbourne. Retrieved from https://www.melbourne.vic.gov.au/community/parks-open-spaces/park-rangers-education/Pages/park-rangers.aspx; City of Melbourne. (n.d.). *Urban Nature Awareness and Education.* City of Melbourne. Retrieved from http://www.melbourne.vic.gov.au/community/greening-the-city/urban-nature/Pages/awareness-education.aspx

For older adults, these spaces offer a place to meet others, make friends, watch people and activities, fostering opportunity to leave the house, be socially connected, and reducing social isolation. International evidence continually suggests that older adults with reduced life-space mobility and social disconnection are at higher risk for various physical and mental conditions including cognitive decline, high blood pressure, heart disease, obesity and premature mortality.[17] Social activities, both formal and informal, organised and spontaneous can help promote social connection, strengthening community cohesion, inclusivity, and contributing to improved emotional and social wellbeing[18] (Box

17 Santini, Z. I., Jose, P. E., Cornwell, E. Y., Koyanagi, A., Nielsen, L., Hinrichsen, C., Meilstrup, C., Madsen, K. R., & Koushede, V. (2020). Social disconnectedness, perceived isolation, and symptoms of depression and anxiety among older Americans (NSHAP): A longitudinal mediation analysis. *The Lancet Public Health, 5*(1), e62–e70. https://doi.org/10.1016/S2468-2667(19)30230-0

18 Peters, K., Elands, B., & Buijs, A. (2010). Social interactions in urban parks: Stimulating social cohesion?. *Urban Forestry & Urban Greening*, *9*(2), 93-100.; Holtan, M. T., Dieterlen, S. L., & Sullivan, W. C. (2015). Social life under cover: tree canopy and social capital in Baltimore, Maryland. *Environment and Behaviour, 47*(5), 502-525.; Ward Thompson, C., Aspinall,

1.6).

Box 1.6. Formal and informal social activities in Singapore

Examples of formal and informal social programming in outdoor recreation space in Singapore include:

Formal/programmed activities: a top-down approach governs permanent facilities (e.g., community gardens, fitness areas, dog parks) and temporary events (e.g., festivals) for social activities

Jurong Lake Gardens	The ActiveSG pavilion offers structured fitness facilities (gym, pool, table tennis). Working adults and older adults visit in mornings/evenings; families frequent during weekends. Accessibility features attract users with mobility challenges, and high Indian participation reflects cultural inclusivity.
Community Gardens	Community gardens are generally restricted to specific communities; these residents have dedicated use for gardening activities though their produce (e.g., fruit, vegetable) are often harvested for distribution among the wider community.
Temporary Events	Festivals such as the Mid-Autumn Festival at Alexandra Canal Linear Park, boost short-term outdoor recreation space social usage, especially among families.

Informal activities: local interests and social groups shape informal recreation

Exercise & Wellness	At Ghim Moh Rooftop Garden and Our Park@618, older women gather for Tai chi, Zumba, and yoga, preferring shaded areas. Chinese residents often join structured activities like Tai chi, while Malay residents engage in group workouts at fitness corners. Many of these activities are self-organised by interest groups or champions.
Social Gatherings	Jurong Lake Gardens is a key social hub, with gathering spots near food courts. The ActiveSG pavilion, despite its structured focus, supports male-dominated informal table tennis groups.
Routine-Based Interaction	Many visitors socialise after exercise, meeting familiar faces on specific days, reinforcing the role of outdoor recreation space in fostering community ties.

Source: Kato, Y., Chan, F., Wang, J., & Yuen, B. (2024). *Outdoor Recreation Space Ethnographic Study Technical Report* (Unpublished technical report).

P., Roe, J., Robertson, L., & Miller, D. (2016). Mitigating stress and supporting health in deprived urban communities: the importance of green space and the social environment. *International Journal of Environmental Research and Public Health, 13*(4), 440.; Bennet, S. A., Yiannakoulias, N., Williams, A. M., & Kitchen, P. (2012). Playground accessibility and neighbourhood social interaction among parents. *Social Indicators Research, 108,* 199-213.; Plane, J., & Klodawsky, F. (2013). Neighbourhood amenities and health: Examining the significance of a local park. *Social Science & Medicine, 99,* 1-8.; Abraham, A., Sommerhalder, K., & Abel, T. (2010). Landscape and well-being: a scoping study on the health-promoting impact of outdoor environments. *International Journal of Public Health*, *55*, 59-69.

The outdoor recreation space environment provides opportunities for engagement, pleasure, and meaning.[19] Mental wellbeing can be enhanced through tranquil green landscapes and water features, offering spaces for relaxation and escape from urban stress (Figure 1.3). Therapeutic garden environments improve mood and enhance cognitive function and wellbeing.[20]

Figure 1.3. Relaxation in parks, Copenhagen

1.4. Improve Ecosystem Services

Urban greenery and outdoor recreation space are increasingly linked with ecosystem services benefits.[21] Ecosystem services comprise:[22]

- Provisioning services, which supply resources like food, water, timber, and fibre.
- Regulating services, which control climate, floods, diseases, waste, and water quality.
- Cultural services, which provide recreational, aesthetic, and spiritual benefits.
- Supporting services, which include processes like soil formation, photosynthesis, and nutrient cycling.

Nature-based solution is an approach that leverages these ecosystem services to help

19 Vella-Brodrick, D. A., Park, N., & Peterson, C. (2009). Three ways to be happy: Pleasure, engagement, and meaning—Findings from Australian and US samples. *Social Indicators Research*, *90*(2), 165–179. https://doi.org/10.1007/s11205-008-9251-6

20 De Vries, S., Van Dillen, S. M., Groenewegen, P. P., & Spreeuwenberg, P. (2013). Streetscape greenery and health: Stress, social cohesion and physical activity as mediators. *Social Science & Medicine, 94,* 26-33; Malone, K., & Tranter, P. (2003). "Children's Environmental Learning and the Use, Design and Management of Schoolgrounds. *Children, Youth and Environments, 13*(2), 87-137; Hartig, T. (2007). Three steps to understanding restorative environments as health resources. *In Open space: People space* (pp. 183-200). Taylor & Francis. Hartig, T., Mitchell, R., De Vries, S., & Frumkin, H. (2014). Nature and health. *Annual Review of Public Health, 35*, 207-228.

21 Millennium Ecosystem Assessment. (2005). *Ecosystems and Human Well-Being: Synthesis.* Island Press. https://www.millenniumassessment.org/documents/document.356.aspx.pdf

22 Millennium Ecosystem Assessment. (2005*). Ecosystems and Human Well-Being: Synthesis.* Island Press. https://www.millenniumassessment.org/documents/document.356.aspx.pdf

address societal challenges such as climate change, flooding, drought, and heat waves.[23] By harnessing ecosystem functions, nature-based solution can deliver multiple benefits. For instance, restoring coastal wetlands not only helps protect against storm surges (regulating service) but can also support local livelihoods through fisheries (provisioning service), and create recreation opportunities (cultural service). This synergistic approach often makes nature-based solution more cost-effective and sustainable compared to technological or "grey" infrastructure solutions (Figure 1.4).[24]

Figure 1.4. West Coast Park Wetlands, Singapore

Cities are increasingly adopting green and blue infrastructure to sustain these services, integrating outdoor recreation spaces like parks, urban plazas, pocket parks, sports fields, canals, shorelines, and walking trails into the built environment[25] (Box 1.7). In response to climate change, others are restoring degraded areas with large-scale tree-planting programmes, providing life-friendly urban forests, and opportunities for outdoor recreation (Box 1.8).

23 Evans, D. L., Falagán, N., Hardman, C. A., Kourmpetli, S., Liu, L., Mead, B. R., & Davies, J. A. C. (2022). Ecosystem service delivery by urban agriculture and green infrastructure: A systematic review. *Ecosystem Services, 54*, 101405. https://doi.org/10.1016/j.ecoser.2022.101405; Berry, A., Girardin, C. A., Smith, A., & Turner, B. (2020). Understanding the value and limits of nature-based solutions to climate change and other global challenges. *Philosophical Transactions of the Royal Society B, 375*(1794), 20190120. https://doi.org/10.1098/rstb.2019.0120

24 Seddon, N., Chausson, A., Berry, P., Girardin, C. A. J., Smith, A., & Turner, B. (2020). Understanding the value and limits of nature-based solutions to climate change and other global challenges. *Philosophical Transactions of the Royal Society B: Biological Sciences, 375*(1794), 20190120. https://doi.org/10.1098/rstb.2019.0120

25 Seddon, N., Chausson, A., Berry, P., Girardin, C. A. J., Smith, A., & Turner, B. (2020). Understanding the value and limits of nature-based solutions to climate change and other global challenges. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *375*(1794), 20190120. https://doi.org/10.1098/rstb.2019.0120

Box 1.7. Biophilic Town Framework, Singapore

Biophilic design in Singapore is implemented at both national and local levels.

At the national level, Singapore integrates biophilic design into outdoor spaces through the City in Nature vision. The focus is on habitat restoration and ecological enhancement. Larger regional parks and play areas are designed with site-specific ecology, restoring historical ecosystems and creating a connected green network. This strengthens biodiversity, improves urban cooling, and enhances recreation.

To maintain ecological balance, the National Parks Board aims to restore habitats in at least 50% of parks, gardens, and streetscapes by 2030. The Urban Redevelopment Authority's Landscaping for Urban Spaces and High-rises programme mandates at least 40% soft scape in public sector developments, promoting flood management and ecosystem-friendly design.

At the local level, from 2023, new public housing projects require an Environmental Impact Assessment to mitigate environmental impacts. It has implemented a Biophilic Town Framework to plan and integrate nature into public housing estates. It connects people with the nature elements of soil, flora and fauna, outdoor comfort, and water. Public housing outdoor spaces support recreation while enhancing biodiversity, cooling, and water filtration, improving sustainability and resilience.

Greenery is a key feature of senior public housing at Kampung Admiralty

Source: National Parks Board. (2024). *Factsheet A: Updates on City in Nature Efforts. SMS Tan Kiat How's MND COS Speech in Parliament.;* National Parks Board. (2024). *Annual Report 2023/2024.;* Urban Redevelopment Authority. (n.d.). *LUSH Checklist for Public Sector Developments.*

Box 1.8. "Plant Million Trees" Programme, South Korea

The "Plant Million Trees" Programme, launched in South Korea, in 2002, aimed to restore landfill sites by transforming them into greenspaces and enhancing biodiversity. In its first year, over ten million trees were planted with participation from 8,000 citizens.

Public planting of "Plant Million Trees" programme

Source: Korea Forest Service (n.d.)

The initiative quickly grew into a national environmental movement, with city governments integrating it into their urban and climate action plans. Seoul launched the "Plant 30 Million Trees" by 2022 in collaboration with the Korea Forest Service. This initiative focuses on tree planting in abandoned plots and empty spaces in the downtown area to manage fine dust and pollution, reducing PM10 by 25% and PM2.5 by 40.9% while improving air quality across the city.

Source: Korea Ministry of Environment. (2004). *The Ten Million Tree Planting Project Exceeds Its 2003 Goal.* Retrieved from http://bit.ly/4iFyDaD; Korea Forest Service. (n.d.). Official website of Korea Forest Service. Retrieved from. https://english.forest.go.kr/kfsweb/kfs/subIdx/Index.do?mn=UENG

CHAPTER 02

What is Outdoor Recreation Space

What is Outdoor Recreation Space

Outdoor recreation spaces are critical green infrastructure of cities. Against the rising trend of extreme weather events, these spaces are increasingly acknowledged as effective pathways to green infrastructure practices that expand community resiliency to shifting weather patterns and climate change.[26] Research has consistently highlighted the potential of accessible open spaces such as parks, playgrounds, greenspaces and even informal urban greenspaces as important determinants of the recreational value of a place.[27] Accessible open spaces support multiple uses by providing opportunities for leisure activities, contact with nature, and destination community gathering places (Figure 2.1). Several considerations including socio-demographic factors, time of day, day of the week[28], activity types[29], and the nature of the space significantly influence how people use outdoor recreation space.[30]

26 Forsyth, A. (2020). What is a healthy place? Models for cities and neighbourhoods. *Journal of Urban Design*, *25*(2), 186–202. https://doi.org/10.1080/13574809.2019.1662718; Largo-Wight, E. (2011). Cultivating healthy places and communities: Evidenced-based nature contact recommendations. *International Journal of Environmental Health Research, 21,* 41–61. https://doi.org/10.1080/09603123.2010.499452

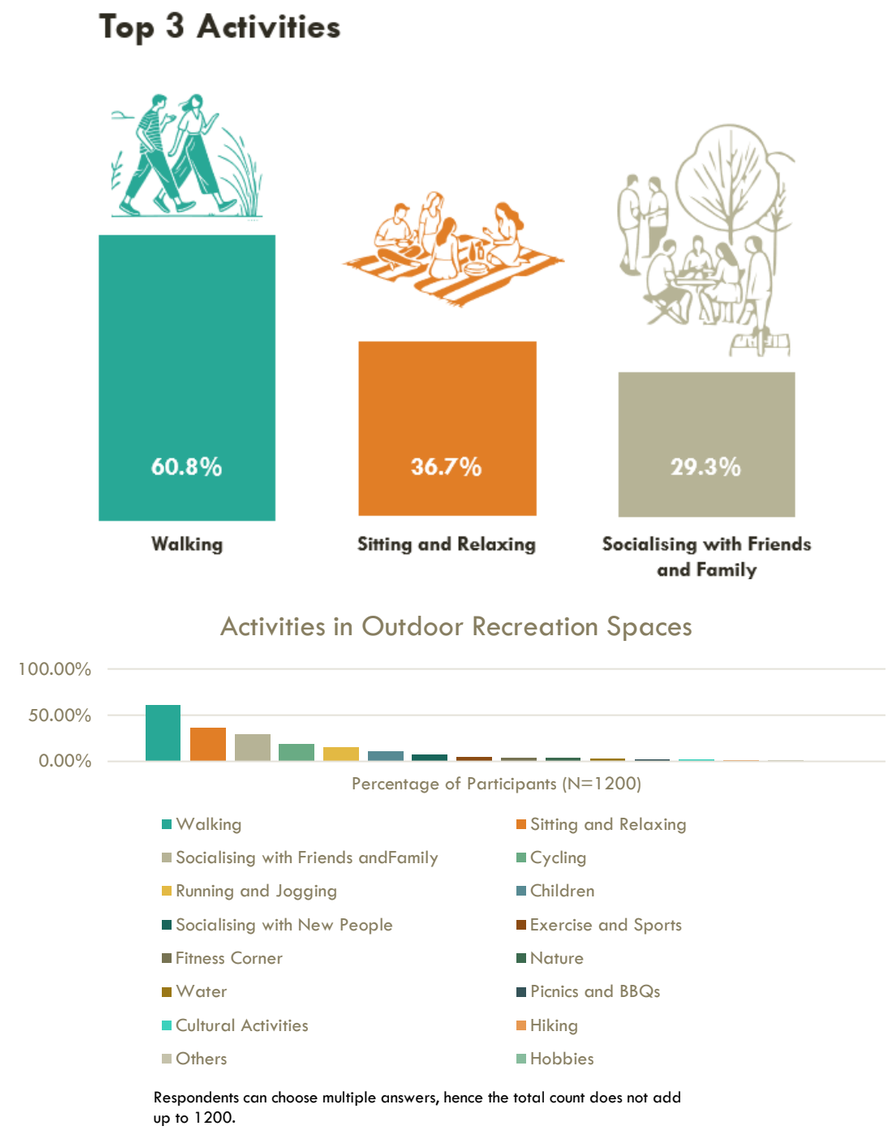
27 Ordóñez-Barona, C. (2017). How different ethno-cultural groups value urban forests and its implications for managing urban nature in a multicultural landscape: A systematic review of the literature. *Urban Forestry & Urban Greening, 26*, 65–77. https://doi.org/10.1016/j.ufug.2017.06.006; Rupprecht, C. D., & Byrne, J. A. (2014). Informal urban greenspace: A typology and trilingual systematic review of its role for urban residents and trends in the literature. *Urban Forestry & Urban Greening, 13,* 597–611. https://doi.org/10.1016/j.ufug.2014.09.002

28 Park, K., Christensen, K., & Lee, D. (2020). Unmanned aerial vehicles (UAVs) in behaviour mapping: A case study of neighbourhood parks. *Urban Forestry & Urban Greening, 52*, 126693. https://doi.org/10.1016/j.ufug.2020.126693

29 Qin, H., Zhang, L., Wang, C., Wang, Y., & Chen, H. (2021). How thermal conditions affect the spatial-temporal distribution of visitors in urban parks: A case study in Chongqing, China. *Urban Forestry & Urban Greening,* 66, 127393. https://doi.org/10.1016/j.ufug.2021.127393; Beeco, J. A., Hallo, J. C., Giumetti, G. W., & Norman, W. C. (2013). The importance of spatial nested data in understanding the relationship between visitor use and landscape impacts. *Applied Geography, 45*, 147–157. https://doi.org/10.1016/j.apgeog.2013.09.001

30 Xie, B., An, Z., Zheng, Y., & Chen, Y. (2018). Healthy aging with parks: Association between park accessibility and the health status of older adults in urban China. *Sustainable Cities and Society, 43*, 476-486. https://doi.org/10.1016/j.scs.2018.09.010

Figure 2.1. Activities facilitated in outdoor recreation spaces in Singapore



2.1. Critical Green Infrastructure

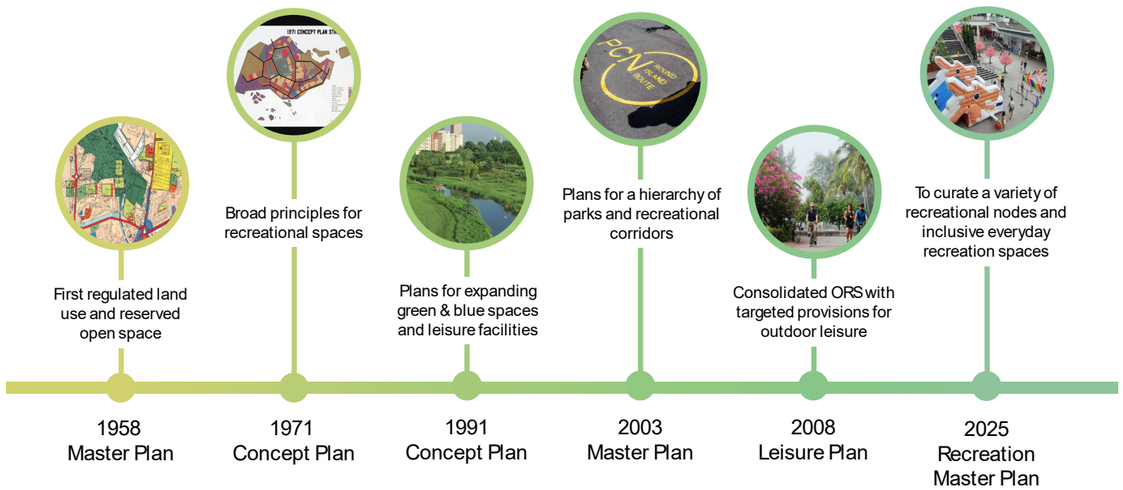
Outdoor recreation spaces are provided in cities in a variety of sizes and forms to fulfil essential social, environmental, and recreation functions. Historically, parks and greenspaces have been integral to human living environments. Human settlements in ancient Mesopotamia, Rome, and Greece incorporated open spaces equipped with gardens, terraces, and plants, offering opportunities for recreation and relaxation to their residents.[31]

31 Gleason, K. L. (1994). Porticus Pompeiana: a new perspective on the first public park of ancient Rome. *The Journal of Garden History*, *14*(1), 13-27.; Nelson, J. G., & Butler, R. W. (1974). Recreation and the environment. *Perspectives on*

However, during the early industrial era, industrial towns in UK such as Manchester, Birmingham, and Edinburgh allocated most land to factories and commerce, leaving limited areas—primarily paths and roads—for recreation. Similarly, in early 19th century Philadelphia and New York, USA, no formal land allocation for recreation existed. Residents instead engaged in recreation activities along boulevards, canals, and nearby surrounding rural landscape.[32] It was only in the later 19th century that formal provision of outdoor recreation spaces became a recognised feature of urban planning.[33] Notable examples include Frederick Law Olmsted's design of Central Park in New York City, which advocated for open spaces amidst commercial and industrial land demands[34], and Ebenezer Howard's Garden City concept, which emphasised the need for healthy, clean, and green alternatives to the unsanitary living conditions prevalent in polluted industrial cities.[35]

Modern cities like Singapore have increasingly embraced and integrated outdoor recreation spaces into planning the country's limited land resource of 735 square kilometres and population of 6 million (Figure 2.2). Singapore implements a think ahead, think across and think again governance philosophy.[36] Interrelated policy frameworks and initiatives developed by various government agencies reinforce these planning efforts, leveraging outdoor recreation spaces for a sustainable and inclusive city (Table 2.1).

Figure 2.2. Evolution of outdoor recreation space planning and provision in Singapore



Environment, 290-310.

32 Nelson, J. G., & Butler, R. W. (1974). Recreation and the environment. *Perspectives on Environment*, 290-310.

33 Nelson, J. G., & Butler, R. W. (1974). Recreation and the environment. *Perspectives on Environment*, 290-310.

34 Eisenman, T. S. (2013). Frederick Law Olmsted, green infrastructure, and the evolving city. *Journal of Planning History*, *12*(4), 287-311.; Frederick, O. (1870). Public parks and the enlargement of towns. *Journal of Social Science, III*.

35 Dempsey, N. (2009). Are good-quality environments socially cohesive? Measuring quality and cohesion in urban neighbourhoods. *The Town Planning Review*, 315–345. Howard, E. (1898). *Garden Cities of To-Morrow* (Vol. 23). Mit Press.

36 Neo, B. S. and Chen, G. (2007). *Dynamic Governance: Embedding Culture, Capabilities and Change in Singapore*. Singapore: World Scientific.

Table 2.1. Outdoor recreation space-related frameworks and initiatives in Singapore*

Government Agency	Example of Initiatives
Ministry of National Development	
National Parks Board	• Garden City and City in Nature visions • Streetscape Greenery Master Plan • Park Connector Network • Biophilic Play Garden Plan • Community in Bloom Programme
Urban Redevelopment Authority	• Long-term planning • Island-wide Leisure Plan • Parks and Waterbodies Plan • Landscape for Urban Spaces and High-Rises Programme • Walking and cycling plan • Green and Blue Plan • Recreation Master Plan
Housing and Development Board	• Lively Places Fund • Build-A-Playground Initiative • Participatory Design Projects • Biophilic Town
Ministry of Sustainability and Environment	
Public Utilities Board	• Active, Beautiful, Clean Waters Programme
Ministry of Land Transport	
Land Transport Authority	• Transit Priority Corridors • Walking and Cycling Plan submission requirement
Ministry of Education and Sport Singapore	• Dual-Use Scheme of school sports fields
Ministry of Sustainability and Environment	• Singapore Green Plan 2030, spearheaded by 5 ministries – Ministry of Education, Ministry of National Development, Ministry of Trade and Industry, Ministry of Transport, Ministry of Sustainability and Environment • Sustainable Singapore Blueprint

*This list was recorded in 2024. It is an evolving and non-exhaustive representation.

Over the years, several motivations and visions have guided the planning and provision of outdoor recreation spaces in Singapore including promoting health and wellbeing, fostering connection with nature in an urbanised setting. The country's cultural and social values are encapsulated in its latest vision, "City in Nature", integrating sustainability and biophilia into high-rise, high-density urban life (Box 2.1).

Box 2.1. City in Nature, Singapore

Singapore's City in Nature vision, part of the Singapore Green Plan 2030, aims to enhance urban sustainability by integrating nature into the city. It incorporates several sustainable Development Goals (SDGs) and seeks to balance development with greenery to improve wellbeing and resilience. Five key strategies are implemented:

- Expanding green spaces (add 200 hectares of nature parks by 2030).
- Naturalising gardens/parks (add 300 hectares by 2026).
- Greening urban areas (200 hectares of skyrise greenery, +170,000 trees by 2030).
- Strengthening green connectivity (300km Nature Ways, 500km park connectors, households within 10-minute walk of a park).
- Enhancing animal management and veterinary care.

SDGs supported by "City in Nature"

Source: National Parks Board (2023)

Source: National Parks Board. (2023). *Singapore, Our City in Nature*. Retrieved January 13, 2025, from. https://www.nparks.gov.sg/about-us/city-in-nature; Singapore Green Plan 2030. (n.d.). *City in Nature*. Retrieved January 13, 2025, from https://www.greenplan.gov.sg/key-focus-areas/city-in-nature/

2.2. **Defining Outdoor Recreation Space**

Globally, several definitions highlight the key features of outdoor recreation spaces. The Charter of Public Space defines public spaces as "all places publicly owned or of public use, accessible and enjoyable by all for free and without a profit motive"[37], emphasising public ownership and universal access. Similarly, United Nations Sustainable Development Goal (SDG) 11, Target 11.7, describes public spaces as "the built-up area of cities that is open space for public use for all".[38] These definitions reflect a global commitment to ensuring that public spaces are adequate, accessible, and inclusive, aligning with the principles of UN-Habitat and the 2030 Agenda for Sustainable Development, which stress inclusivity regardless of gender, race, age, or socioeconomic status.[39]

Other definitions expand on these ideas by addressing the functions of such spaces. The Planning Institute of Australia describes open spaces as areas set aside for both formal and informal sport and recreation, conserving natural environments, providing greenspaces, and managing urban stormwater.[40] This definition underscores the multi-functional role of open spaces, combining recreational, ecological, and urban management purposes. In Singapore, the Urban Redevelopment Authority, national planning agency, describes public spaces as the "living rooms of a city" where people can linger, bond, and interact, enhancing neighbourhood identity, and fostering a sense of belonging.[41] These definitions illustrate the important role of outdoor recreation space play in urban liveability and sustainability.

In this playbook, outdoor recreation space refers to public open space (e.g., greenspaces, outdoor sports facilities, civic spaces) that affords opportunities for people to get outdoors and engage in leisure, social, and recreation activities. In the past decades with urban and population growth, Singapore has expanded the variety of outdoor recreational spaces including parks, nature reserves, playgrounds, waterways, and sports facilities, along with a range of community spaces, co-created with residents at car parks, rooftop gardens, and void decks[42] of public housing apartments.[43]

2.3. **Outdoor Recreation Space Typologies**

Outdoor recreation space encompasses a diverse array of natural and built environments.

Singapore

In the context of Singapore, outdoor recreation space can largely be categorised into parks and nature reserves, and urban areas (Figure 2.3). Collectively, these typologies illustrate a wide spectrum of spaces, scales, functions, and roles within high-rise, high-density urban development. This diversity enables various patterns of use (Box 2.2).

37 United Nations Human Settlements Programme (UN-Habitat). (2015). *Global Public Space Toolkit: From Global Principles to Local Policies and Practice*. UN-Habitat. https://unhabitat.org/global-public-space-toolkit-from-global-principles-to-local-policies-and-practice

38 United Nations. (2015). *Transforming Our World: The 2030 Agenda for Sustainable Development (A/RES/70/1)*. https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_70_1_E.pdf

39 United Nations. (2015). *Transforming Our World: The 2030 Agenda for Sustainable Development (A/RES/70/1)*. https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_70_1_E.pdf; United Nations Human Settlements Programme (UN-Habitat). (2017). *New Urban Agenda*. https://unhabitat.org/sites/default/files/2019/05/nua-english.pdf, at the United Nations Conference on Housing and Sustainable Urban Development (Habitat III). Quito, Ecuador: United Nations.

40 The Planning Institute of Australia. (2009). *Design Standards for Urban Infrastructure. 14 Urban Open Space*. https://www.cityservices.act.gov.au/__data/assets/pdf_file/0007/396871/ds14_urban_open_space.pdf

41 Urban Redevelopment Authority. (n.d.). *Enliven Public Spaces Together*. Urban Redevelopment Authority. Retrieved, December 19, 2024, from https://www.ura.gov.sg/Corporate/Get-Involved/Enliven-Public-Spaces.

42 These are located on the ground floor of public housing apartment buildings, purposefully left void of flats to facilitate social activities among residents, e.g., for wedding and funeral. See Singapore National Heritage Board (2013) *Void Decks*.

43 National Parks Board. (2024, February 3). *Gardens, Parks & Nature*. Retrieved December 4, 2024, from https://www.nparks.gov.sg/gardens-parks-and-nature; Urban Redevelopment Authority (n.d.). *More Recreation Closer to Homes*. Urban Redevelopment Authority. Retrieved December 4, 2024, from https://www.ura.gov.sg/Corporate/Planning/Long-Term-Plan-Review/Space-for-Our-Dreams-Exhibition/Play/More-Recreation.

Figure 2.3. Typologies of outdoor recreation space in Singapore

Box 2.2. Outdoor recreation spaces visited by Singapore residents

Our population survey (N=1,200) found that 82% had visited an outdoor recreation space in the past year, while 18% had not. The most visited outdoor recreation spaces were parks (47.0%), outdoor sports facilities (26.8%), and HDB (public housing) void decks (26.1%).

- Outdoor recreation space usage: 32.4% visited only one type, while the rest visited more than 1 ORS type including 24.4% visited three or more types of outdoor recreation space.
- Informal outdoor recreation space importance: 71.1% stressed the importance of informal spaces like void decks for daily recreation, especially among Indians (78.7%) and Other ethnic groups (84.4%).
- Favourite outdoor recreation space: Parks (38.8%), beaches/seaside areas (15.1%), footpaths/cycling paths (8.0%). Preferences vary by age: younger adults (age 15–29) prefer cycling paths, those age 30–44 favour playgrounds, and older adults (age 60+) prefer greenspaces near home.

Favourite outdoor recreation spaces often required travel beyond 5 km, with East Coast Park and Punggol Park (parks with waterbodies) being top choices. East Coast Park is the most-visited favourite outdoor recreation space, with 30% travelling 7.4 km and staying 2–3 or more hours. Punggol Park serves a more local population, with visitors travelling 1.9 km and visiting daily. People travel further for larger parks with water features, highlighting a preference for green and blue spaces in outdoor recreation spaces.

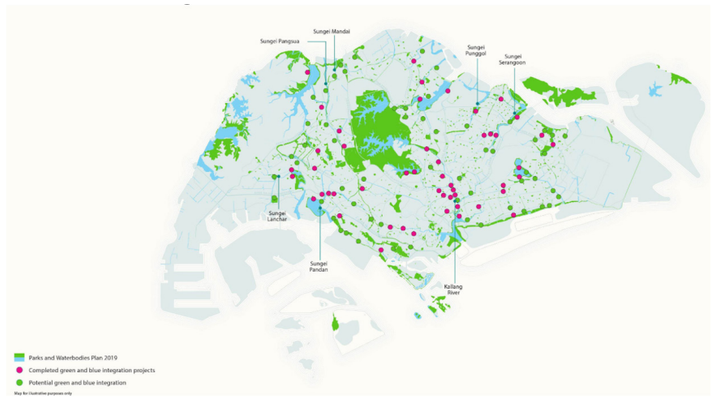
Source: Kato, Y., Chan, F., Wang, J., & Yuen, B. (2024). *Outdoor Recreation Space Community Survey Technical Report* (Unpublished technical report).

Parks and Nature Reserves

Parks

Parks are the most ubiquitous outdoor recreation space in the city. Parks are green areas primarily designated for public enjoyment under the statutory Master Plan, since the time of Singapore's 1st Master Plan 1958.[44] As with many other cities, Singapore implements an open space standard (presently 0.8 hectare per 1000 population), and a hierarchical park distribution to ensure access to greenspaces. The Singapore National Parks Board currently manages 408 parks and gardens, comprising of 3 national gardens, 88 regional parks, and 317 neighbourhood parks.[45] There are another 24 Nature Areas including 4 nature reserves and 20 other areas subjected to administrative safeguards under the Parks and Waterbodies Plan[46], collectively covering 3,347 hectares (Figure 2.4).

Figure 2.4. Parks and Waterbodies Plan 2019



Source: Parks and Waterbodies Plan (2019)[47]

Waterbodies

Waterbodies, designated for drainage purposes, include reservoirs, ponds, rivers, and other water channels.[48] The Active, Beautiful, Clean Waters programme, launched in 2006, invests significantly in designing and upgrading these spaces, transforming them into welcoming environments with community facilities.[49] Currently, the network comprises over 8,000 km of waterways and 17 reservoirs, providing green and blue spaces, and connecting people and waterbodies. Notable reservoir parks include Bedok Reservoir Park, MacRitchie Reservoir Park, and Jurong Lake (Figure 2.5).[50]

44 Urban Redevelopment Authority. (2019). *The Planning Act: Master Plan Written Statement 2019*. Retrieved December 23, 2024, from https://www.ura.gov.sg/-/media/Corporate/Planning/Master-Plan/MP19writtenstatement.pdf

45 National Parks Board. (n.d.). *Facts & Figures: FY2023*. National Parks Board. Retrieved December 23, 2024, from https://www.nparks.gov.sg/portals/annualreport/facts-figures.html

46 National Parks Board. (n.d.). *Nature Areas & Nature Reserves.* National Parks Board. Retrieved December 23, 2024, from https://www.nparks.gov.sg/biodiversity/our-ecosystems/nature-areas-and-nature-reserves

47 Urban Redevelopment Authority. (n.d.). *Multi-Functional Green and Blue Spaces*. Urban Redevelopment Authority. Retrieved December 24, 2024, from https://www.ura.gov.sg/Corporate/Planning/Long-Term-Plan-Review/Space-for-Our-Dreams-Exhibition/Steward/Multi-Functional-Green-and-Blue

48 Urban Redevelopment Authority. (2019). *The Planning Act: Master Plan Written Statement 2019*. Retrieved December 23, 2024, from https://www.ura.gov.sg/-/media/Corporate/Planning/Master-Plan/MP19writtenstatement.pdf

49 Centre for Liveable Cities. (2017). *Urban Systems Studies: The Active Beautiful, Clean Waters Programme: Water as an Environmental Asset*. Centre for Liveable Cities. Retrieved December 19, 2024, from https://www.clc.gov.sg/docs/default-source/urban-systems-studies/rb172978-mnd-abc-water.pdf?sfvrsn=64f4ad34_4.

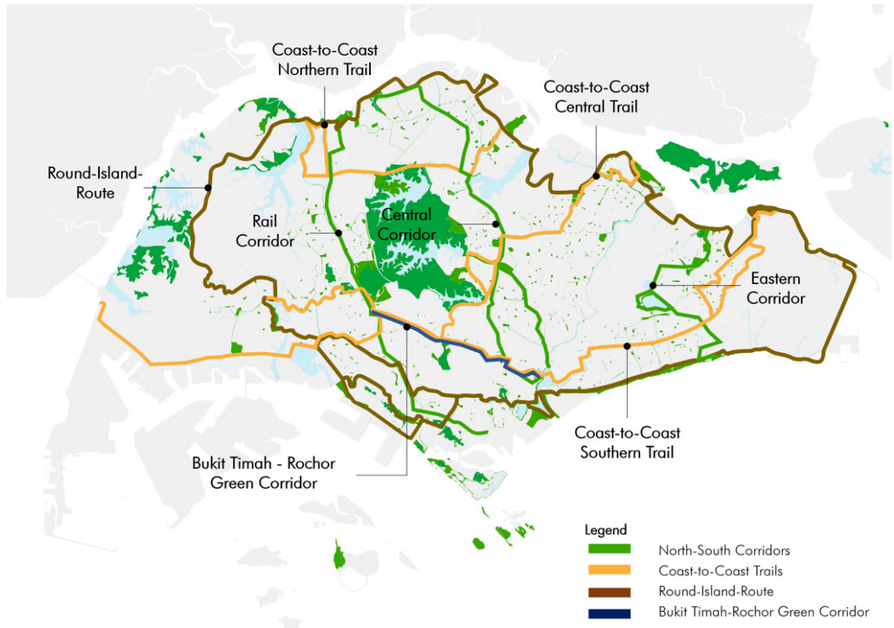
50 Centre for Liveable Cities. (2017). *Urban Systems Studies: The Active Beautiful, Clean Waters Programme: Water as an Environmental Asset*. Centre for Liveable Cities. Retrieved December 19, 2024, from https://www.clc.gov.sg/docs/default-source/urban-systems-studies/rb172978-mnd-abc-water.pdf?sfvrsn=64f4ad34_4.

Figure 2.5. Bedok Reservoir, MacRitchie Reservoir, and Jurong Lake

Park Connector Network

Since the first park connector completion in 1995, the Park Connector Network (PCN) has expanded to a 380 km island-wide system of green corridors linking major parks and nature areas across Singapore, supporting outdoor recreation and active mobility (Figure 2.6).[51] PCN routes are categorised into island-wide routes, which consist of multiple park connectors and trails spanning longer distances, and PCN loops, which guide users through specific regions.

Figure 2.6. Location of island-wide PCN routes



Source: National Parks Board (n.d.)[52]

Currently, there are four island-wide PCN routes and six PCN loops. Notable island-wide routes include the 36 km Coast-to-Coast Trail, connecting Jurong Lake Gardens to Coney Island Park, and the 150 km Round Island Route, Singapore's longest recreational trail, with

51 National Parks Board. (n.d.). *Know Our Recreational Connectivity*. Retrieved December 23, 2024, from https://pcn.nparks.gov.sg/aboutrecreationalconnectivity/

52 National Parks Board. (n.d.). *Island-wide Routes.* National Parks Board. Retrieved December 24, 2024, from https://pcn.nparks.gov.sg/know-our-pcn/island-wide-routes/

its first 75 km phase launched in January 2022.[53] Examples of PCN loops include the 42 km Eastern Coastal Loop, passing through eastern housing estates such as Geylang, Changi, Tampines, Bedok, and Siglap, and the North-Eastern Riverine Loop, linking Buangkok, Sengkang, Punggol, and extending into Hougang Town (Figure 2.7).[54]

Figure 2.7. Distribution of PCN loops

Source: National Parks Board (n.d.)[55]

Complementing these networks, nature corridors and nature ways further strengthen ecological linkages by connecting greenspaces and nature reserves, supporting biodiversity and facilitating wildlife movement. Some 50 nature ways spanning 210 km provide green routes along roads with native flora such as those in Ang Mo Kio, Bedok and Toa Payoh Towns (Figure 2.8).[56]

Additionally, the Heritage Road Scheme, launched by the National Parks Board in 2001, preserves scenic tree-lined roads. Five roads including South Buona Vista Road and Lim Chu Kang Road, were gazetted as Heritage Roads in 2006, with a mandated 10 m green buffer on both sides to protect existing trees and plants.[57]

53 National Parks Board. (n.d.). *Coast-to-Coast Trail*. Retrieved January 7, 2025, from https://www.nparks.gov.sg/gardens-parks-and-nature/parks-and-nature-reserves/coast-to-coast; National Parks Board. (n.d.). *Round Island Route*. Retrieved 7 January 2025, from https://pcn.nparks.gov.sg/know-our-pcn/rir/

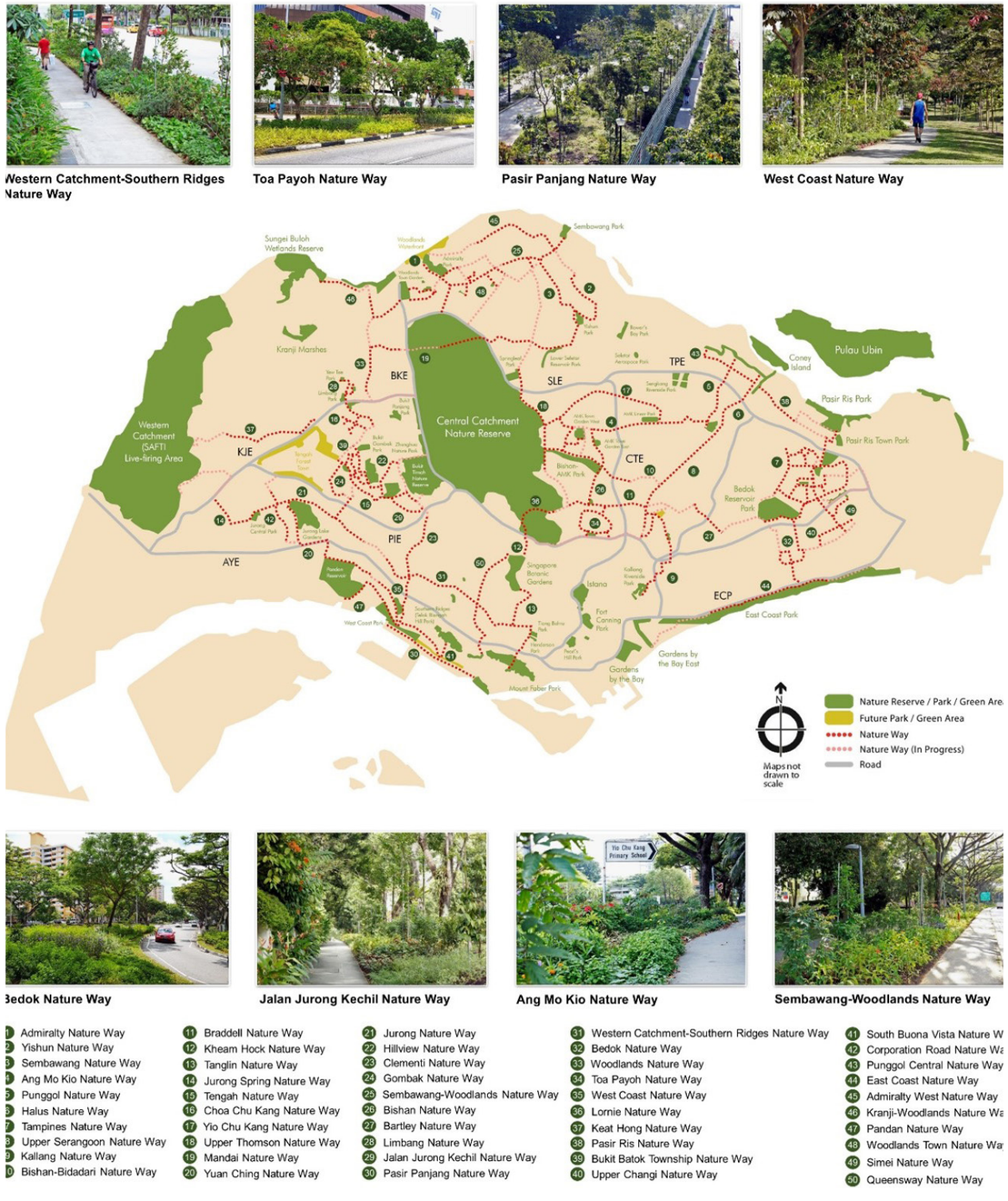
54 National Parks Board. (n.d.). *A Guide to Eastern Coastal Park Connector Network (ECPCN) Cycling Trail.* Retrieved January 7, 2025, from https://www.nparks.gov.sg/~/media/nparks-real-content/gardens-parks-and-nature/park-connector-network/00-pcn-overview-page/ecpcn_d5.ashx ; National Parks Board. (n.d.). *North Eastern Riverine Loop*. Retrieved January 7, 2025, from https://pcn.nparks.gov.sg/the-pcn-experience/nerl/

55 National Parks Board. (n.d.). *Checkout the Network*. Retrieved January 7, 2025, from https://pcn.nparks.gov.sg/the-pcn-experience/pcnloops/

56 National Parks Board. (n.d.). *Nature Corridor and Nature Ways*. Retrieved January 7, 2025, from https://beta.nparks.gov.sg/visit/when-visiting-parks/about-parks-nature-reserves-pcns/nature-corridors-ways

57 National Parks Board. (n.d.). *Rail Corridor*. Retrieved January 7, 2025, from https://www.nparks.gov.sg/railcorridor/enhancement-plans

Figure 2.8. Nature ways in Singapore



Source: National Parks Board (n.d.)[58]

58 National Parks Board. (n.d.). *Nature Corridor and Nature Ways*. Retrieved January 7, 2025, from https://beta.nparks.gov.sg/visit/when-visiting-parks/about-parks-nature-reserves-pcns/nature-corridors-ways.

Planned Outdoor Recreation Space

Table 2.2 outlines the key typologies and characteristics of planned outdoor recreation spaces in Singapore.

Table 2.2. Planned outdoor recreation space typologies in Singapore

Playgrounds[59]	Designed spaces including playgrounds, hardcourts, and fitness corners. Singapore has over 1,400 playgrounds, with 72% in public housing estates, ensuring 87% of households are within a five-minute walk. 3-Generation playgrounds combine fitness areas for all age groups.
Promenades[60]	Waterfront spaces such as Marina Promenade and Singapore River Promenade, integrate with the Park Connector Network. These areas feature scenic water views, jogging and cycling paths, and outdoor refreshment areas linked to cafes and restaurants.
Sports Facilities[61]	Managed by Singapore Sports, these facilities include swimming complexes, gyms, sports stadiums, tennis centres, and futsal fields, mostly located in or near housing areas. A dual-use scheme allows school sports facilities to be open to the public, expanding recreation space availability.
Community and Allotment Gardens[62]	Volunteer-managed allotment gardens in parks, housing areas, schools, and organisations. National Parks Board's Community In Bloom programme supports over 2,400 allotment gardens across 28 parks, promoting biodiversity and social bonding.
Skyrise Greenery[63]	Greenery integrated into high-rise buildings, e.g., green walls, rooftop gardens, sky terraces, to optimize urban greenspace. The Skyrise Greenery Incentive Scheme funds up to 50% of installation costs, supporting over 200 projects since 2009 including rooftop gardens and green walls.

Informal Outdoor Recreation Space

Informal outdoor recreation spaces are unplanned, often overlooked urban greenspaces that provide some benefit to residents and ecosystem even though they are not specifically designed or managed for recreation or environmental protection.[64] Examples include open fields, riverbanks, roadside verges, vacant lots in urban areas, as well as void decks and pathways in public housing estates. While people may not always explicitly identify these spaces, they frequently visit nearby informal space for outdoor recreation

59 Housing Development Board. (n.d.). *Facilities*. Retrieved January 7, 2025, from https://www.hdb.gov.sg/residential/living-in-an-hdb-flat/my-neighbourhood/facilities

60 National Parks Board. (n.d.). *Singapore River Promenade*. https://pcn.nparks.gov.sg/singapore-river-promenade/

61 Sport Singapore. (n.d.). *Facilities.* Retrieved from https://www.sportsingapore.gov.sg/support-resources/facilities/

62 National Parks Board. (n.d.). *Community Gardens.* https://gardeningsg.nparks.gov.sg/get-involved/community-gardens/; National Parks Board. (n.d.). *Allotment Gardens.* https://gardeningsg.nparks.gov.sg/get-involved/allotment-gardens/

63 National Parks board. (n.d.). *Skyrise Greenery*. https://skyrisegreenery.nparks.gov.sg/

64 Kaw, J. K., Lee, H., & Wahba, S. (2020). *The Hidden Wealth of Cities: Creating, Financing, and Managing Public Spaces.* World Bank. https://doi.org/10.1596/978-1-4648-1449-5

(Box 2.3). This pattern of use aligns with global literature on the value of informal public spaces in local recreation.[65] Informal spaces form an important part of the natural urban landscape and should be recognised as a component of the broader greenspace and outdoor recreation space network.

Box 2.3. Importance of informal outdoor recreation space

From our population survey, (N=1200) most residents (71.1%) in Singapore consider informal outdoor recreation spaces important for daily recreation. These spaces enable unstructured leisure activities, play, socialisation, and nature contact. Their flexibility accommodates diverse needs, aligning with global recognition of informal spaces as inclusive and adaptable for varied uses.

Among the various outdoor recreation space visited in the past 12 month, 48.9% of study participants had visited an informal space (void deck and footpath).

Type of outdoor recreation space visited in past 12 months

Type of outdoor recreation space	Number of responses	Percentage [a]
Parks	564	47.0%
Outdoor sports facilities	321	26.8%
Void deck	313	26.1%
Footpath/cycling path	274	22.8%
Beach or seaside	236	19.7%
Playground	198	16.5%
Rivers/lakes/canals	132	11.0%
Outdoor theme parks	84	7.0%
Private garden (mine or someone else's)	70	5.8%
Forest	54	4.5%
Playfields	49	4.1%
Farmland	21	1.8%
Others (e.g. senior corner)	6	0.5%
None	216	18.0%
I don't know	9	0.8%

N=1200

[a] Percentages are based on total number of respondents.

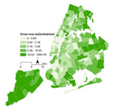
Source: Kato, Y., Chan, F., Wang, J., & Yuen, B. (2024). *Outdoor Recreation Space Community Survey Technical Report* (Unpublished technical report).

65 Kaw, J. K., Lee, H., & Wahba, S. (Eds.). (2020). *The Hidden Wealth of Cities: Creating, Financing, and Managing Public Spaces.* World Bank Publications.

Six Liveable Cities

Examination of outdoor recreation spaces in six liveable cities—Helsinki, Melbourne, New York, Portland, Seoul, and Tokyo—demonstrates similar provision but with significant contextual differences, shaped by unique geography, climate, economic conditions, socio-demographics, cultural influences, and lifestyle factors of each city (Figure 2.9).

Figure 2.9. Characteristics of outdoor recreation space in selected cities

Indicators	Helsinki	Melbourne	New York	Portland	Seoul	Tokyo	Singapore
ORS map							
ORS ratio	34%	15%	16%	34%	30%	53%	19%
ORS per capita	105.7m²	28.3m²	13.8m²	199m²	17.7m²	82.1m²	25.0m²
Dominant ORS type	Urban green recreation spaces, forests, woodlands	Open space networks, urban parks, gardens	Landscaped public parks, privately owned outdoor spaces, urban renewal sites	Urban neighbourhood parks	Cultural, social public spaces	Urban pocket parks, forests, mountains	Parks and nature reserves, PCN, urban recreation spaces, and roadside greenery
Trends and principles in ORS planning	Nature-based ecosystem services, multifunctional accessible spaces	Culture, sports, inclusiveness, accessibility, sustainability	Increasing availability and accessibility of existing spaces	Sustaining healthy native ecosystems and enhancing urban tree canopy	Park-oriented green ecological city and preserving historical sites	Promoting greenery	Sustainability, biophilia, and enhancing quality of life

As with Singapore, each city has developed and implemented a diverse range of spaces and facilities to meet urban and population needs (Figure 2.10).

Figure 2.10. Typologies and facilities of outdoor recreation space in selected cities

City	Beaches	Botanical, Arboretum & Forests	Public Open Spaces	Cycling Routes & Greenway	Dog Parks	Events	Footpaths, Jogging Tracks & Trails	Heritage, Memorials	Informal Use & Recreation	Linking & Linear Space	Waterfront Areas & Piers
Helsinki	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Melbourne	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
New York	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Portland	—	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Seoul	—	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tokyo	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Singapore	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

City	Outdoor Sport Areas & Sport Fields	Play Areas	Promenades	Seating & Viewing	Skating & Ice Rinks	Plazas & Urban Spaces	Golf Courses & Restricted Sports	Open Spaces & Cemeteries	Water Features & Waterways	Winter Swimming Places	Private Open Spaces
Helsinki	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Melbourne	✓	✓	✓	✓	—	✓	✓	✓	✓	—	✓
New York	✓	✓	✓	✓	✓	✓	✓	✓	✓	—	✓
Portland	✓	✓	✓	✓	✓	✓	✓	✓	✓	—	✓
Seoul	✓	✓	✓	✓	✓	✓	✓	✓	✓	—	✓
Tokyo	✓	✓	✓	✓	✓	✓	✓	✓	✓	—	✓
Singapore	✓	✓	✓	✓	—	✓	✓	✓	✓	—	✓

2.4. **Five Types of Outdoor Recreation Space Examined**

This playbook focuses on five types of commonly found outdoor recreation space across three study areas in Singapore (Figure 2.11):

- Park Connector—Alexandra Canal Linear Park.
- Rooftop Garden—Ghim Moh Rooftop Garden Block 24.
- Regional Park—Jurong Lake Gardens.
- Public Housing Neighbourhood Park—Our Park@618.
- Private Housing Neighbourhood Park—Mayflower Crescent Park.

These typologies canvas a variety of publicly accessible recreation, fitness and physical activity options, and in-situ spatial and social programming co-located alongside a range of public facilities (Figure 2.12). Together, they showcase a spectrum of outdoor recreation space opportunities present in the everyday life of Singapore residents within high-rise, high-density neighbourhoods.

Figure 2.12. Amenities in outdoor recreation space typologies

Site	Footpaths	PCN	Running Track	Facilities	Open Fields	Sheltered Seats	Playground	Fitness Corner	Hard Court	Multipurpose Hall	Community Garden	Dog Run	Watersports/ Activity	Promenade	Others (specify)
Alexandra Queenstown Park Connector	1	0	1	1	0	1	1	1	1	0	0	0	1	0	
Ghim Moh Blk 24 Rooftop Garden	1	0	0	0	0	1	1	1	1	0	0	0	0	0	**Childcare**
Jurong Lake Gardens	1	1	1	1	1	1	1	1	0	1	1	1	1	1	
Our Park @618	1	0	0	0	0	1	1	1	1	0	1	0	0	0	
Mayflower Crescent	1	0	0	0	0	1	1	1	0	0	0	0	0	0	

Figure 2.11. Five types of study outdoor recreation space

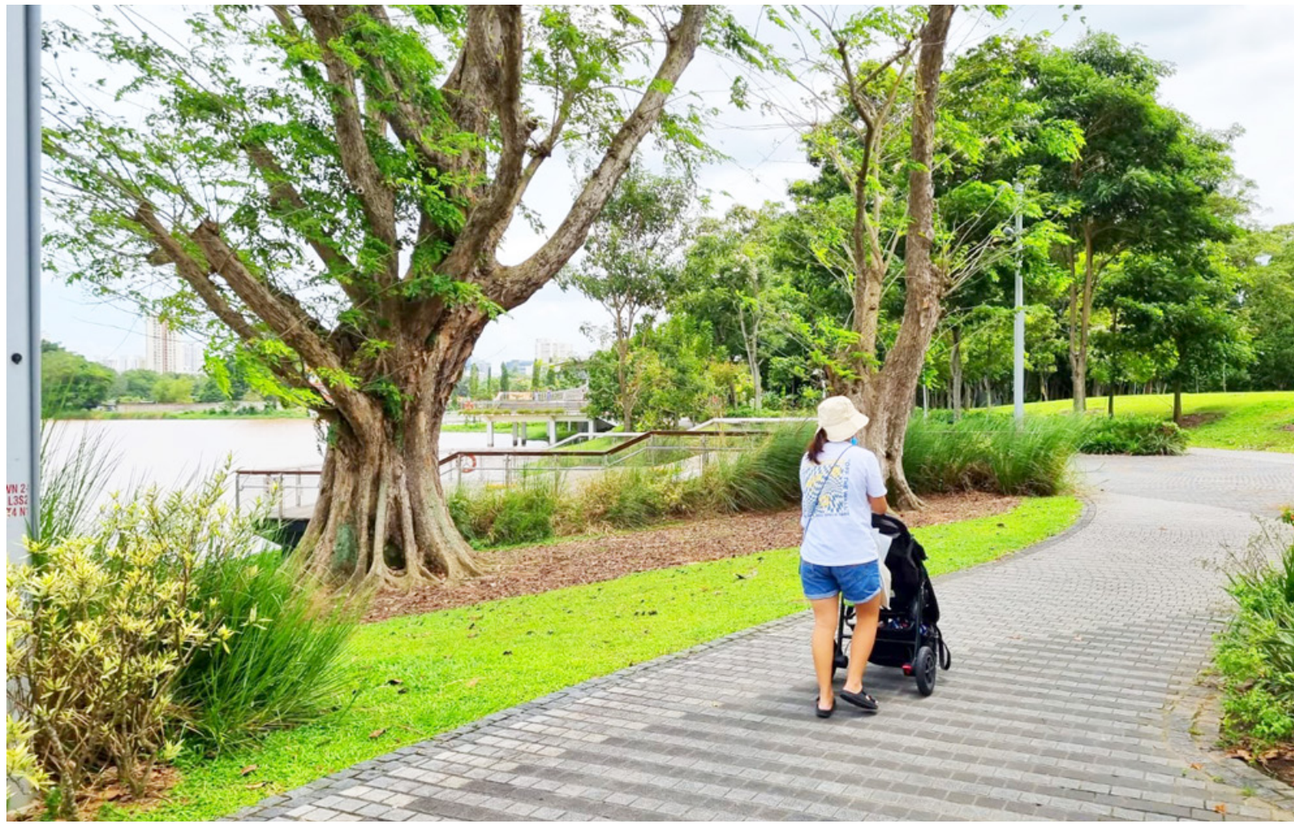
Alexandra Canal Linear Park – Linear Park

Ghim Moh Rooftop Garden – Rooftop Garden

Jurong Lake Gardens – Regional Park

Our Park @ 618 – Public Housing Neighbourhood Park

Mayflower Crescent Park – Private Housing Neighbourhood Park



CHAPTER 03

What Enhances Person-Environment Connection

What Enhances Person-Environment Connection

3.1. **Attraction**

Ethnographic studies on above five types of outdoor research space in Singapore show that well-used outdoor recreation space offers a blend of tranquillity, physical activity and social engagement opportunities, with provisions like fitness corners, playgrounds, and shaded areas being particularly valued. Outdoor recreation spaces with these amenities and desirable qualities often become popular hotspots, providing spaces where people can carry out activities, interact, and engage with others and nature.

Basic to the choice is the location (accessibility), characteristics (amenities and desirable qualities) and functionality (motivation and activities) of the outdoor recreation space. For example, park connectors like Alexandra Canal Linear Park, enhance accessibility by linking residential areas to key destinations such as public transport and nearby amenities (e.g., market, shops), folding these spaces into residents' daily travel and life routines (Figure 3.1). Neighbourhood parks and rooftop gardens such as Our Park@618, Mayflower Crescent, and Ghim Moh Rooftop Garden, prioritise convenience of use by offering accessible greenspaces for exercise and social interaction, especially among older residents.

A UK study of older adults found a general preference for parks with a variety of public facilities.[66] Other studies show that facilities such as lighting, sidewalks, benches, or plant species richness in urban greenspaces can affect the use and activity of urban greenspaces including a positive relationship with users' mental health.[67] The implication is

66 Alves, S., Aspinall, P. A., Thompson, C. W., Sugiyama, T., Brice, R., & Vickers, A. (2008). Preferences of older people for environmental attributes of local parks: The use of choice-based conjoint analysis. *Facilities*, *26*(11/12), 433–453.

67 Voigt, A., Kabisch, N., Wurster, D., Haase, D., & Breuste, J. (2014). Structural diversity: A multi-dimensional approach

a need to recognise the wide variety of activities that constitutes outdoor recreation and understand their spatial demands and user needs in the planning and design of outdoor recreation space. This requires an approach that is person-centric, working with people's varying abilities and needs to provide an array of amenities, factors including personal experiences, positive memories, and environmental qualities can influence people's interaction with outdoor recreation spaces, shape user satisfaction, and potentially tip a pleasant place into unpleasant and unattractive environments (Table 3.1).

Figure 3.1 Alexandra Canal Linear Park attraction

Table 3.1. Factors influencing person-environment connection in outdoor recreation spaces

Accessibility & Inclusivity	Ensure accessibility for all users including older adults and those with mobility challenges. Thoughtful design focuses on connectivity, inclusivity and usability, enhancing attractions and eliminating barriers.
Environmental Quality & Aesthetic Appeal	Leverage nature to design spaces that integrate natural ecosystems while offering visual appeal and functional benefits. Use context-specific and climate-sensitive design to provide relief from tropical weather and align with cultural and spatial contexts.
Community Engagement & Collaboration	Activate strong partnerships and stakeholder collaboration for sustainable development and management. Continuous assessment of community response helps refine design frameworks and policies.
National Vision & Strategic Planning	Adopt national vision and local targets to guide planning and resource allocation, integrating nature into urban spaces to ensure sustainability and high quality of life for residents.
Public Demand & Expectations	Understand user needs and develop evidence-based outdoor spaces that maximise their positive impact on health, ecosystem and communities.

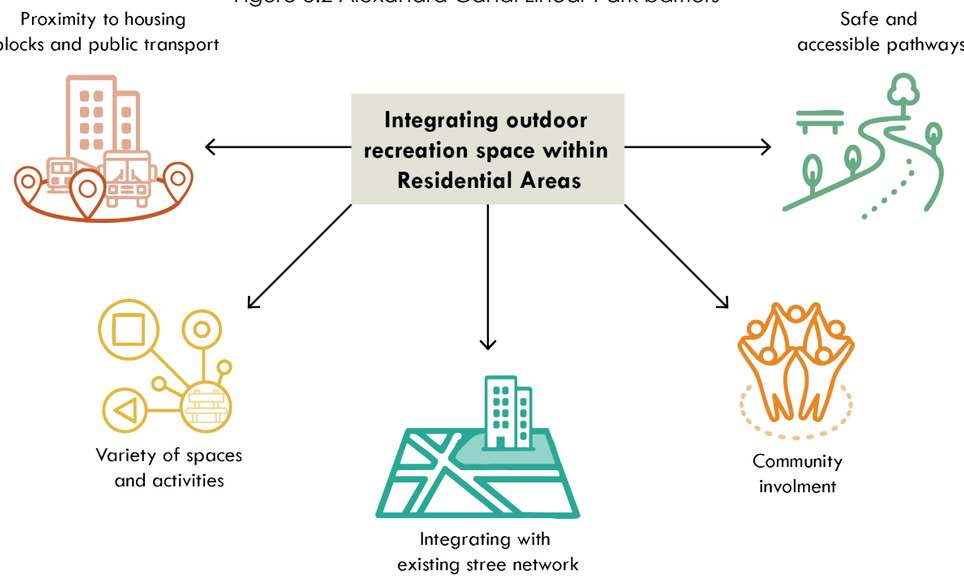
to assess recreational services in urban parks. *Ambio*, *43*, 480–491; Fuller, R. A., Irvine, K. N., Devine-Wright, P., Warren, P. H., & Gaston, K. J. (2007). Psychological benefits of greenspace increase with biodiversity. *Biology Letters, 3,* 390–394.

Quality & Innovation in Outdoor Recreation Spaces	Apply advancements in design, technology, and maintenance practices to drive innovation, efficiency in park management and enhance user experience.

3.2.**Barrier**

Participants in our study identified several barriers. Many of the barriers are related to the design of the outdoor space (built features, maintenance), weather (need for appropriate shade and shelter), and safety concerns arising from on-site use and crowding. Survey participants highlighted thermal comfort and poor lighting, e.g., lack of night lighting, as concerns, suggesting potential areas for improvement. Participants in ethnographic studies pointed to concerns relating to safety (personal, fall and traffic risks), especially among older adults, e.g., slippery paths, inadequate lighting, conflict on shared paths between cyclists and pedestrians (Figure 3.2). Others talked about maintenance problems including cleanliness, insufficient facilities like washrooms, and shelters along with the need for more shaded seating. In more popular spaces, participants raised concerns about noise, overcrowding, and limited wayfinding and connectivity.

Figure 3.2 Alexandra Canal Linear Park barriers



The findings reinforce the importance of understanding user needs including barriers (real or perceived), resolving these barriers, and strengthening the desirable qualities like accessibility, comfort, and safety of the setting to encourage more visits (Table 3.2). International evidence suggests that perceived barriers have significant effect on neighbourhood satisfaction and may lead to outdoor space use avoidance if not addressed.[68]

68 Hadavi, S., & Kaplan, R. (2016). Neighbourhood satisfaction and use patterns in urban public outdoor spaces: Multidimensionality and two-way relationships. *Urban Forestry & Urban Greening*, *19*, 110–122.

Table 3.2. Barriers and possible actions

Feature	Function	Barriers	Possible Actions
Bench	Resting spots for visitors and caregivers, enhancing comfort and accessibility.	Benches are uncomfortable, infested with insects or too hot under the sun. Insufficient shaded benches near key facilities and along long routes.	Provide different types of comfortable seating to meet different needs and preferences. Ensure ergonomic, durable seating designs and materials in shaded, visible areas and along frequently used pathways. Benches should not be more than 50 metres apart.[69]
Shelter	Offer shade and protection from sun and rain, enabling outdoor space use during various weather conditions.	Spaces lack sufficiently sheltered area to protect from rain and sun, especially for more informal open spaces and around playgrounds and fitness corners.	Provide in high pedestrian area and along walking routes to enhance comfort. Use climate-sensitive materials like bamboo with UV coatings. Apply high-albedo paints to reduce heat.
Greenery	Enhances aesthetics, shade, and nature interactions while addressing challenges like leaf shedding and wildlife issues.	Some spaces appear too artificial while others have inappropriate foliage, causing the ground to be covered in fallen leaves and roffing matter, increasing risk of slipping.	Use strategic landscaping and nature-based solution to enhance comfort and visual appeal, and for noise reduction. Ensure regular maintenance of greenery to enhance sense of safety. Involve the community to increase environmental stewardship.
Water Cooler	Provide drinking water facilities in hot weather.	Insufficient water coolers in areas where people dwell for longer periods, e.g., at larger parks and greenspaces.	Place near toilets or high-activity areas, ensuring visibility and easy access. Co-locate with other essential amenities like seating, pavilion, to create social interaction opportunity.
Washroom	Essential sanitation facilities, especially in large regional parks and greenspaces.	Lack of public toilets, especially in larger parks and long PCN. People cannot easily locate public toilets in parks.	Install in central locations with clear signage and wayfinding. Adopt universal design. Ensure regular cleaning and maintenance for comfort.
Pavilion	Offer space for rest and social interaction while addressing misuse and noise issues.	Insufficient sheltered areas for community activities, especially at smaller parks and greenspaces. Lack of spaces for people to relax and socialise.	Add comfort aid like fan, mist curtain, seating, lighting, view and interest points in and around the pavilion. Design multipurpose structures for activities. Use durable, climate-sensitive materials. Promote responsible use through public education and park rules. Activate the pavilion as a social space through co-location and programming.
Barbecue Pit	Facilitate family and group gatherings but may cause smoke disturbances.	Barbecue pit areas do not have enough shelters, and tend to be difficult to book online, especially if a resident is not tech savvy.	Shift to picnic areas with durable seating and shelters. Provide clear communication for online and offline booking to ensure inclusion and access. Promote responsible use through public education, programming and park rules.
Lighting	Enhance safety and usability during nighttime while encouraging evening visits.	Insufficient lighting in some areas, especially for informal outdoor spaces and long PCN.	Install sufficient lighting, using a range of lighting types such as ambient, flood light, floor light, LED, motion sensor and smart lighting in key areas for visibility, safety and visual appeal. Use lighting to add place identity.
Path Hierarchy	Ensure safety and harmonious coexistence of diverse users.	Complaints over lack of safety on shared paths, issue of speeding cyclists.	Create separate paths and clear lane markings for pedestrians and fast-moving cyclists to reduce conflicts. Promote responsible use through public education, programming and park rules.
Wayfinding	Facilitate navigation and exploration, particularly in large outdoor spaces.	Lack of adequate signage and directional maps in large outdoor space. In its absence, participants refer to online services such as google maps, but these tend to lack records of landmarks in greenspaces.	Develop clear, easy to understand, all-user signage and wayfinding. Place them strategically to aid navigation and access to different parts of ORS and amenities, e.g., place signs at entry /exit points, key activity destinations and along paths.
Amenities	Support diverse activities and extend outdoor space usability.	Larger greenspaces might not have sufficient amenities clustered in one area that could extend outdoor recreation space use and stay. Such options might also lack inclusivity.	Provide essential (e.g., washrooms, shelters, drinking water points) and activity (e.g., sports fields, fitness equipment, playgrounds) amenities. Offer inclusive, healthy food options (halal and non-halal). Use amenities to add place identity.
Engaging Users	Involve people in the design, planning and management of outdoor space to better understand user needs and experiences.	Spaces might not meet the need of users, and some neighbourhood areas are lacking in updated and engaging facilities, e.g., fitness corners and playgrounds.	Involve residents in facility planning, design, and management. Encourage public participation, co-design and volunteerism to promote responsible use and stewardship. Provide clear communication about facilities and easy to access feedback channels.

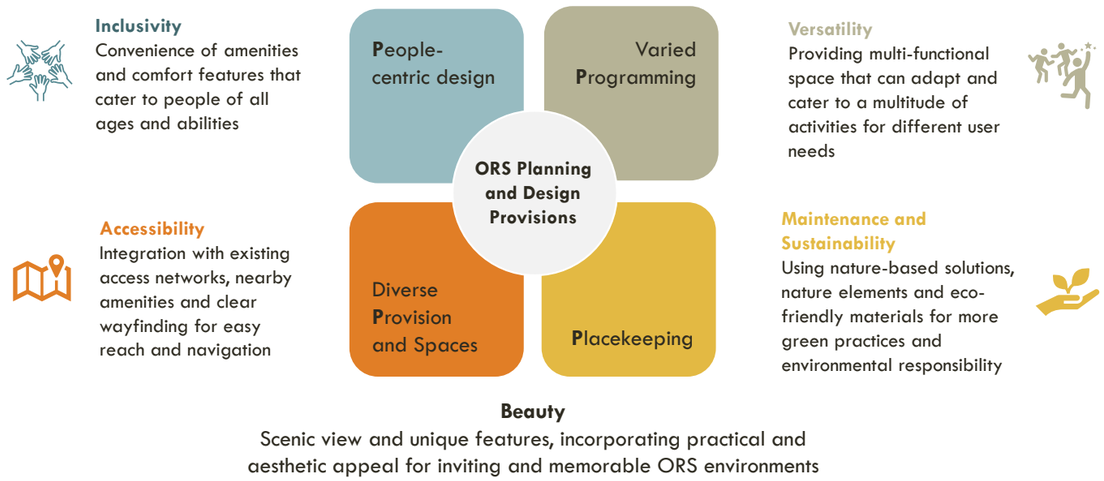
3.3.**Connecting Up**

The analysis of attractions and barriers consolidates four key principles that can enhance person-environment connection in outdoor recreation space, whether regional park, neighbourhood park, park connector or rooftop garden:

- People-centric design.
- Diverse provision and spaces.
- Varied programming.
- Placekeeping, involving longer-term place management for sustainability.

Even as the focus is on putting the hard and soft infrastructure in place, it is important not to overlook longer-term place management considerations, e.g., issues of maintenance, versatility, and sustainability. That is, planning and design of outdoor recreation space is not only about the quantity (more and varied outdoor recreation space) but also more critically about its quality (beauty, comfort, safety, etc.) (Figure 3.3).

Figure 3.3. Planning and design principles - 4Ps



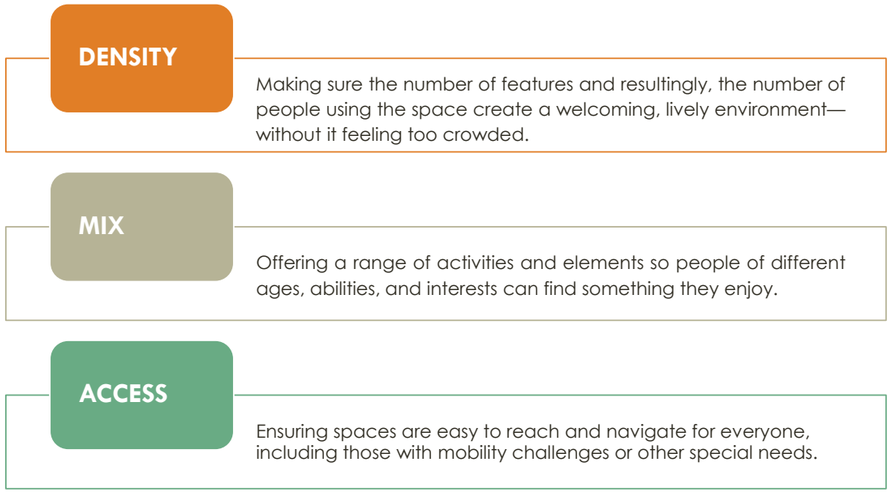
69 Barron, A. (2015). *Age-Friendly Seating and Sense* of Place. Retrieved from https://www.manchester.gov.uk/download/downloads/id/23615/age-friendly_seating_and_sense_of_place.pdf

CHAPTER 04

Adopt People-Centric Design

Adopt People-Centric Design

A people-centric approach to outdoor recreation space encompasses designing, developing, and managing this space with user comfort, experiences, and needs. At the core are people's diverse abilities, ages, and activities, weaved together with elements (natural and built) and programming to create spaces that are engaging, functional, accessible and inclusive to all, and importantly, people love and use. Central to the people-centric approach is the Density-Mix-Access (DMA) framework. Urban DMA framework was initially developed as a method to understand urban morphology, or how cities are laid out.[70] DMA guides planners and designers to surface users' behaviour and interaction patterns with outdoor recreation space through three key factors:



70 Dovey, K., & Pafka, E. (2020). What is walkability? The urban DMA. *Urban Studies*, *57*(1), 93–108. https://doi.org/10.1177/0042098018819727

The DMA framework helps to better understand and make sense of the multipolicy of elements in outdoor recreation space design processes of distribution, functional mix, and connectivity (Table 4.1).

Table 4.1. Application of DMA framework to outdoor recreation space

Diverse User Needs and Preferences	Outdoor recreation space uses and users are many and diverse. Outdoor recreation is typically pursued for purposes of various physical activities, play, relaxation, and social activities. Interaction with outdoor recreation spaces is influenced by several factors including lifestyle and behavioural patterns. People have different abilities and demographics. They look for a varying range of spaces and landscapes at different times of day and life for various activities, completed individually or collectively. E.g., parks, sports facilities, and greenspaces are variously used for a variety of outdoor recreation activities. They often visit not one but several types of outdoor spaces for recreation.
Informal Spaces	Outdoor recreation spaces are not just formally planned spaces. Many outdoor recreation occurs in informal spaces such as void decks of public housing buildings and footpaths. Recreation often takes place in familiar, everyday locations in Singapore. This highlights the need to incorporate a range including informal spaces into the mix of outdoor recreation space provision to better meet community needs.
Accessibility and Connectivity	Spatial accessibility (to and within the outdoor recreation space) is key to equitable outdoor recreation. Perceived lack of access is a barrier that can deter use and diminish satisfaction. Related is the identification and development of land use connections relevant to residents that create outdoor spaces for spontaneous encounters, social interactions and daily life in community.

Several elements and quality considerations are important in the DMA analysis. Recent research in Finland found that alongside quantity, quality of urban greenspace contributes significantly to explaining its use.[71]

4.1. Accessibility, Flexibility and Inclusivity

Accessibility is fundamental to outdoor recreation space use and a key principle of people-centric design. This refers to the ease of access of reaching destinations and opportunities. It encompasses movement features to and within the outdoor recreation space like prioritising barrier-free access and universal design (Box 4.1). It also involves breaking down perceived barriers and raising awareness of the opportunities—letting people know about the accessibility features, services and programmes even before they arrive—to build spaces that help everyone including individuals with disabilities and differing needs to use the space comfortably.

Another key principle is flexibility. Flexibility in outdoor recreation space requires versatility and adaptability in space design to meet changing needs and trends. Key strategies

71 Kajosaari, A., Hasanzadeh, K., Fagerholm, N., Nummi, P., Kuusisto-Hjort, P., & Kyttä, M. (2024). Predicting context-sensitive urban green space quality to support urban green infrastructure planning. *Landscape and Urban Planning*, *242*, 104952.

include, e.g., creating multi-functional spaces that can accommodate different activities. The aim is to offer people choice, spark creativity, and spontaneity in using the outdoor environment (Table 4.2).

Box 4.1. Universal design of parks in USA

The American Society of Landscape Architects provides the following detailed considerations for universally designed parks and plazas to activate them for public life and connected communities:

- Connections to the street: Parks should be at street level for easy access. Integrated ramps and stairs should provide a seamless experience, with safe, high-contrast, non-slip materials.
- Clear identity: A distinct sense of place can be achieved by buffering noise with trees while maintaining easy entry.
- Providing options**:** Public spaces should accommodate diverse needs, offering different environments and activities.
- Ease of access to restrooms: Clearly marked and conveniently located restrooms near pathways and streets are essential for all users, particularly families, older adults, and people with disabilities.
- Isolated and open: A balance of open and enclosed spaces caters to different sensory needs, benefiting older adults, neurodivergent individuals, and those who are deaf or hard of hearing.
- Previewing spaces: Clear sightlines help individuals assess environments before entering, which is crucial for those with sensory sensitivities.
- Comfortable and accessible seating: Seating should accommodate mobility device users, with armrests, backrests, and space for storing mobility aids. Seating should be strategically placed for comfort and accessibility. Seating should be available in both sun and shade, offering secluded and open options. Trees are useful for natural shade.
- Moveable seating: Adjustable seating arrangements accommodate group needs. Materials should avoid glare to aid those with low vision, and circular/U-shaped seating supports communication for deaf and hard-of-hearing individuals.
- Trees: Trees provide shade and define space but should be well-maintained to avoid hazards. High-allergen species should be minimised.
- Well lit: Good lighting enhances safety and usability, particularly for older adults, women, the deaf, and those with low vision.
- Consistent multi-sensory wayfinding: Tactile paving, water sounds, and consistent visual references assist those with sensory disabilities.
- Safe water: Railings with seating offer secure access to water features, and tactile paving helps warn of shallow water hazards.

Source: Extracted from American Society of Landscape Architects. (n.d.). *Universal Design: Parks and Plazas.*

Table 4.2. Providing flexible outdoor recreation spaces

Multipurpose and Reconfigurable Features	Incorporate adaptable designs such as modular infrastructure, moveable seating, 'rooms' or multi-purpose layouts, to enable spaces to be easily reconfigured for different uses and offer people choice and options to meet different interests and needs.
Integration With Other Facilities	Promote multi-functionality and activate meaningful connections with adjoining land use for local residents' everyday life, e.g., transform asphalt-covered school grounds into park-like greenspaces that cater to children's educational and play needs as well as community recreation, and climate resilience; provide shaded pathways through the park to nearby public transportation, and activity hubs like market and shops.
Open Layouts	Design open concept outdoor space settings to enhance versatility, a sense of space, and creativity.
Community Participation	Engage with the community to understand their needs and preferences and adapt the spaces accordingly to meet evolving local community needs.

A third key principle is inclusivity. Inclusivity is about creating inclusive environments where all people, regardless of age, background, and capability can participate equally. As with accessibility and flexibility, the first step is to get a deeper understanding of people's (user and non-user) needs by engaging with the community (e.g., collect data on residents' outdoor recreation, use and experience of outdoor spaces, perceived barriers and enablers). Collaborative research methods such as citizen science, co-design, and participatory action research, are increasingly used to invite local residents to collect data and participate in design processes.[72] The next step is to review and assess the state of provision including how equitable the spaces are, what is missing, and the necessary investments to deliver diversity, equity, and inclusion.

Enhancing inclusivity in outdoor recreation space requires partnerships and collaboration among stakeholders, emphasising the importance of understanding diverse needs and inclusion of everyone, encouraging users to be respectful to create a welcoming environment and experience for all. It involves supporting diversity, representation, and a sense of belonging by all people through features such as accessibility, comfort, facilities, safety and wayfinding (Figure 4.1). Inclusivity is about designing and developing outdoor recreation space by and with all people.

72 Baum, F., MacDougall, C., & Smith, D. (2006). Participatory action research. *Journal of Epidemiology and Community Health*, 60(10), 854–857.; Yuen, B., Chan, F., Lim, K., & Tan, W. M. (2023). *Community Wellness Hub Playbook*. SUTD and MOHT

Figure 4.1. Intergenerational play space for all ages

Aesthetics and Ambience

Aesthetics (visual and sensory quality) and ambience (atmosphere, feel of place) are key ingredients for enhancing user experience, visual appeal, and attraction of outdoor recreation space as visit destination. Activated through visual, tactile, olfactory, and auditory stimuli, they canvas a range of elements—visual (art, architectural and landscape design, greenery, water features), sensory (sound, smell, texture), ambience factors (lighting, scale and proportion) to promote positive user experience. These elements influence space comfort and character, memorable landscapes and special identity or sense of place including a sense of tranquillity, vitality, novelty, grandeur, wonder, and even mysticism (Figure 4.2).

Recent evidence from China suggests that landscape visual quality is important for increasing people's physical and psychological health: good landscape visual quality can attract people and affect their satisfaction with urban parks.[73] Other studies show that attractive outdoor recreation spaces can influence people, especially older adults' health and wellbeing—foster social interaction[74], improve mental health[75], increase physical activity, and reduce obesity.[76] Conversely, use avoidance occurs when the quality of urban spaces deteriorates and is no longer attractive or appealing.[77]

73 Liu, R., & Xiao, J. (2020). Factors affecting users' satisfaction with urban parks through online comments data: Evidence from Shenzhen, China. *International Journal of Environmental Research and Public Health, 18*(1), 253. https://doi.org/10.3390/ijerph18010253

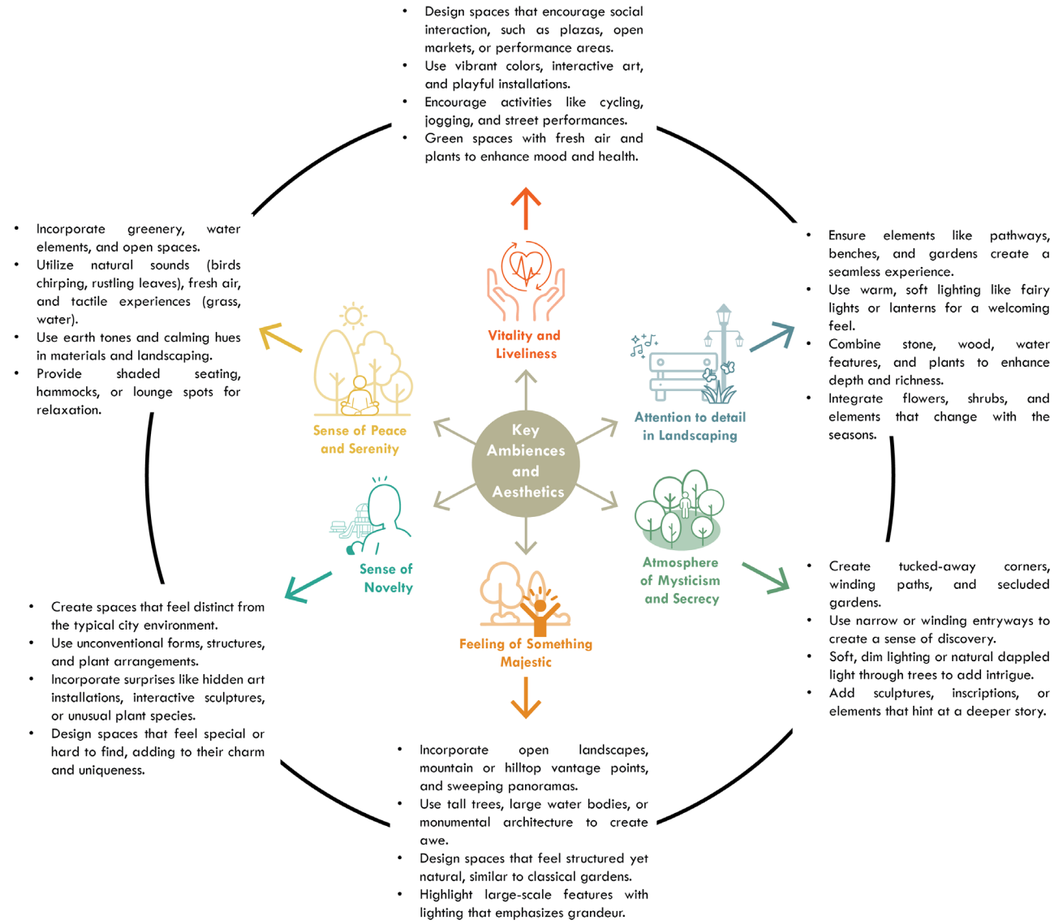
74 The Centre for Urban Design and Mental Health (2014). *How Urban Design can Impact Mental Health*. Retrieved from https://www.urbandesignmentalhealth.com/how-urban-design-can-impact-mental-health.html.

75 Francis, J., Wood, L. J., Knuiman, M. and Giles-Corti, B. (2012). Quality or quantity? Exploring the relationship between public open space attributes and mental health in Perth, Western Australia. *Social Science and Medicine, 74*(10), 1570-1577.

76 Malambo, P., Kengne, A. P., Lambert, E. V., De Villiers, A. and Puoane, T. (2017). Does physical activity mediate the association between perceived neighbourhood aesthetics and overweight/obesity among South African adults living in selected urban and rural communities? *Journal of Physical Activity and Health, 14*(12), 925-932.

77 Jackson, L. E. (2003). The relationship of urban design to human health and condition. *Landscape and Urban Planning,* 64(4), 191-200.

Figure 4.2. Key considerations for ambience and aesthetics in outdoor recreation spaces



Noise

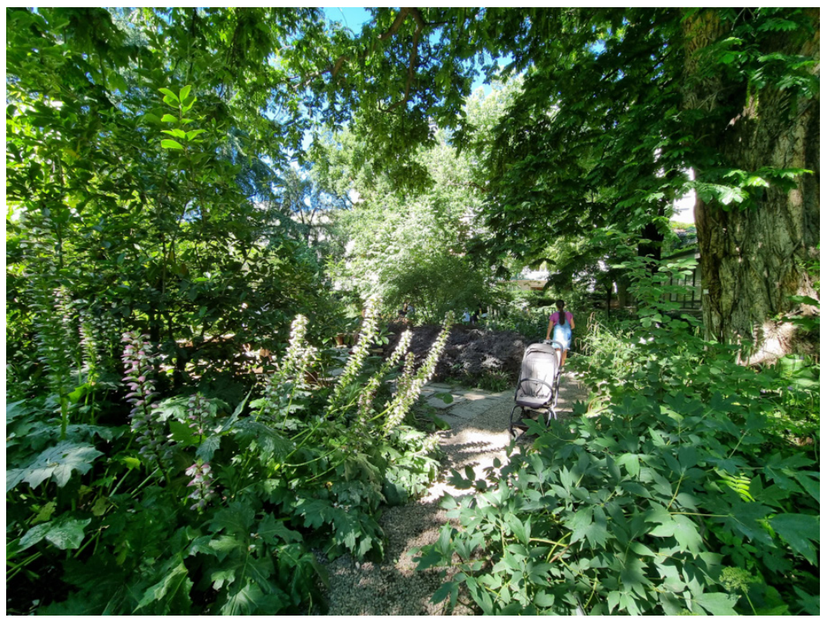
Activities and people often bring noise. Noise can have a negative impact on ambience. Participants from our study consistently expressed concerns about noise nuisance from traffic (e.g., park located next to busy road), construction, crowd, and loud play, detracting from the peaceful atmosphere they seek in outdoor recreation space. The noise nuisance was described to result in sensory overload.

> *If a place is very noisy, gets me very overwhelmed. So, I wouldn't want to go to that area, and it doesn't feel like I'm there to enjoy nature anymore or like be in outdoor space. It just feels I'm [at] shopping [centre] like Orchard Road [shopping area]. (Female, Ang Mo Kio, 21-40 years old)*

Key strategies include separation of activity zones, e.g., creating quiet zones for relaxation and solitude away from noisy high activity areas, and enforcing quite hours so as not to disturb other users and nearby residents (Figure 4.3). Another is to deploy sound buffers between activity zones, e.g., using trees and shrubs to provide noise abatement buffers. With appropriate plant species and planting design, this strategy can reduce noise by five

to ten decibels for every 30 m width of woodland, about 50% noise to the human ear.[78]

Figure 4.3. Private space surrounded by nature



Sense of Belonging and Memories

Feelings of belonging, a key factor in making a place special, are often associated with compatibility (i.e., P-E fit), the attainment of benefits, and place-based connections such as satisfaction and place attachment.[79] Central to this development is the creation of positive memories and views about the outdoor recreation space, e.g., through its landscape, aesthetic, ambience, and enjoyable experiences and interactions with nature and people. Social interaction is particularly valued by older adults—outdoor recreation spaces are important spaces for social interaction.

> *You stay home you don't know anything. That's why come down [to the park] sometimes, at first you come down you don't know anybody, you just walk, take your routine walk, then sit down, then we start to talk to each other, then become quite close already. (Female, Ang Mo Kio, 61-80 years old)*

An important pathway for transforming space into special place is through positive memories. Nostalgia is a prominent theme linked to emotions and memories, usually positive, that are associated with a particular outdoor recreation space. The positive emotions are reinforced by familiarity, routine, and repeat visits to those spaces. The key elements include distinct atmosphere, activities or landmark, contributing to feelings of novelty, discovery, and achievement associated with the place.

> *I grew up there, then there's like lantern festivals and we'll walk around the park. And then, there's a playground. So that's like those memories. (Female, Ang Mo Kio, 21-40 years old)*

> *Where there's a canopy tower and, I birdwatch then we had to take a boat there and climb like 1000 steps together. Yeah, but it's like once you reach there, it's the feeling of I can see the canopy. (Female, Ang Mo Kio, 21-40 years old)*

Conversely, negative emotions (e.g., feeling unsafe, fear of crime, annoyed by noise, frustrated by poor maintenance) can decimate satisfaction and use (lower likelihood of repeat visit). Negative emotions should not be ignored; they may lead to negative word-of-mouth to others, eroding the appeal of the outdoor recreation space and discouraging visitation.

> *The equipment over there are always faulty, once they repair it, it breaks again momentarily. The people came here to take photos. They have been at it for 2 or 3 years but stopped halfway and ceased the repairs. (Male, Ang Mo Kio, 61-80 years old)*

Social Media and Spatial Framing

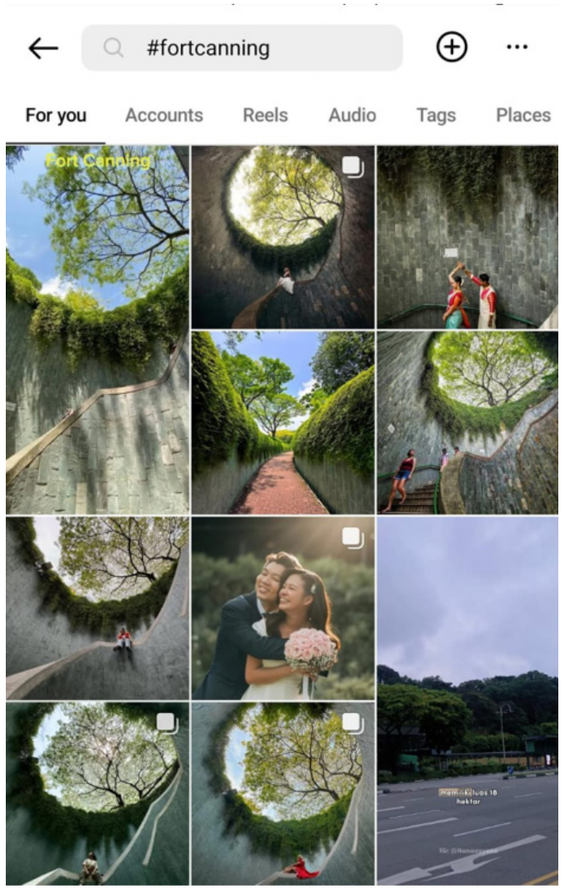
With the rapid development of digitalisation, social media has become a powerful channel in the communication of outdoor recreation space appeal. Many visitors are increasingly sharing and showcasing their adventures, photographs, and opportunities on social media (Figure 4.4).

Spatial framing of scenic landscapes is another potential tool in raising people's awareness of outdoor space and endearing spaces—these outdoor recreation spaces offer stunning sights. Central Park, New York City, USA, Hangang Park, Seoul, S Korea, Hyde Park, London, UK, for example, are among the most visited and photographed city parks in the world. In Singapore, some parks through their scenic landscapes or historic and cultural landmarks are fast becoming attractive popular photo backdrop for wedding shoots or Instagram destinations.

78 Forest Research, UK (n.d.) *Noise Abatement*. Retrieved from https://www.forestresearch.gov.uk/tools-and-resources/fthr/urban-regeneration-and-greenspace-partnership/benefits-of-greenspace/noise-abatement/#:~:text=Greenspace%20has%20the%20ability%20to,human%20ear%20by%20approximately%2050%25.eenspace%20has%20the%20ability%20to,human%20ear%20by%20approximately%2050%25.

79 Budruk, M., & Wilhelm Stanis, S. A. (2013). Place attachment and recreation experience preference: A further exploration of the relationship. *Journal of Outdoor Recreation and Tourism*, *1–2,* 51–61. https://doi.org/10.1016/j.jort.2013.04.001.; Ramkissoon, H., Smith, L. D. G., & Weiler, B. (2012). Relationships between place attachment, place satisfaction and pro-environmental behaviour in an Australian national park. *Journal of Sustainable Tourism*, *21*(3), 434–457. https://doi.org/10.1080/09669582.2012.708042

Figure 4.4. Outdoor recreation spaces as popular Instagram destinations



Sensitivity to Context and Timelessness

Rather than applying a generic approach, context-sensitive design strengthens the uniqueness of a place by placing emphasis on local context in designing and managing outdoor recreation space and features. [80] It is premised on a deep understanding of the surrounding environment, considering exiting topography, natural, historic and scenic environment, and community value. A central tenet is on respecting people's place needs and experiences to help create inclusive outdoor recreation spaces that relate to the community and are more likely to be used (Box 4.2).

80 Kajosaari, A., Hasanzadeh, K., Fagerholm, N., Nummi, P., Kuusisto-Hjort, P., & Kyttä, M. (2024). Predicting context-sensitive urban green space quality to support urban green infrastructure planning. *Landscape and Urban Planning*, *242*, 104952. https://doi.org/10.1016/j.landurbplan.2023.104952

Box 4.2. Superkilen Park, Copenhagen

Superkilen park acts as a giant exhibition, showcasing objects from 60 different nationalities to reflect the diversity of its surrounding neighbourhood. Residents are asked to nominate urban objects from their home countries. These include, e.g., a slide from Chernobyl, Iraqi swings, an Indian climbing playground, a Japanese octopus playground, benches from Brazil, classic UK cast iron litter bins, and a Moroccan fountain. Small stainless-steel plates inlaid in the ground describe each object, what it is, and its country of origin.

Bright-coloured pathways at Superkilen park

Source: ArchDaily (2012)

Source: ArchDaily. (2012). *Superkilen / Topotek 1 + BIG Architects + Superflex.* Retrieved from https://www.archdaily.com/286223/superkilen-topotek-1-big-architects-superflex; Danish Architecture Center. (n.d.). *Superkilen.* Retrieved from https://dac.dk/en/knowledgebase/architecture/superkilen-2/

Timelessness is another quality of special places. A sense of timelessness transcends time and fashion changes. Its key elements include nature, historical and cultural significance, unique design and architecture to contribute to the destination's distinctiveness, ensuring it remains memorable and relevant over time. Nature (e.g., tree, biodiversity, landform) is inherently timeless, consistently inspiring awe, and creating a lasting emotional connection, while historical and cultural elements (heritage and local culture) add depth, evoking introspection and a strong sense of place that resonates with people across generations.[81]

Safety and Cleanliness

Safety (from fall, crime, and traffic) is an important consideration of outdoor recreation space use and satisfaction, ensuring a positive, enjoyable experience while minimizing risks associated with activities, environment, and other users.[82] Given differences in gait speed and traffic judgements between young and older pedestrians[83], older adults need more

81 Daniels, T. L. (2009). National parks: Where the timeless landscape meets the tourist time clock. *Journal of Architectural and Planning Research*, *26*(2), 111–123.

82 Jansson, M., Fors, H., Lindgren, T., & Wiström, B. (2013). Perceived personal safety in relation to urban woodland vegetation—A review. *Urban Forestry & Urban Greening*, *12*, 127–133. https://doi.org/10.1016/j.ufug.2013.01.005; Williams, T. G., Logan, T. M., Zuo, C. T., Liberman, K. D., & Guikema, S. D. (2020). Parks and safety: A comparative study of green space access and inequity in five US cities. *Landscape and Urban Planning*, *201*, 103841. https://doi.org/10.1016/j.landurbplan.2020.103841

83 Oxley, J., Fildes, B., Ihsen, E., Charlton, J., & Days, R. (1997). Differences in traffic judgments between young and old adult pedestrians. *Accident Analysis & Prevention*, *29*(6), 839–847. https://doi.org/10.1016/S0001-4575(97)00053-5

safety measures.[84] Older adults are especially concerned over the risk of falling (e.g., from uneven or slippery surfaces), and potential conflict with traffic (e.g., pedestrian-cyclist conflict along shared paths).

> *I think the path must be careful. Make sure it's not slippery, because certain part is wet. (Female, Ang Mo Kio, 61-80 years old)*

> *The park connector a lot of cyclists, a lot of joggers, children riding bicycle, then they sometimes come behind me and then I am not aware. (Female, Male, Queenstown, 81 years old and above)*

Safety is a multi-dimensional design issue. First, to identify and remove user concerns and physical characteristics, which are often associated with high-risk environments (e.g., poor lighting, poor maintenance, vandalism, isolated places where crime can take place). Safety enhancing strategies include adequate lighting[85], non-slippery paths[86], and proper maintenance of facilities.[87] Other strategies involve the use of technology, e.g., CCTV, sensors, and technological innovations that increase safety (Box 4.3), programming, and activities such as activating informal surveillance, e.g., have areas in line of sight of nearby houses, have park watch groups, and intensifying activity to bring more people into the space and reduce isolation.[88]

84 Dumbaugh, E. (2008). Designing communities to enhance the safety and mobility of older adults. *Journal of Planning Literature*, *23*(1), 17–36. https://doi.org/10.1177/0885412207311818

85 Lis, A., Zienowicz, M., Kukowska, D., Zalewska, K., Iwankowski, P., & Shestak, V. (2023). How to light up the night? The impact of city park lighting on visitors' sense of safety and preferences. *Urban Forestry & Urban Greening, 89*, 128124. https://doi.org/10.1016/j.ufug.2023.128124

86 National Parks Board. (2023). *Pathways*. Retrieved January 7, 2025, from https://gardeningsg.nparks.gov.sg/page-index/hardscapes/pathways/

87 Koplan, J. (2002). The environment and health. *Health Affairs, 21*(2), 179–184. https://doi.org/10.1377/hlthaff.21.2.179

88 Whyte, W. H. (1980). *The Social Life of Small Urban Spaces*. Conservation Foundation.

Box 4.3. Safety along shared paths, Melbourne

Southbank Promenade is a shared path with high volume of pedestrians and cyclists in Melbourne CBD, Australia. Since 2022, sensors have been deployed at Southbank Promenade to understand how the flow and speeds of cyclists and e-scooters impact pedestrian safety along the shared path, especially during peak commuting times.

This project was informed by pedestrian safety concerns expressed in the Participate Southbank community consultation in 2022. A pedestrian and bike sensor, VivaCity Artificial Intelligence Road Survey (AIRS) sensor is used to collect active mobility data including transportation modes (pedestrian, bicycle and e-scooter), transport mode counts and peak times, and speed of movement. Artificial intelligence is used to analyse video footage captured by the AIRS sensor. Different active mobility users are converted into X/Y coordinates, representing specific locations on the promenade. To ensure privacy and data safety, only X/Y coordinates created from on-site analysis of footage are stored and transmitted to the City of Melbourne's data lake in Amazon Web Services (AWS) Australia. Video footage captured by the AIRS sensor is discarded once the on-site analysis is completed.

In addition to sensors, safety signages and path markings are also implemented at higher-risk areas (e.g., entrance of shopping centre, restaurants, intersections) along the Promenade to nudge safer, more considerate sharing of paths between pedestrians and cyclists.

Source: City of Melbourne. (n.d.). *Southbank Promenade: A Shared Thoroughfare.* Retrieved from https://participate.melbourne.vic.gov.au/emerging-tech-testbed/southbank-promenade

Second, to help users know what is ahead and around to heighten their sense of risk control in the outdoor recreation space, consider enhancing site legibility. Strategies include adding visible sightlines, easily recognisable landmarks or reference points, easy-to-navigate layout, clearly defined pathways, and easy-to-locate entrances, exits, and access to help. Clear signage and wayfinding are important tools for promoting safety, helping people to know where they are, and how to get to where they want to go (Figure 4.5). While the smaller parks, e.g., rooftop garden, neighbourhood park, make it easier for users to engage with what is there, participants in the large regional park unanimously asked for clear and identifiable wayfinding signage to help them find their way around the large park and engage with what is there. Amenities like washrooms, barrier-free paths, and drinking water points should be clearly signposted, ensuring that users can easily navigate the space and access these essential amenities comfortably, without disorientation or feeling lost (Figure 4.6).

Figure 4.5. Signage and wayfinding

Figure 4.6. Wayfinding signage

Third, cleanliness—keep the space and facilities regularly clean to ensure they remain inviting. Cleanliness contributes to safety, public health, and aesthetics of the outdoor recreation space. Research in Canada found that cleanliness is generally associated with higher physical activity levels in urban parks.[89] Besides providing adequate trash bins and regular clean up, it is important to promote responsible pet ownership (e.g., clean up after own dog waste), and educate and raise public awareness and community stewardship in caring for the space (e.g., disposing their waste properly, become champions in protecting nature environments) (Box 4.4).

89 Hamilton, K., Kaczynski, A. T., Fair, M. L., & Lévesque, L. (2017). Examining the relationship between park neighbourhoods, features, cleanliness, and condition with observed weekday park usage and physical activity: A case study. *Journal of Environmental and Public Health, 2017*, 7582402. https://doi.org/10.1155/2017/7582402.

Box 4.4. Community in Nature initiative, Singapore

The Singapore National Parks Board has launched the Community in Nature Initiative, a national movement since 2011 to involve people and communities in the conservation of Singapore's natural heritage.

Objectives

- To connect, educate and inspire diverse communities to actively conserve and celebrate our natural heritage.
- To cultivate champions within the community in protecting our nature environments.
- To nurture and form partnerships to achieve better biodiversity and social outcomes.
- To foster and support community groups and organisations working to reconnect people with our natural environment.

Activities

- Citizen science programme, e.g., butterfly watch, dragonfly watch, garden bird watch.
- Habitat enhancement, e.g., one million trees movement, invasive species management programme.
- Nature education, e.g., biodiversity week for schools, greening schools for biodiversity.

One Million Trees Movement (left), Biodiversity Week for Schools (right)

Source: National Parks Board (n.d.).

Source: National Parks Board. (n.d.). *The Community in Nature initiative.* Retrieved from https://www.nparks.gov.sg/nature/community-in-nature

Facilities and Amenities

Facilities and amenities are essential elements that influence the aesthetics, safety, comfort, and whether and how people use the outdoor recreation space.[90] Depending on the size of the space, a range of facilities (built and natural) are provided, e.g., greenspaces, playgrounds, pathways, seating, shade structures, lighting, and other amenities like water features, fitness stations, and dog-friendly areas. Aside from supporting physical activity, parks and recreation departments in USA are including food and beverage (F&B) services (healthy food options) in outdoor recreation space to support healthy eating, catalyse social interaction, and enhance user experience[91] (Box 4.5).

Box 4.5. Jurong Lake Gardens mid-autumn festival food fair, Singapore

Jurong Lake Gardens holds an annual celebration of the Mid-Autumn Festival named "Lights by the Lake", organised by the Singapore National Parks Board. The event showcases a range of programmes including concerts, night bazaars, lantern displays, carnival games, cultural showcases and music performances. In the evening, a Food Street offers a selection of street food. A diverse range of F&B outlets are available (e.g. Chinese food, Muslim food, desserts), catering to different demographics. This has been widely successful in attracting visitors—residents and tourists, who do not usually frequent the park.

Food Street at Lights by the Lake

Source: National Parks Board (2024)

Source: National Parks Board. (2024). *F&B Offerings*. Retrieved from https://lightsbythelake.nparks.gov.sg/fnb/; National Parks Board. (2024). *Lights by the Lake*. Retrieved from https://www.nparks.gov.sg/juronglakegardens/whats-happening/lights-by-the-lake

Participants in our study emphasised the importance of access to washrooms and drinking water points in large regional park. Accessible washrooms and age-appropriate exercise equipment are priorities for older adults and families with children.

90 Veitch, J., Carver, A., Abbott, G., Giles-Corti, B., Timperio, A., & Salmon, J. (2015). How active are people in metropolitan parks? An observational study of park visitation in Australia. *BMC Public Health*, *15*, 610. https://doi.org/10.1186/s12889-015-1960-6

91 Public Health Law Center. (2013). *Five Steps to Food and Beverage Success.* Retrieved from http://bit.ly/1qWM2yD

The washroom is very far. (Female, Jurong Lake Gardens, 41-60 years old)

Very few adults use this [fitness equipment] and actually more kids play around with them even though it may not be safe for them. (Female, Ang Mo Kio, 61-80 years old)

Facility not satisfied. Not enough equipment. (Female, Ang Mo Kio, 61-80 years old)

In our co-design activity on neighbourhood parks, participants expressed a preference for a multi-functional neighbourhood park that caters to the needs of different user groups (Figure 4.7).[92] They included facilities like open space equipped with a running track for running and jogging only, and a multi-generational playground where old and young can play close by, and where sufficient seating was available. Participants proposed to have a combination of wet and dry playground with insulated roof (because of Singapore's hot tropical weather). The roof would be tall enough for children to conduct various activities, and some artistic and creative benches can be installed next to the playground. Hygiene considerations and pest control would be given attention where water exists. Participants further designed the space to have a small football field, and an area providing outdoors experiential experience for parents and children. Participants put a garden with a diverse range of flowers and herbs next to the open space. The lawn was further divided into a mediation zone and a picnic area, where there would be a sign of "No Mobile Phone" and "Keep Your Volume Down" to ensure a peaceful environment for everyone. Participants emphasised that there should be enough greenery and tree shade throughout the park to encourage usage. They proposed that more seating areas should be provided along the walking path and near the open space and playground. Pathways would consider user safety and comfort, like using new materials that can cool down the temperature. A pavilion would be installed at an entrance of the neighbourhood park, allowing people to see, sit and relax.

Figure 4.7. A neighbourhood park designed by participants

92 Wang, J., Chan, F., Koh, J., Kato, Y., & Yuen, B. (2024). *Outdoor Recreation Space Community Design Workshop Technical Report* (Unpublished technical report).

Families highly appreciate creative play equipment and often lament over an unappealing play space. Increasingly, Singapore is building nature-based playgrounds, promoting connection with nature, exploration, and tactile experiences[93] (Box 4.6).

Box 4.6. Clusia Cove – A water playground, Singapore

Clusia Cove is a 3-hectare water playground within Jurong Lake Gardens. Designed to mimic coastal environments, it combines recreation and education through interactive water play that simulates tidal patterns, ripples, and currents. Children can experience natural water dynamics and tidal cycles firsthand. Sand play zones and boardwalks offer views of Jurong Lake. A nearby pavilion with restrooms and vending machines provides a rest area for parents and caregivers. Clusia Cove uses a closed-loop water recycling system with a cleansing biotope, water playground, and eco-pond. Sand beds and semi-aquatic plants filter and oxygenate the water. The shallow pool, up to 30 cm deep, ensures safe and hygienic play.

Family-friendly water playground at Clusia Cove, Jurong Lake Gardens

Source: National Parks Board (n.d.)

Source: National Parks Board. (n.d.). *Clusia Cove*. Retrieved from https://www.nparks.gov.sg/juronglakegardens/explore-our-gardens/attractions/clusia-cove

Including specialised user-oriented facilities is a frequently used strategy. Besides playgrounds, another is dog run in parks. Pet-friendly outdoor spaces cater to the needs of pet owners, especially dog owners, providing opportunities for socialisation, exercise, and relaxation (Box 4.7).

93 Singapore National Parks Board. (n.d.). *Playgrounds*. Retrieved from https://www.nparks.gov.sg/visit/activities/fun-children/playgrounds

Box 4.7. Dog run at Jurong Lake Gardens, Singapore

The dog run at Jurong Lake Gardens is a 2200 square metres grass field that allows dogs to run freely. The grass mounds provide natural obstacles for dogs to enjoy. Aside from the fenced space for dogs to unleash, the dog run also provides washing areas and trash bins for owners to clean up after their dogs. Those features were introduced after a series of public engagement exercises.

Washing areas in the dog run

The dog run has become a social space for dog owners. Owners can enjoy the surrounding natural landscape, converse with other dog owners while their dogs play, making the visit enjoyable for both owner and pet. The pet-friendly theme is continued into the Starbucks café located 1.6 km away and the drinks include a special blend: Puppuccino, adding incentive to walk the distance to the cafe.

Source: National Parks Board. (n.d.). *Dog Run*. Retrieved from https://www.nparks.gov.sg/juronglakegardens/explore-our-gardens/attractions/dog-run

Yet another is facility for the mind. Singapore has developed therapeutic gardens to facilitate user interaction with nature and improve mental wellbeing (Box 4.8). Other cities like Portland have developed memory gardens for people with dementia (Box 4.9).

Box 4.8. Design features of Singapore therapeutic gardens

Therapeutic gardens are designed with:

- Clear and well-connected layout with looped pathways that provide continuous circulation, enabling visitors to navigate the space with ease.
- The wide pathways also enhance accessibility for visitors, including those who are using wheelchairs.
- Curving pathways and vegetation that partially obscures what is coming next with the intention of engaging visitors and encouraging them to explore further.
- A contemplative and rich setting with many opportunities for sensory engagement.
- For example, a therapeutic garden can have a clear layout but is rich with trees, shrubs, flowers, ample places to sit and paths to wander.
- Different planting zones with a specific selection of plant species that evoke memories of the past and engage the senses.
- These include plants that are fragrant, edible, medicinal, coloured or textured, as well as those that attract birds and butterflies.
- A mix of raised planters that are ergonomically designed to enhance accessibility for wheelchair users and standing planters for elderly who are physically fit.

Source: National Parks Board. (n.d.). *About our Therapeutic Gardens.* Retrieved from https://www.nparks.gov.sg/visit/activities/therapeutic-gardens-therapeutic-horticulture-programmes/therapeutic-gardens-parks; National Parks Board. (n.d.). *Woodlands Healing Garden.* Retrieved from https://www.nparks.gov.sg/visit/parks/park-detail/woodlands-healing-garden/#what-to-do

Box 4.9. Memory Garden, Portland

Portland Memory Garden is purposefully designed for people with memory problems including Alzheimer's patients and their caregivers to enjoy the outdoors. Garden features include,

- The garden is designed to provide therapeutic value for people with memory loss, e.g., perennial plants such as roses and hydrangeas are planted to bring back pleasant memories to patients who have visited the garden previously.
- The garden is circular with a landmark at its centre.
- This landmark can be seen from anywhere in the garden, making navigation for visitors with memory problems easier.
- Gates of the garden can be locked so that visitors cannot wander off.
- The garden accommodates seasonal botanical features making it usable during extreme weather conditions.
- The garden has raised flower beds so that people with physical abilities can enjoy the plants.
- The plants are close to the seating so that visitors can have a sensory experience of the flowers as they sit.

Source: Portland Memory Garden (n.d.).

Source: East PDX News. (n.d.). Year round, Portland Memory Garden provides refreshing experiences. Retrieved from https://eastpdxnews.com/general-news-features/year-round-portland-memory-garden-provides-refreshing-experiences/; Center of Design for an Ageing Society (n.d.). Retrieved from http://www.centerofdesign.org/pages/memorygarden.htm; Portland Memory Garden. (n.d.). *Photos.* Retrieved from https://www.portlandmemorygarden.org/photos.html

Climate Sensitivity and Comfort

Outdoor recreation space is a vital part of urban climate action. Adopting climate-sensitive design helps mitigate climate change impacts, e.g., heat stress.[94] Key strategies involve nature-based solutions, incorporating more trees, water features, and greenspaces in the design. International evidence shows that climate-responsive design can make parks more thermally comfortable.[95] Participants from our study (N=1200) indicated that most users would avoid outdoor spaces during hot afternoons (80.5%), and rainy weather (94.7%), reinforcing the need for climate-sensitive design.

Comfort is widely adopted as a primary goal for assessing the quality of public space design.[96] It is a subjective feeling of wellbeing that is influenced by micro-climate conditions like temperature, humidity, wind speed, solar radiation, shade availability, and space design itself. Comfort in outdoor recreation space involves both physical and psychosocial aspects in creating a pleasant and conducive environment for activities. Strategies include the use of natural elements like trees, green walls, and green roofs, to offer shading, airflow, and sustainability.

Shade and/or covered shelters with seating are vital for older adults as well as other users to rest, people-watch or socialise (Figure 4.8) The park bench is the most archetypal item of furniture in outdoor recreation space with lots of social opportunity, a place of solitude and belonging. The Happy Benches projects in Manchester, UK, encourage people to sit down and chat with strangers.[97]

Figure 4.8. We sit where there is shade

94 Oke, T. R., Mills, G., Christen, A., & Voogt, J. A. (2017). Climate-sensitive design. In *Urban climates* (pp. 408–452). Cambridge University Press.; Torkfar, P., & Russo, A. (2023). Assessing the benefits of climate-sensitive design with nature-based solutions for climate change adaptation in urban regeneration: A case study in Cheltenham, UK. *Sustainability, 15*(22), 15855. https://doi.org/10.3390/su152215855

95 Brown, R. D., Vanos, J., Kenny, N., & Lenzholzer, S. (2015). Designing urban parks that ameliorate the effects of climate change. *Landscape and Urban Planning, 138*, 118–131. https://doi.org/10.1016/j.landurbplan.2015.02.006

96 Li, M., Yin, H., Qu, M., & Trivers, I. (2022). Outdoor comfort in public spaces: A critical review. *International High Performance Buildings Conference*, Paper 422. Retrieved from https://docs.lib.purdue.edu/ihpbc/422.

97 Global Shapers Manchester. (n.d.). *Happy Benches*. Retrieved February 28, 2025, from https://mcrshapers.org/happy-benches/#:~:text=and%20others'%20wellbeing.-,'Happy%20Benches'%20encourage%20people%20to%20sit%20down%20and%20chat%20with,healthier%20when%20connected%20to%20others.

The choice of seating material is important. Unlike steel, which can become too hot under the sun, or concrete, which is often cold and hard, natural or recycled fibres provide better seating thermal comfort. Benches could be designed as a rest-cum-social hub, complemented by a group of convenience features such as shelter, trash bins, and drinking fountain, and opportunities to use low-maintenance, eco-friendly, and safety-focused structures to create an inviting and functional environment (Figure 4.9). To ensure inclusivity, the design considers space for wheelchair users, backrests and armrests for older adults, handrails for mobility support, and adequate lighting for the visually impaired, older adults, and all. In colder climates, outdoor heaters could be provided to enhance comfort, while misting systems or fans in hot weather can improve ventilation.

Figure 4.9. Drinking water point also art and identity feature

Source: Various sources[98]

There is opportunity to leverage technology. Beijing in China has used artificial intelligence (AI) to improve park visitor experience, create more personalised and interactive activities, and streamline operations (Box 4.10). Melbourne in Australia has implemented Data in the Park projects to improve city park experience and management (Box 4.11).

98 (Left) Author; (Right) K Design Award. (2014). *WaterDrop* [Photograph]. Retrieved from https://kdesignaward.com/exhibition/209

Box 4.10. AI Park, Beijing

The 40-hectare Haidian Park in Beijing is the world's first artificial intelligence (AI) theme park. The park is free to use and includes a playground for children, an open field for picnic or flying kites. The park integrates several AI-driven features into recreation facilities to enhance user engagement and physical activity including,

- Smart running track: An 860-m running track equipped with facial recognition cameras allows visitors to monitor their exercise metrics, such as distance covered, time, average speed, and calories burned, displayed on a digital leaderboard located at the start and end of the track.
- Augmented reality (AR) Tai chi station: Visitors could participate in Tai chi lessons through a large screen equipped with a camera and motion sensors, which recognises if the user follows the exercise prompts accurately.
- Autonomous vehicle: A self-driving bus provides transportation at several stations within the park. The bus can accommodate a maximum of 8 passengers.
- Other AI features include facial recognition features installed in vending machines, lockers, and access to a building where people can interact with a walking, talking robot.

Tai chi station with AR display screen

Source: Smart Regional Spaces (2018)

Source: Smart Regional Spaces. (2018). *Haidian AI Park*. Retrieved from https://www.smartregionalspaces.net.au/smart-precedent-projects/haidian-ai-park

Box 4.11. Data in the Park, Melbourne

The Data in the Park initiative uses sensor technology to improve park management, planning and user experience in Melbourne, Australia. Led by the Emerging Technology Testbed team at the City of Melbourne, the initiative began as a pilot at Argyle Square near the University of Melbourne in 2020 and has since expanded to five additional parks. Key features include,

- Smart infrastructure for data-driven insights: Sensors monitor pedestrian and cyclist movements, playground and facility usage, air quality, and micro-climate conditions.
- Data-informed public space planning and management: Real-time data help identify high- and low-use areas, peak usage times, and environmental conditions affecting park experience. Sensor data also allow for longitudinal tracking of these indicators to inform future planning, management and operation of public open spaces.
- Enhancing safety: At Southbank Promenade, sensors monitor the speed and movement of pedestrians, cyclists, and e-scooters to address safety concerns raised during public consultation. AI processes video footage to analyse mobility patterns while ensuring privacy by only storing X/Y coordinates instead of raw video.
- Community-centred approach: Signages are displayed to inform the purpose of public open space sensing. Live data dashboards are available on the City of Melbourne website, ensuring transparency and community participation.

Playground sensors at Royal Park (left, middle), Sensor signage (right)

Source: City of Melbourne. (n.d.). *Southbank Promenade: A Shared Thoroughfare*. Retrieved from https://participate.melbourne.vic.gov.au/emerging-tech-testbed/southbank-promenade; City of Melbourne. (n.d.). *Data in the Park – Royal Park*. Retrieved from https://participate.melbourne.vic.gov.au/emerging-tech-testbed/royal-park

CHAPTER 05

Build Diverse Provision and Spaces

Build Diverse Provisions and Spaces

Building diverse provisions in outdoor recreation spaces is an essential strategy for ensuring that these spaces cater to varied demographic, and a wide range of activities, and experiences. There are two aspects. First concerns the spatial distribution (availability and access) of outdoor recreation spaces in the community and city. Second is about offering diverse spaces and facilities within an outdoor recreation space. Both aspects are central to promoting inclusivity (provision for all), health and wellbeing (spaces for physical activity, social interaction, and mental restoration), environmental sustainability (spaces for absorbing stormwater runoff, mitigating urban heat island effect), and biodiversity (spaces for flora and fauna).

5.1. Spatial Distribution, Availability, Access

How outdoor recreation space is distributed within the community, and across the city is a basic consideration of the supply of recreation facilities, affecting the availability, proximity, and access to recreation opportunities. The availability of outdoor recreation space (supply) directly influences how many, when, who, where, how, and why people use them (demand). The relationship between outdoor recreation space supply and user demand is a dynamic, two-way process. Increased user demand can trigger the construction of new spaces or improvement to existing facilities and affect the overall supply of outdoor recreation spaces within a community.

Assessing the supply and demand is an important first step in outdoor recreation space planning and provision. Outdoor recreation space supply is often reviewed in terms of its distributional attributes (quantity and quality of provision like adequacy, appropriateness, efficiency) including the amount, accessibility, distribution, location, size, and features of provision.[99] In USA, the Trust for Public Land conducts an annual national assessment of park supply in 100 large US cities using ParkScore index with 14 measures on park acreage, investment, amenities, access, and equity.[100] Although the most frequently studied, parks are not the only outdoor recreation space in the community and city. It is important for supply to also consider all other outdoor recreation spaces including playfields, and informal greenspaces used for urban leisure.

Data and analysis are important to understanding not only supply but also user demand. A mix of quantitative, qualitative, and real-time methods, e.g., surveys and sensors, can be used to find out people's socio-temporal usage patterns, experiences, preferences, motivations for use/not, and satisfaction (Box 5.1).

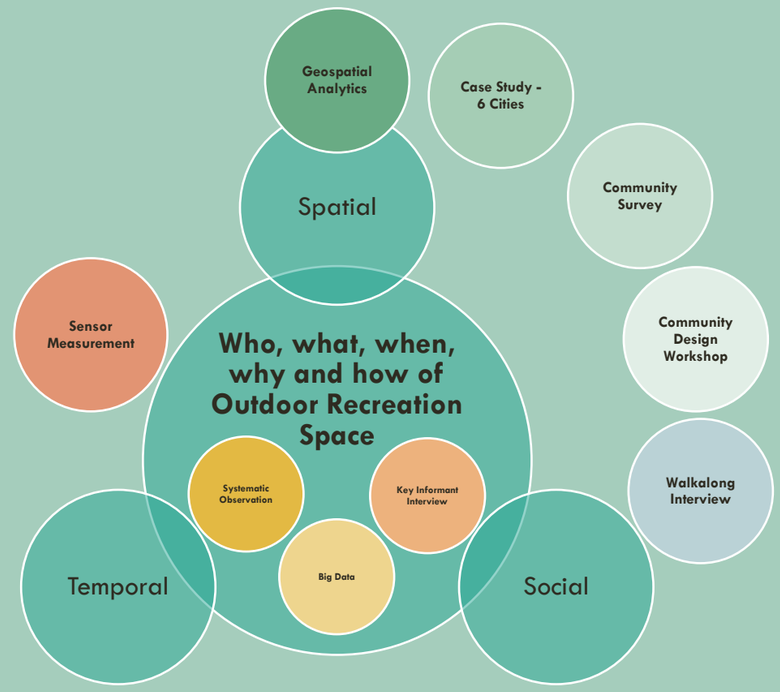
99 Xu, S., Li, J., Gao, X., Zhao, H., Hu, J., & Yuan, S. (2024). Framework for analyzing the relationship between supply, demand, and flow of recreational services in urban park green spaces. *Ecological Indicators, 166*, 110857. https://doi.org/10.1016/j.ecolind.2024.110857

100 Trust for Public Land. (2024). *ParkScore Scoring Metrics*. Retrieved from https://www.tpl.org/parkscore/rankings

Box 5.1. An Integrated Socio-Temporal Study of Outdoor Recreation Spaces in Singapore

This interdisciplinary research project (2022-2025) aims to develop a holistic understanding of Singaporeans' lived experiences of outdoor recreation space to identify when, who, where, how, why of outdoor recreation. The study utilises mixed methods including sensor measurement and spatio-temporal analytics of outdoor recreation space preferences and needs.

Researching outdoor recreation space in Singapore



Source: Lee Kuan Yew Centre for Innovative Cities, Singapore University of Technology and Design. (n.d.). *An Integrated Socio-Temporal Study of Outdoor Recreation Spaces in Singapore.* Retrieved from https://lkycic.sutd.edu.sg/research/ageing-urbanism/an-integrated-socio-temporal-study-of-outdoor-recreation-spaces-in-singapore/

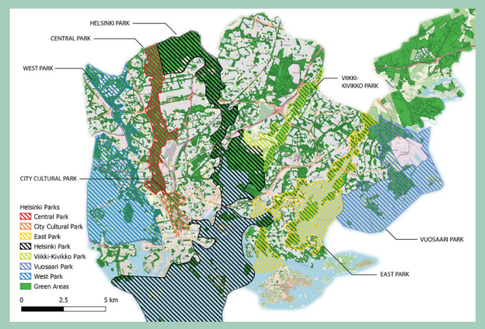
Our study of six liveable cities found that all six cities have provided outdoor recreation spaces. Outdoor recreation space refers to public open spaces in the city that afford opportunities for people to get outdoors and engage in a variety of activities and settings such as greenspaces, outdoor sports facilities, and civic spaces. Greenspaces cover at least 15% (Melbourne, New York) to 34% (Helsinki, Portland, Seoul) and in one instance (Tokyo), as much as 52% of the city's land area. All six cities embody a long tradition and practice of providing a range (different types, location, size, character, facilities) of outdoor recreation space to meet population needs (Box 5.2).

Box 5.2. Outdoor recreation space in Helsinki

Based on location, outdoor recreation spaces in Helsinki, Finland, can be divided into urban and rural recreation spaces.

- Rural recreation areas are in the urban peripheries.
- Urban recreation spaces are located within urban and suburban areas and are relatively close to housing areas.

Urban green recreation spaces, i.e., forests and parks, are, in some cases, connected to rural green areas by green wedges. Green wedges are continuous green spaces connecting the city centre to the outskirts.



The average distance to parks for residents is about 600 metres though the average distance for people residing in central and suburban areas is 800 and 500 metres respectively. While green and natural areas are the most dominant types of outdoor recreation space in Helsinki, the city offers a wide range of outdoor recreation spaces including,

- Beaches
- Cycling routes
- Dog parks
- Forests and Urban Parks
- Forests with marked paths
- Jogging tracks and footpaths
- Moorings for leisure boats
- Open public spaces (plazas, open markets)
- Outdoor excursion areas
- Outdoor sport areas
- Skating rinks and artificial ice rinks
- Waterfront areas (sea and lakes)
- Winter swimming places.

Source: Hasanzadeh, K., Choi, Y., Lim, K., Goh, E., Chan, F., Dieterich, A., & Yuen, B. (2023). *A Desktop Review of Planning and Use of Outdoor Recreation Spaces in Six Cities: Helsinki, Melbourne, New York, Portland, Seoul, Tokyo* (Unpublished technical report).

Laying out an effective and efficient spatial distribution of outdoor recreation space is, however, a challenging task considering limited urban land and competing land uses. Of importance is the match between user demand and availability and access to outdoor recreation spaces as a mismatch can negatively impact on residents' quality of life. A classic example is USA where uneven distribution has resulted in some neighbourhoods (usually private housing, high income, highly educated, predominantly White residents) have better access to greenspaces than others (public housing, low income, predominantly Hispanic and Black residents). Take Chicago, a city with high park accessibility (98% of residents are within a 10-minute walk of a park), and ranked #10 in 2024 ParkScore of 100 US cities (Box 5.3). Despite citywide park provision and an annual tree canopy cover of 16%, in some underserved neighbourhoods, this cover retreats to a low 4%.[101] The lack of greenspace puts vulnerable groups, e.g., older adults at risk of chronic diseases, extreme summer heat, and flooding.

Box 5.3. Chicago park provision

Chicago, IL, USA

Land Area: 607.44 km^2

Population: 2,746,388 as of 2020 census

Citywide Parkland Acreage: 13,821 acres, 10.2% of city area

Median Park Size: 2.2 acres

Access: 98% of residents within a 10-minute walk of a park.

Equity**:** 98% of low-income households within a 10-minute walk of a park. Low-income neighbourhoods have 25% more park space as those in high-income neighbourhoods.

Annual Park Investment: US$545,032,507 93-year average); US$200 per resident

Amenities:

Facilities	Citywide Number	Citywide per capita
Basketball hoops	1222 hoops	4.47 per 10,000 residents
Dog parks	30 dog parks	1.10 per 10,000 residents
Playgrounds	981 playgrounds	3.39 per 10,000 residents
Senior recreation centres	252 centres	1.85 per 20,000 residents
Restrooms	339 restrooms	1.24 per 10,000 residents
Splashpads	243 splashpads	8.90 per 10,000 residents

Source: U.S. Census Bureau. (2020). *QuickFacts: Chicago City, Illinois.* Retrieved from https://www.census.gov/quickfacts/fact/table/chicagocityillinois; Trust for Public Land. (2024). *ParkScore: Chicago.*

Against limited land constraint and sustainable development, Chicago has adopted the planning principle of multi-functionality and implemented various nature-based solutions to expand availability and access to greenspaces including planting more trees, greening schoolyards and roofs.

- Chicago is a pioneer of green roof construction in USA. Since the first green roof construction at Chicago City Hall in 2001, there are 509 green roofs (over 5 million square feet) within the City of Chicago by 2013.[102] Green roofs are roofs that are partially or fully planted over with vegetation, a

101 City of Chicago. (2022). *Chicago Climate Action Plan.* Retrieved from https://www.chicago.gov/city/en/sites/climate-action-plan/home.html

102 Chicago Green Roofs. (n.d.). *Chicago Green Roofs*. Retrieved from https://www.chicago.gov/content/city/en/depts/dcd/supp_info/chicago_green_roofs.html

growing medium, root barrier, and waterproofing membranes, using extensive or intensive green roof systems (Table 5.1). Several other countries and cities including Paris and Singapore have implemented green roofs to encourage social, economic, and environmental benefits.[103]

Table 5.1. Types of green roofs in Chicago

Type	Infrastructure	Maintenance
Extensive - American Red Cross Rauner Centre 	2,800 square feet green roof installed on one-third of building's roof surface Promotes energy savings and reduces rainwater runoff Sedum mix used for a lightweight, modular green roof system	Easy to install vegetated trays Minimal maintenance
Semi-intensive - Chicago City Hall 	20,000 square feet green roof installed on half of the roof of Chicago City Hall Has over 20,000 plants of more than 150 varieties Helps to save US$5,000 on utility bills annually	Regular irrigation Gardening staff maintain the roof Irrigation system provides water to green roof regularly
Intensive - Gary Comer Youth Centre 	Soil depth goes up to 24 inches Urban farm that yields produce year-round which is used to feed students and is sold at the local market and restaurants in the city Outdoor classroom and job training for youth	Full-time gardener needed to sustain the garden Students partake in the stewardship of their garden plots

Source: Various sources[104]

- Space to Grow Programme supports the transformation of public schoolyards—asphalt-covered school grounds, especially in low-income neighbourhoods into nature-filled outdoor spaces—"vibrant spaces to play, learn and be outside" with community participation[105] (Box 5.4). As of 2024, there are 34 Space to Grow schoolyards across Chicago.[106] Green schoolyard has become a national movement. Elsewhere, Amsterdam and Paris are similarly working to expand green schoolyards as part of their nature-based solution to promote emotional wellbeing, and urban resilience.[107]

Box 5.4. Space to Grow, Chicago

Greening schoolyards can be a powerful strategy for ensuring that all children have access to the benefits of contact with nature. Working with the community, school districts can turn school grounds into living ecosystems where trees and vegetation give children opportunities to learn and connect with nature, "loose parts" for play, and manage stormwater at the same time. Designed with flexibility, these schoolyards integrate green infrastructure and multi-use recreation facilities to serve both students and the wider community.

- Multi-use spaces: Schoolyards include outdoor classrooms, athletic courts, tracks, and playgrounds designed for all ages. These elements encourage physical activity while allowing spaces to be used for different purposes.
- Green infrastructure: Permeable surfaces, rain gardens, and native plantings improve stormwater management. At James Wadsworth Elementary School in Woodlawn, redesign efforts reduced impervious ground cover from 100% to 50%, easing pressure on the city's sewer system.
- Community engagement: Spaces are co-designed with parents and local groups, ensuring the design caters to the unique needs and visions of the local community. The green schoolyards remain accessible beyond school hours for community use.

Multi-use spaces in James Wadsworth Elementary schoolyard

Source: Space to Grow (n.d.).

Source: Space to Grow. (n.d.). *Greening Chicago Schoolyards.* Retrieved from https://www.spacetogrowchicago.org/

103 RAND Engineering and Architecture. (n.d.). *Green Roof Fact Sheet*. Retrieved from https://randpc.com/articles/energy-efficiency/green-roof-fact-sheet#:~:text=Green%20roofing%20systems%20consist%20of,two%20to%20six%20inches%20deep

104 GreenGrid. (n.d.). *American Red Cross Rauner Centre*. Retrieved from https://www.greenroofs.com/projects/american-red-cross-rauner-center/; City of Chicago. (n.d.). *Green Roofs on Historic Buildings: Chicago City Hall*. Retrieved from https://www.nps.gov/articles/000/green-roofs-on-historic-buildings-chicago-city-hall.htm; Hoerr Schaudt. (n.d.). *Gary Comer Youth Centre*. Retrieved from https://hoerrschaudt.com/project/gary-comer-youth-center/

105 Healthy Schools Campaign. (n.d.). *Space to Grow: Greening Chicago Schoolyards*. Retrieved from http://www.spacetogrowchicago.org

106 Marcy, C. (2024, August 13). *Interview with the Senior Vice President, Healthy Schools Campaign* [Personal communication].

107 Flax, L., Korthals Altes, R., Kupers, R., & Mons, B. (2020). Greening schoolyards—An urban resilience perspective.

Urban planning is a powerful tool for land use allocation, sustainable development, and open space planning. Urban planning of outdoor recreation space, whether in the community or at city level, involves integrating greenspaces (diverse types), and prioritizing considerations like environment, public health, and equity, to provide accessible amenities and recreation opportunities, and quality of life for all residents. Several approaches prevail such as adopting a systems approach and planning a system of parks and natural areas. [108] Key aspects include,

- Considering population needs, and site conditions like drainage, topography, vegetation, micro-climate.
- Defining the desired function and zoning of the outdoor recreation spaces.
- Integrating with adjoining land uses like public transport, residential area, shops.
- Involving the community in developing provisions and spaces that are meaningful to them.
- Recognising changing needs and trends to stay relevant, that ongoing changes of the community require attention and may change provisions.

On-site space planning involves designing the infrastructure (e.g., lighting, pathways, seating), landscape elements (e.g., trees, plants, greenery), and spaces for activities (e.g., contact with nature, exercise, play, relaxation) to maximise usability, and aesthetic appeal, while minimising environmental impact like noise nuisance. Activities are the basic building blocks to give people a reason to visit an outdoor recreation space. Of consideration are factors like safety, comfort, connectivity, accessibility and within walking distance of residents.

In recent years, others have emphasised the importance of understanding people-environment interactions to provide enhanced knowledge about the human drivers and responses (social action) to recreation settings (ecological change) by studying social-ecological complex adaptive systems (e.g., urban environment system, forest ecosystem).[109] The social-ecological system analysis investigates the social and ecological factors, the interactions and interrelationships of various elements within the system, and between the system and its environment.[110]

Yet others like USDA Forest Service have suggested to include a benefits of leisure perspective using the Recreation Opportunity Spectrum to measure, plan, and manage outdoor recreation settings and opportunities. [111] The Recreation Opportunity Spectrum investigates recreation quality in outdoor recreation settings as the degree to which the natural resource base and its environmental opportunities meet people's preferences, emphasising the importance of providing diverse recreation opportunities to secure quality visitor experiences (Table 5.2).

Cities, 106, 102890. https://doi.org/10.1016/j.cities.2020.102890

108 Hart, W. J. (1966). *A Systems Approach to Park Planning*. IUCN Publications, Supplementary Paper No. 4.

109 Morse, W. C., Selin, S., Cerveny, L. K., & Blahna, D. J. (2022). Editorial: Introduction to sustainably managing outdoor recreation and nature-based tourism as social-ecological complex adaptive systems. *Journal of Outdoor Recreation and Tourism, 38*, 100519. https://doi.org/10.1016/j.jort.2022.100519

110 Morse, W. C. (2020). Recreation as a social-ecological complex adaptive system. *Sustainability, 12*(3), 753. https://doi.org/10.3390/su12030753

111 Gundersen, V., Tangeland, T., & Kaltenborn, B. P. (2015). Planning for recreation along the opportunity spectrum: The case of Oslo, Norway. *Urban Forestry & Urban Greening, 14*(2), 210–217. https://doi.org/10.1016/j.ufug.2015.02.007

Table 5.2. Recreation opportunity spectrum

Opportunity Class	Experience Opportunity	Physical, Social, and Managerial Setting
Primitive (P)	Isolation from sights and sounds of man, high challenge and risk, use of outdoor skills.	Large, unmodified natural area, minimal user presence. Only essential facilities for resource protection; no comfort facilities. Informal, dispersed spacing to minimise contact., no motorised use.
Semi-primitive non-motorised (SPNM)	Some isolation, high interaction with nature, moderate challenge, use of outdoor skills.	Predominantly unmodified environment, low user density. Facilities protect resources and user safety. On-site materials used where possible., no motorised use.
Semi-primitive motorised (SPM)	Some isolation, high interaction with nature, moderate challenge, motorised use allowed	Similar to SPNM, but permits motorised use; low user density, limited management controls. Motorised use is permitted.
Rustic (R)	Balance of social interaction and isolation, moderate outdoor skill use, both motorised and non-motorised recreation allowed.	Moderate natural modification, moderate user density, rustic facilities for safety and convenience. Conventional motorised use allowed in design and construction.
Concentrated (C)	Social interaction, convenience-focused, outdoor skills and risk-taking less important.	Substantially modified environment, moderate to high user density. Resource modification enhances recreation and maintains vegetative cover and soil, many facilities, designated activity areas, motorised access and parking,
Modern Urbanised (MU)	Highly developed, social interaction prioritised, minimal outdoor skills or challenge.	Urban setting with extensive built infrastructure, high user density. Exotic, manicured vegetation. Soil protection via hard surfacing and terracing, facilities for large groups, including electrical hookups and sanitation. Motorised access, public transport availability.

Source: Adapted from Brown et al (1978)[112]

Green and Blue Spaces

Greenspaces are frequently associated with outdoor recreation spaces. They refer to areas with vegetation like trees, plants, and biodiversity including native flora and fauna. Parks are a common type of greenspace in the city. Blue spaces are outdoor areas with water features like river, lake, sea, fountain. Individually or combined, they offer a variety of recreation, social, relaxation, and wellbeing opportunities like contact with nature, exercise, fishing, boating, picnic[113] as well as environmental and ecological functions like mitigating urban heat island effect and enhancing outdoor thermal comfort, stormwater

112 Brown, P. J., Driver, B. L., & McConnell, C. (1978). *The Opportunity Spectrum – Concept and Behavioural Information in Outdoor Recreation Resource Supply Inventories: Background and Application* (Forest Management Faculty Publications No. 31). University of Montana. Retrieved from https://scholarworks.umt.edu/forest_pubs/31

113 Anguelovski, I., Cole, H., Connolly, J., & Triguero-Mas, M. (2018). Do green neighbourhoods promote urban health justice? *The Lancet Public Health, 3*(6), e270. https://doi.org/10.1016/S2468-2667(18)30096-3

and flood management[114] (Box 5.5).

Box 5.5. Flood mitigation strategy of Bishan-Ang Mo Kio Park, Singapore

Bishan-Ang Mo Kio Park is a 62-hectare urban park between two public housing towns, Bishan and Ang Mo Kio. Developed under the Active, Beautiful, and Clean Waters Programme, the existing concrete canal is transformed into a blue-green recreation park including,

- Pond gardens
- Butterfly habitat
- Cleansing biotopes
- River plains, vegetated riverbanks provide recreation space during low water and act as flood zones when water levels rise (this park is integrated with the Kallang River)
- The river's winding path extends the channel from 2.7 km to 3.2 km, slowing water flow and increasing capacity by 40% compared to a concrete channel. Water depth ranges from 10 to 50 cm in dry weather and can rise to 3 m during heavy rain.

The park has a river monitoring and warning system to prevent flooding and ensure safety. Water level sensors issue early warnings. During heavy rain, warning lights, sirens, and audio announcements at safety nodes advise users to move to higher ground above red markers. The park has 11 safety nodes, each with an information board guiding visitors on safety procedures.

Diagram of a safety node (left), a safety marker with speaker (right)

Source: National Parks Board (2018), Public Utilities Board (n.d.)

Source: Schaefer, C. (2014). *Bishan-Ang Mo Kio Park: From Concrete Canal to Natural Wonderland.* Retrieved from https://web.mit.edu/nature/projects_14/pdfs/2014-Bishan-Ang-Mo-Kia-Park-Schaefer.pdf; National Parks Board. (2018). *Bishan-Ang Mo Kio Park Information Sheet.* Retrieved from https://beta.nparks.gov.sg/docs/default-source/parks-docs/bishan-ang-mo-kio-park/bishan-ang-mo-kio-map-information-booklet.pdf; Public Utilities Board. (n.d.). *Kallang River (Bishan-Ang Mo Kio Park).* Retrieved from https://www.pub.gov.sg/Public/Places-of-Interest/Our-Reservoirs-and-Waterways/Bishan-Ang-Mo-Kio-Park

The cooling benefit of green and blue spaces is influenced by several factors including vegetation type, microclimate, size of the outdoor space and its green and blue areas,

114 Johar, F., & Razak, M. R. (2015). The right attitude to sustain the green neighbourhoods. *Procedia - Social and Behavioral Sciences, 202*, 135–143. https://doi.org/10.1016/j.sbspro.2015.08.214

which can affect the duration of direct solar radiation, and temperature of surfaces. Research on neighbourhood park in Perth, Australia, found that trees and shade are important to the cooling benefit, with shade being the predominant source.[115] Key strategies to enhance outdoor recreation thermal environment and comfort include,

- Tree planting, e.g., establish dense tree canopy strategically to provide shade throughout the day, especially in high-traffic areas; plant low-growing shrubs to offer additional shade; select trees and shrubs with high shade potential including native plants.
- Add water features, e.g., stream, pond, fountain, misting system, to lower ambient temperature, enhance visual appeal and biodiversity, and serve as waterplay or recreation areas. [116]
- Provide amenities for comfort and convenience, e.g., washrooms and ensure that they are accessible, sign-posted, and well-maintained; seating with shade structures to make the space comfortable for longer visits; adequate lighting to extend space usage into the evening and improve safety.
- Adopt climate-responsive design, e.g., include elements based on microclimate including sun angles and prevailing wind (Figure 5.1).

Figure 5.1. Climate-sensitive shelter design, integrating natural materials and renewable energy

It is important for outdoor recreation spaces to create spaces for all ages including,

- Children: Provide inclusive, safe, and age-appropriate play areas and equipment that accommodate children of all abilities, e.g., sensory play elements, wheelchair-accessible swings (Box 5.6).
- Youth: Provide activity areas that appeal to youth, e.g., skate park, sports

115 Barghchi, M., Grace, B., Edwards, N., Bolleter, J., & Hooper, P. (2024). Park thermal comfort and cooling mechanisms in present and future climate scenarios. *Urban Forestry & Urban Greening, 101*, 128533. https://doi.org/10.1016/j.ufug.2024.128533

116 Hami, A., Abdi, B., Zarehaghi, D., & Maulan, S. B. (2019). Assessing the thermal comfort effects of green spaces: A systematic review of methods, parameters, and plants' attributes. *Sustainable Cities and Society, 49*, 101634. https://doi.org/10.1016/j.scs.2019.101634; Li, J., Zheng, B., & Bedra, K. B. (2022). Evaluating the improvements of thermal comfort by different natural elements within courtyards in Singapore. *Urban Climate, 45*, 101253. https://doi.org/10.1016/j.uclim.2022.101253

facilities, or hangout areas with Wi-Fi and interactive features like QR code and app to provide information about the place and features and appropriately buffered from quiet areas.

- Adults: Provide activity areas that appeal to adults, e.g., fitness stations, walking paths, seating areas.
- Older adults: Provide shaded benches, barrier-free walking paths, and spaces for socializing, individual or group activities like Tai chi.

Box 5.6. Nature playground – Forest Ramble, Singapore

Forest Ramble at Jurong Lake Gardens is Singapore's largest nature playground, spanning 2.3 hectares with 13 stations inspired by animal movements such as jumping like squirrels or splashing like otters. Designed with natural materials like sand and wood, it provides a sensory-rich environment that fosters environmental awareness and appreciation. The playground prioritises inclusivity, featuring wheelchair-accessible merry-go-round, and other elements that allow children of all abilities to play together.

Source: National Parks Board. (n.d.). *Forest Ramble (Nature Playgarden)*. https://www.nparks.gov.sg/juronglakegardens/explore-our-gardens/attractions/forest-ramble-(nature-playgarden)

The diversity of users and activities necessitates the provision of diverse spaces and multi-functional zones, e.g.,

- Activity areas
  - Provide spaces for different activities to support different needs, from individual to group, active to passive recreation activities, e.g., demarcate zones for active recreation and social gatherings like around playground, fitness station, picnic area, and quiet areas for passive recreation like walking paths, seating, gardens for relaxation and solitude.
  - Provide a mix of shaded areas (trees, pavilions), and open sunny spaces to accommodate different preferences for sun and shade in the outdoors.

- Flexible spaces: Provide flexible spaces, e.g., open lawn, modular design, and movable chair, to allow spaces to adapt to various events and activities like tai chi classes, farmers' market, live music performances.
- Cultural and social spaces: Provide spaces for community activities like art and cultural festivals and events, heritage and history of the site to heighten cultural relevance, and connection to surrounding community and sense of place. Of relevance is cultural sensitivity, e.g., provide multi-lingual signage.
- Nature zones: Provide habitats for native flora and fauna, e.g., bioswale, wetland, garden for ecological balance.

The key consideration is to balance natural and built elements in outdoor recreation space—beauty, functionality, and cultural relevance, while ensuring accessibility, comfort, safety, sustainability, and community involvement. The community is the expert in the design process, and community involvement is crucial to the future success of the outdoor recreation space, ensuring that the provisions meet community needs. The goal is to create a place, not a design, that is inviting with a safe, comfortable image, and a strong sense of community where the whole of its setting (spaces and facilities) and uses (activities and programming) is greater than the sum of its constituent components.

Complementary Amenities

Complementary amenities can be activated to enhance the experience of outdoor recreation space. A key aspect is the integration of a caloric landscape, which involves offering healthy food options in and around an outdoor recreation space. Access to nutritious food supports healthier lifestyles, complements physical activity, and aligns with broader public health goals. Higher caloric, higher fat, saturated fat, and carbohydrate neighbourhood food environments have associations with the risks of being overweight.[117] The implication is that food outlets, vending machines, and cafés in and near outdoor recreation space should prioritise wholesome choices such as fresh fruits, whole grains, and low-calorie options to reinforce positive health behaviours.

Another aspect is to co-locate and triangulate a group of complementary amenities to create prompts to stimulate social interaction.[118] This could involve strategically placing a cluster of amenities together like art sculpture, water feature, scenic view, buskers or other activities that draw people's attention. For example, a bench, a drinking water point, and fitness zone could be co-located together with other amenities such as a coffee cart to form a social space, rather than arranging each amenity in a separate place (Figure 5.2). Thoughtful planning of the range, mix, and placement of amenities is crucial to social connection opportunities.

117 Dickens, B. L. (2024). *Profiling the Role of Outdoor Recreational Green Space, Energy Density, and Macronutrient Exposure with Overweightness in 15,614 Adults in Singapore* (Unpublished technical report).

118 Whyte, W. H. (1980). *The Social Life of Small Urban Spaces*. Conservation Foundation.

Figure 5.2. Strategic placement of complementary amenities

5.2. **Close-to-Home Outdoor Recreation Space**

About 50% of visits to local parks in Singapore are to neighbourhood parks.[119] Our study of outdoor recreation usage patterns in Singapore found that about 1 of 2 residents' favourite outdoor recreation spaces are located close to home compared to near-work or -learning places. The finding reinforces the importance of proximity and access to outdoor recreation space in supporting regular use, and making positive memories, especially in older adults' life-space.[120] People are willing to travel up to 2.5 km for near-home larger parks and greenspaces, while frequent users and older adults prefer shorter travel distances, less than 1 km and less than 10-minute walk. Past studies have found neighbourhood parks important for residents' social capital, especially families living with children in high-rise, high-density housing, providing a convenient outdoor play and social space that is away from indoor computer games in an increasingly digital society.[121] Others argue that having more parks nearby can predict higher levels of physical activity, and healthy ageing among older adults.[122]

Aspects, which are important to close-to-home outdoor recreation space becoming community places include,

- Variety and place identity
  - Provide a variety of accessible outdoor recreation spaces close to home including neighbourhood park, rooftop garden, park connector, and informal greenspaces for people to walk, cycle, play, or do other physical and social activities, spend time in the outdoors, recharge and relax.
  - Create distinctive spaces—unique and different from other parks and gardens, which the surrounding community can relate to, and develop emotional connection, e.g., by working with existing landform, using architecture (design, colour, materials) and landscaping elements (vegetation, shelter, lighting) to enhance place identity.
  - Provide a range of on-site recreation activities and amenities, e.g., seating, designated spaces for sports field, walking paths, fitness station, and playground to encourage people to visit, and stay longer (Box 5.7).
- Connectivity
  - Plan and integrate this space as part of a broader, inter-connected "open space system".
  - Connect with surrounding land uses, e.g., public transport, shops, and activity centres, to enhance convenience, accessibility, and meaningful connections with community life (Figure 5.3).
- Community involvement
  - Get the community involved to understand how to meet their needs.
  - Develop volunteer opportunities for programming, community-led events and activities.

Box 5.7. Essential components to improve neighbourhood park usage

Seating
- Comfortable and variety of seats
- Well-shaded by trees, shelters, and other means
- View of waterbody or activity plaza (focal points)
- Near to people traffic/concentrations, e.g., joggers, cyclists, tai-chi groups, diners at nearby café

Focal points and stimuli for interaction
- Great seating around the playground
  - Caregivers can easily watch over their children
  - Others may also sit down to enjoy the lively atmosphere
- Adequate lighting to offer a sense of safety at night and promote nighttime visit

Universal design
- Make the whole place accessible and usable by all
  - Barrier-free access
  - Wide space beside seats for wheelchair users
  - Sensory and tactile features for the visually impaired

Source: Ling, S. K. (2012). *The Value of Parks Nearby and Ways to Enhance Them* (Research Technical Note RTN 09-2012, Urban Studies Series). National Parks Board, Singapore.

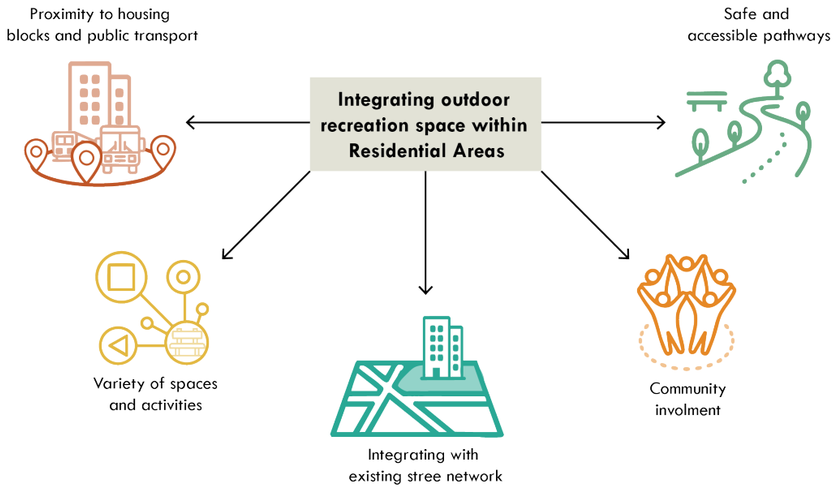
119 Ling, S. K. (2012). *The Value of Parks Nearby and Ways to Enhance Them*. Research Technical Note RTN 09-2012, Urban Studies Series. National Parks Board, Singapore.

120 Wells, N., & Laquatra, J. (2008). Why green housing and green neighbourhoods are important to the health and well-being of older adults. *Generations (San Francisco, Calif.), 33*, 50–57.

121 Yuen, B. (1996). Use and experience of neighbourhood parks in Singapore. *Journal of Leisure Research, 28*(4), 293–311. https://doi.org/10.1080/00222216.1996.11949776; Kuo, F. E. (2010). *Parks and Other Green Environments: Essential Components of a Healthy Human Habitat*. National Recreation and Park Association.

122 Poppe, L., Deforche, B., Van Cauwenberg, J., Brondeel, R., Mertens, L., Van de Weghe, N., Benoit, S., Veitch, J., & Van Dyck, D. (2022). The association between the number of parks near home and levels of physical activity among community-dwelling older adults: A longitudinal study. *Cities, 130*, 103931. https://doi.org/10.1016/j.cities.2022.103931

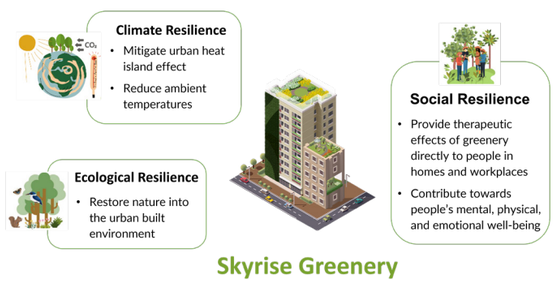
Figure 5.3. Integrating outdoor recreation space within residential areas



In addition to neighbourhood parks, Singapore has provided an increasing range of outdoor recreation settings and opportunities in its high-rise, high-density housing development. Under the Singapore Green Plan and City in Nature vision, the goal is to enable every household to be within a 10-minute walk of a park by 2030.[123]

- Rooftop gardens and skyparks are an emerging type of outdoor recreation space in Singapore (Figure 5.4). Built on or within high-rise buildings (residential and commercial), these greenspaces provide nearby opportunities for recreation and relaxation. In addition to enhancing accessibility (seamless access from building), rooftop gardens and skyparks help improve climate resilience by adding greenery to vertical urban areas. When planning these spaces, it is important to consider the types of activities and programmes they will offer. The aim is to provide accessible options for residents rather than to overcrowd every precinct. This typology is especially popular with older adults for social connection (Box 5.8). Elsewhere, other cities including Chicago, London, New York City, Tokyo, and Vienna are developing rooftop garden or green roof.

Figure 5.4. Skypark concept



Source: National Parks Board (n.d.)[124]

123 See also Chapter 2.3.
124 National Parks Board. (n.d.). *Skyrise Greenery*. Retrieved from https://skyrisegreenery.nparks.gov.sg/

Box 5.8. Usage at Ghim Moh Rooftop Garden, Singapore

At Ghim Moh Rooftop Garden, residents can reach the garden by taking a lift from their apartment buildingss. All residents interviewed at Ghim Moh Garden were able to travel to the rooftop garden within a 5-minute walk. An older resident mentioned that she usually meets and chats with friends in the rooftop garden, and they would go for a meal or grocery shopping together afterwards. Another, an adult user living near the rooftop garden mentioned that a preschool is near the garden, and he would accompany his children to play in the garden after school.

Regardless, participants shared that the garden is only accessible to the residential units within the building and lacks connectivity to other places or amenities.

Source: Kato, Y., Chan, F., Wang, J., & Yuen, B. (2024). *Outdoor Recreation Space Ethnographic Study Technical Report* (Unpublished technical report).

- Corridors for recreational connectivity in the form of park connector (PCN) plays a vital role in enhancing recreational access and connectivity across Singapore. It provides seamless links between major parks and housing areas through an extensive system of linear green corridors. The Singapore PCN include walking and cycling paths, signage, good lighting, and safe crossings (Box 5.9). Residents of Alexandra Canal Linear Park value it as a transit area and a shortcut for daily commutes such as children walking to school. Its key attractions include its greenery, and linkage of housing areas and nearby key amenities, integrating the PCN seamlessly into daily life, supporting commuting, recreation, and social needs (Box 5.10). Park connectors or greenways are developed in many other countries (urban and rural areas) including Australia, Europe, USA, and Canada.

Box 5.9. Singapore Park Connector Network (PCN) design guidelines

The park connector network transforms underutilised linear spaces, like road reserves, drainage reserves, and land beneath railway tracks into landscaped pathways for walking and cycling. It links parks, nature areas, and coastal spaces, offering extended opportunities to explore Singapore's greenspaces and travel longer distances amidst nature surroundings. There are two types of park connector:

Roadside connectors: located alongside roads,

- 4-metre segregated path: 1.5 metre footpath + 2.5 metre park connector path.
- Shared park connector path: for widths under 3.5 metre.
- 6-metre Park Connector Network Round Island Route (PCN-RIR): 2 metre footpath + 4 metre park connector path, with 4 metre adjacent greenery.

Waterway connectors: found along big drains, canals, waterfront and coastal areas,

- 4-metre segregated path: 1.5 metre footpath (closer to waterway) + 2.5 metre park connector path.
- Shared park connector path: for widths under 3.5 metre.
- 6-metre Park Connector Network Round Island Route: 2 metre footpath (closer to waterway) + 4 metre park connector path, with 2 metre greenery.
- Coastal 6-metre Park Connector Network Round Island Route: 2m footpath + 4m park connector path, with 9m planting space.
- 5-metre shared boardwalk: for coastal areas.

Source: National Parks Board. (n.d.). *Know Our Recreational Connectivity.* Retrieved from https://pcn.nparks.gov.sg/aboutrecreationalconnectivity/; Land Transport Authority. (2018). *Walking and Cycling Design Guide.* Retrieved from https://www.lta.gov.sg/content/dam/ltagov/industry_innovations/industry_matters/development_construction_resources/pdf/ActiveMobilityProposalsandRequirements/Walking%20Cycling%20Design%20Guide%20SG.pdf

Box 5.10. Key attractions of Singapore close-to-home outdoor recreation spaces

Key attractions in outdoor recreation space focus on diverse activities, appealing aesthetics, and a welcoming atmosphere that fosters social interaction.

- Diverse and inclusive spaces: Mix of active (sports, playgrounds) and passive (seating, greenery) spaces. A welcoming, visually appealing environment encourages social interaction and repeat visits.
- Strategic location and accessibility: Easily accessible outdoor recreation space supports daily routines and social wellbeing. Leverage nearby infrastructure (e.g., schools, markets, shops, public transport) to enhance visitation.
- Spatial considerations:
    - Movement and proximity: Anchor attractions like sports facilities and playgrounds guide visitor movement.
    - Surrounding infrastructure: Schools and amenities shape distinct peak hours, especially on weekdays.
    - Focal points: Visitors stay within familiar zones, requiring well-placed focal points to optimise usage.

Outdoor recreation space types	Key Attraction
Park Connector (Alexandra Canal Linear Park)	Tranquil atmosphere with rich greenery, fitness corners, and scenic murals, but faces challenges with wayfinding, shading, and shared lane safety.
Rooftop Garden (Ghim Moh Rooftop Garden)	Well-maintained, accessible facilities with a lively playground and senior fitness area, though cleanliness, noise, and connectivity issues persist.
Regional Park (Jurong Lake Gardens)	Scenic views, diverse play and garden spaces, and well-maintained paths, though overcrowding, wayfinding, and accessibility remain key concerns.
Public Housing Neighbourhood Park (Our Park@618)	Cool, windy environment with well-used fitness corners, community events, and open spaces, but faces maintenance, shading, and air quality issues.
Private Housing Neighbourhood Park (Mayflower Crescent Park)	Quiet, natural ambiance with large trees and strong community engagement, though visitors desire better seating, pavilion space, and tree maintenance.

Source: Kato, Y., Chan, F., Wang, J., Jimenez Vasquez, L. A., & Yuen, B. (2024). *Outdoor Recreation Space Final Technical Report* (Unpublished technical report).

Informal Spaces

Outdoor recreation is not limited to formally organised and designated recreation spaces. In many cities including Singapore, outdoor recreation takes place in informal spaces close to home as well; 7 in 10 of our study participants (N=1200) considered informal outdoor greenspaces as important/very important for daily recreation. Many frequently visit these spaces though they may not explicitly recognise them as these spaces often

lack place name or identity. Regardless, these spaces are another convenient, ubiquitous source of proximate nature that are unstructured but with multiple ecosystem, health, and social benefits.[125] Rupprecht and colleagues define informal greenspaces as[126],

- An urban space with a history of strong anthropogenic disturbance.
- At least partly covered with non-remnant spontaneous vegetation.
- Being neither formally recognised nor managed for environmental protection, recreation, agriculture, etc.

They may include wasteland, vacant lots, utility corridors, etc., and generally have intact natural ecosystems or interstitial wilderness.[127] In Singapore, due to its high-rise, high-density public housing design, void deck is a ubiquitous informal outdoor recreation space that many residents use for transit (get into and out of the housing block), and social interaction daily. The void deck is a unique local high-rise building feature where the ground floor of the apartment block is purposefully left void of housing units to enhance cross-ventilation, circulation, and offer community space. The void deck is sometimes used for communal events like wedding, funeral or partially repurposed for activity areas such as senior activity centres, childcare centres, residents' committee centres, coffee corners[128] because of its easy access to residents of all ages. The void deck is often invested with seating—people can sit and wait for the lift, collect daily mail or talk to other residents, offering spontaneous recreation opportunities, and complements the surrounding neighbourhood park, and precinct garden. Our on-site observations show that residents would sometimes add their own chairs (usually more comfortable) to what is provided on-site (Figure 5.5).

Despite their many potential benefits, informal greenspaces remain an understudied space. More research is needed to understand how different informal greenspaces are used and valued by residents. Crucially, informal greenspaces should be included in outdoor recreation space typology planning. The intent is not to formalise these spaces but to recognise their role and value in the community and city.

Figure 5.5. Singapore void deck

125 Luo, S., & Patuano, A. (2023). Multiple ecosystem services of informal green spaces: A literature review. *Urban Forestry & Urban Greening*, 81, 127849. https://doi.org/10.1016/j.ufug.2023.127849; Sikorska, D., Łaszkiewicz, E., Krauze, K., & Sikorski, P. (2020). The role of informal green spaces in reducing inequalities in urban green space availability to children and seniors. *Environmental Science & Policy*, 108, 144–154. https://doi.org/10.1016/j.envsci.2020.03.007

126 Rupprecht, C. D., Byrne, J. A., Ueda, H., & Lo, A. Y. (2015). 'It's real, not fake like a park': Residents' perception and use of informal urban green space in Brisbane, Australia, and Sapporo, Japan. *Landscape and Urban Planning*, 143, 205–218. https://doi.org/10.1016/j.landurbplan.2015.07.003

127 Jorgensen, A., & Tylecote, M. (2007). Ambivalent landscapes—Wilderness in the urban interstices. *Landscape Research*, 32, 443–462. https://doi.org/10.1080/01426390701449802

128 Mocnik, S. (n.d.). *Coffee Corner at Block 122: Café for Older Adults in Toa Payoh West Singapore*. LKYCIC Webpost Note: Recreation Note 19. Retrieved from https://lkycic.sutd.edu.sg/research/resources/

CHAPTER 06

Create Varied Programming

Create Varied Programming

Programming and activities, whether planned and organised or ad hoc and informal, are an integral part of outdoor recreation space management (Box 6.1). Alongside the provision of accessible, flexible, and inclusive spaces and facilities, programming is essential for adapting and animating this infrastructure to the needs of the community.[129] Programming serves multiple purposes including,

- Influencing user and use
- Changing people's perception of the space
- Increasing the number of users
- Diversifying user profiles
- Enhancing on-site experiences and sense of safety
- Promoting community engagement, social interaction, and place attachment
- Encouraging sustainability by mobilising eco-friendly practices and minimising waste during activities and events

129 Glover, T. D. (2015). Animating public space. In S. Gammon & S. Elkington (Eds.), *Landscapes of Leisure*. Palgrave Macmillan. https://doi.org/10.1057/9781137428530_7

Box 6.1. Park Takeover Programme, Portland

The Park Takeover programme in Portland, Oregon, USA, is an initiative that temporarily transforms underutilised or neglected public spaces—often small pockets of land within the city—into vibrant community parks through pop-up activations, and community-led events. From Friday to Saturday during June 2024, a local youth organisation took over to activate Director Park, located in downtown Portland, with a range of activities. These included skateboarding, basketball, boardgames, and live music performances, and vendors selling various goods and foods to promote intergenerational use of the park.

Various activities took place at Directors Park, Portland

Source: Portland Downtown. (n.d.). *Events at Directors Park*. Retrieved February 28, 2025, from https://community.portlandmetrochamber.com/directorpark/Details/blaze-director-park-takeover-1116772?sourceTypeId=Hub

Programming provides activity generators that can attract and increase people presence in outdoor recreation spaces, and reinforce the interaction between people, use, and safety in outdoor recreation spaces (Box 6.2). Depending on the outdoor space location, size, and facilities, programming can encompass a wide range of recreation, education, contact with nature, and socialisation activities such as,

- Adventure and exploration, e.g., hiking, camping, nature walk.
- Arts and culture, e.g., outdoor concert and performance, art in the park.
- Family and children's activities, e.g., junior ranger programme, treasure hunt, play at children playground.
- Fitness and wellness activities, e.g., brisk walking, tai chi, yoga, exercise (individual or fitness classes).
- Seasonal and special events, e.g., Mid-Autumn and other cultural festivals, dance or live music events.
- Sports and recreation—team sports and/or individual sports, e.g., soccer, kite flying, cycling, frisbee tournament.
- Nature and environmental education, e.g., community gardening, tree planting, bird watching, citizen science programme.
- Community building activities, e.g., picnics, famer's market, pet-friendly event.

Another frequently used strategy to engage users is food and beverage service, usually in larger outdoor recreation spaces, which offers health and social connection opportunities—to develop conversation and memories as well as expanding access to healthy food options.[130]

Box 6.2. Programming at Finsbury Park, London

Finsbury Park is in a multi-cultural neighbourhood in North London, UK. The park has a lake, walking paths, an outdoor gym, and mixture of open ground, formal gardens for various activities including live music performance in summer. Laid out during the Victorian period, Finsbury Park went into physical decline by the 1980s and was rejuvenated in 2003 with a £5 million Heritage Lottery funding. The regeneration included cleaning the lake, building a new café and children's playground, and various other facilities like tennis courts, athletics track, horticultural garden, and spaces for a wide range of programmes like basketball, volleyball, baseball, cricket, softball, and skateboarding. Regularly organised and planned activities include fitness classes, and a weekly parkrun. The park and its many activities, especially in terms of sports and exercise attract a range of people, providing a safe green space for interaction between diverse social groups that would not otherwise talk to each other.

British indie music festival at Finsbury Park

Source: When the Horn Blows (2022)

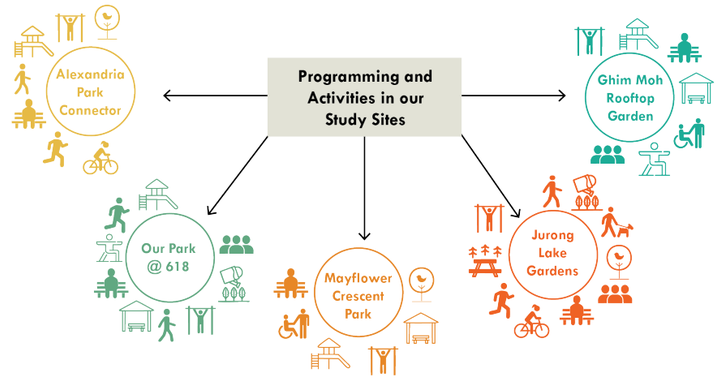
Source: Jackson, H. (2006). *Rising From the Ashes: The Resurrection of Finsbury Park*. Retrieved from https://www.londongardenstrust.org/features/finsbury.htm; When the Horn Blows. (2022, July 18). *Festival review: Community Festival, Finsbury Park, London (July 2022)*. Retrieved from https://whenthehornblows.com/content/2022/7/18/festival-review-community-festival-finsbury-park-london-july-2022

6.1. **Programming Different Spaces**

Programming and activities will vary according to the space and its facilities even though some activities may be common in all outdoor recreation space like fitness, recreation, nature and social interactions (Figure 6.1 and Table 6.1).

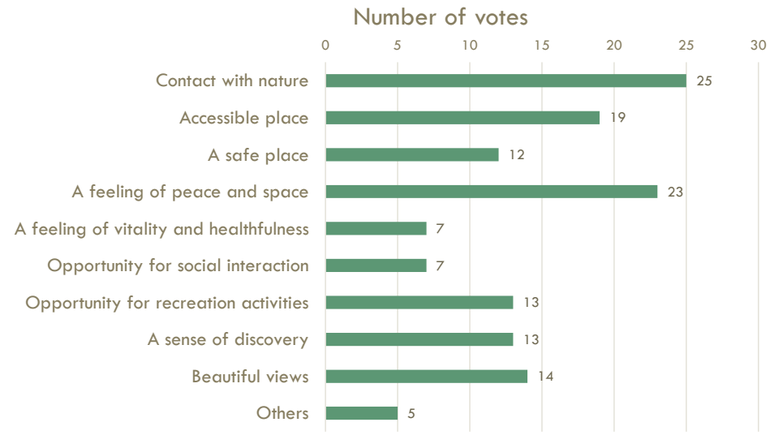
130 Naylor, P., Bridgewater, L., Purcell, M., Ostry, A., & Wekken, S. (2010). Publicly funded recreation facilities: Obesogenic environments for children and families. *International Journal of Environmental Research and Public Health, 7*(5), 2208–2221. https://doi.org/10.3390/ijerph7052208

Figure 6.1. Programming and activities in study sites



Fitness, recreation, and social programming are vital strategies to increase the functional relevance and appeal of outdoor recreation spaces. As some participants from our study shared, repeated engagement in the same activities can result in the outdoor space becoming an endearing or special place to the user. That is, spaces become "special" not solely due to their intrinsic qualities but through the routinisation of activities over time (Figure 6.2).

Figure 6.2. Factors in creating special place



Note: Each participant may select up to three essential features (N=48)

Beyond the administrative typologies discussed, outdoor recreation space can also be categorised based on people's perceptions. Three types—Special, Great, and Ideal outdoor recreation space are identified based on residents' perception and preference. These space conceptions reveal what people look for in outdoor recreation space for meaningful interactions.

Table 6.1. Programming in different outdoor recreation spaces in Singapore

Study Site Typology	Main Activity and Programming	Activity Examples
Alexandra Canal Linear Park (Park Connector Network)	Utilitarian Activities	Walking and cycling to commute and navigate neighbourhoods.
	Physical Exercise	Walking, jogging, running, and cycling for fitness and recreation.
	Caregiving & Play	Accompanying children and individuals in need of care at a playground and exercise corner, ensuring their safety and comfort
Our Park @618 (Neighbourhood Park, Public Housing)	Community Gardening	Participating in urban farming and maintaining shared greenspaces.
	Caregiving & Play	Accompanying children and individuals in need of care at a playground and exercise corner, ensuring their safety and comfort
	Fitness & Recreation	Using fitness corner and playground for structured physical activities and play.
Mayflower Crescent Park (Neighbourhood Park, Private Housing)	Fitness & Recreation	Using fitness corner and playground for structured physical activities and play.
	Solitude & Relaxation	Unwind through quiet activities, connecting with nature and observing wildlife.
	Caregiving	Accompanying children at a playground and exercise corner, ensuring their safety and comfort
Jurong Lake Gardens (Regional Park)	Formal Fitness & Sports Programme	Structured activities at ActiveSG facility, including indoor gym workouts, swimming, table tennis, along with exercises at fitness corner.
	Social Gathering	Meeting friends and families near food courts and other park amenities, as well as having BBQ and picnic around BBQ pits and open areas.
	Passive Observation	Appreciating nature, wildlife, and the surroundings, particularly around Clusia Cove and Forest Ramble.
	Pet-Related Activities	Walking and playing with a dog, interacting with other dog owners at a dedicated dog run or a pet-friendly Starbucks.
Ghim Moh Rooftop Garden (Rooftop Garden)	Informal Group Exercises	Community-led fitness activities such as Tai Chi, Zumba, and Yoga, promoting health and social interaction.
	Fitness & Play Areas	Engaging in physical activities at the fitness corner and playground for all age groups.
	Caregiving & Play	Accompanying children and individuals in need of care at a playground and exercise corner, ensuring their safety and comfort.

Special Outdoor Recreation Space

A Special outdoor recreation space refers to an outdoor space imbued with personal significance, often tied to cherished memories or meaningful experiences. Such places evoke a sense of connection, whether through relaxation, adventure, or moments shared with loved ones. The qualities associated with the nominated Special outdoor recreation space varied according to the type of space and its intrinsic nature,

- Nature spaces and parks were associated with the presence of nature, having a peaceful ambience, aesthetics and varied landscapes, and being host to activities and programmes.
    - A recurring theme is the provision of opportunities for exercise and health, such as running, walking, or jogging. These opportunities are often intertwined with desired factors like ease of access and convenience from homes or workplaces, which enabled greater frequency of visits, and integration into daily routines.
- Quieter and more isolated spaces where residents often visit specifically for its quietness, a place for solitude and relaxation.
    - A recurring theme here is nature—the ambience, aesthetics, and presence of nature, especially in nature spaces and parks made these spaces special. Examples included natural landforms, and the ethereal, calming, and mystical atmosphere that nature exudes.

Great Outdoor Recreation Space

A Great ORS is seen as a destination that stands out due to its exceptional beauty, uniqueness, or sense of awe it inspires when in the place. This place may be remarkable for its natural landscapes, innovative design, or the way it blends nature with human creativity. It offers one-of-a-kind or unforgettable experiences that leave a lasting impression. Great ORS encapsulate many desired qualities.

- Aesthetic appeal emerges as the most frequently mentioned characteristic of a great outdoor recreation space, underscoring the importance of beauty in such spaces.
- Inclusive and welcoming environments are also highly valued, reinforcing the need for accessibility and a sense of belonging.
- Sustainability and resilience are seen as essential, highlighting environmental consciousness, and the importance of long-lasting spaces.
- Timelessness and ease of maintenance, indicating a preference for spaces that endure and remain functional over time.
- Adaptability is another key consideration, with many favouring spaces that can evolve to meet changing needs.
- Sensitivity to context is also noted, showing an appreciation for spaces that harmonise with their surroundings.

Ideal Outdoor Recreation Space

An ideal outdoor recreation space is an outdoor recreation space that people aspire to have in their neighbourhoods. In this study, residents conceptualised their own ideal outdoor recreation space, responding to three commonly observed typologies of outdoor recreation space: rooftop gardens, park connectors, and neighbourhood parks. Key features of Ideal outdoor recreation space encompass inclusivity, accessibility, beauty, versatility, and sustainability, along with the cohesive integration of these qualities.

6.2. **Activities and Usage Patterns**

Our survey found that walking is the most common activity across all socio-demographics, followed by sitting, socialising, cycling, and jogging. Analysis of social media X data in the last decade revealed that walking, running, and cycling are the most messaged activities in Singapore since 2013 (Figure 6.3).

Figure 6.3. Percentage of messages about recreational activities on X from 2013 to 2023

Aside from space and facilities, community needs and demographics are important considerations in outdoor recreation space programming (Table 6.2). Understanding demographics and identifying specific interests and needs of the community is a key strategy for creating bespoke programmes that reflect the community's preferences and priorities and strengthen community participation and partnership.[131] Our data show that each demographic group brings unique needs and preferences (Box 6.3). Since activity patterns vary by gender, age, and ethnicity, it is important for programming to accommodate diverse fitness and recreational levels to create an inclusive environment that supports individuals with varying health conditions and physical abilities. For instance, individuals who rate their health highly often prefer vigorous activities such as cycling, running, and sports while those with lower self-rated health tend to gravitate towards quieter and serene outdoor spaces that support relaxation and social interactions.

131 Foderaro, L. W. (2024). *The power of parks to strengthen community: A special report*. Trust for Public Land, USA.

Table 6.2. Activities in Singapore outdoor recreation space

Informal Activities Self-organised morning group exercise (tai chi, Zumba, yoga) popular among older women; males prefer solitary or active sports	Provide shaded/sheltered spaces for group exercise; ensure multilingual inclusivity in structured activities, e.g., fitness classes.
Utilitarian Activities Pedestrian walkways in parks serve as commuting shortcuts with shaded rest areas, benefiting working adults and older adults	Maintain well-connected pathways with shaded rest spots and access to amenities for both commuters and recreational users.
Independent Activities Solitary exercise and relaxation activities peak in cooler morning hours; midday use declines due to outdoor heat.	Ensure availability of quiet, shaded areas; design spaces to support both active and passive independent users.
Caregiving Caregivers bring children to playgrounds after school and on weekends; caregivers look after older adults; intergenerational social interactions occur	Place playgrounds near childcare and senior activity centres; include seating for caregivers.
Pet-Related Activities Pet owners frequent dog parks and greenspaces in the morning and evening; dog-walking fosters social interaction	Integrate pet-friendly amenities (dog runs, waste bins) near social spaces; promote responsible pet ownership.
Passive Observation Passive users engage in people-watching and nature appreciation, peaking during cooler hours; use varies by gender and age	Design structured seating areas with shade and security features; implement flexible programming for passive users.

International evidence on the effect of programming on community engagement is mixed. Some suggests that events and organised activities in parks can encourage social interaction between people from different backgrounds, especially when visitors are active or engaged in shared activities.[132] Others are concerned that diverse, inclusive programming can exclude—"diverse programming does not necessarily guarantee broad representation or that different groups will interact".[133] Some users are deterred by symbolic, financial, and/or physical barriers associated with organised activities and events. This necessitates that creating diverse programming considers not only how the activities and events are experienced but also careful planning and organisation of the location, timing, and type of programming. This can benefit from,

- Engaging with local community
  - Community Input: survey residents to understand their interests and needs.
  - Communication: raise public awareness through, e.g., social media, flyers, and local news to promote activities and events.
  - Co-production: co-produce programming with residents through

132 Powers, S., Graefe, A., Benfield, J., Hickerson, B., Baker, B., Mullenbach, L., & Mowen, A. (2022). Exploring the conditions that promote intergroup contact at urban parks. *Journal of Leisure Research, 53*(3), 426–449. https://doi.org/10.1080/00222216.2022.2043754

133 Grodach, C. (2010). Art spaces, public space, and the link to community development. *Community Development Journal, 45*(4), 474–493. https://doi.org/10.1093/cdj/bsp019

participatory design approaches.[134]
    - Partnerships: collaborate with other local stakeholders like community groups, schools, and businesses to heighten community ownership.

- Ensuring accessibility and inclusivity
    - Activities are accessible to all including people from different backgrounds and abilities.
    - Adaptive sports to offer activities for people with disabilities, e.g., wheelchair basketball.
    - Multi-lingual programmes to offer activities in multiple local languages.
    - Senior-friendly activities to offer activities for older adults, e.g., brisk walk, gardening, social gathering.

Box 6.3. Lifestyle and behavioural user groups in Singapore

Lifestyle

- Active Nature Lovers (n=661) are younger, slightly male-dominant, and highly active. They prefer cycling, running, and water sports but visit outdoor recreation space less often, staying longer. Their top favourite outdoor recreation spaces include East Coast Park and Admiralty Park.
- Sedentary Life Supporters (n=539) are mostly older and female, favouring quiet activities like walking and relaxing. They visit outdoor recreation space frequently but for shorter stays. They prefer tranquil spaces like Pasir Ris Park and Bedok Reservoir Park, both with blue spaces.

Behavioural user groups

- Evening Active Commuters (n=325) are mainly aged 30–59. They favour walking, socialising, and vigorous activities, visiting mostly in the evening. They prefer spaces around home, East Coast Park, and Admiralty Park.
- Active Senior Morning Users (n=370) are the oldest group, with 42% aged over 60. They walk frequently, visit alone, and prefer weekday mornings. They favour age-friendly places like Punggol Park and Kallang Riverside Park.
- Weekend Family Outgoers (n=213) are working adults aged 30–59. They visit outdoor recreation space less often, mainly for weekend family outings. They favour the Zoo, Gardens by the Bay, and Pasir Ris Park.
- Weekend Youth Socialisers (n=292) are mostly aged 15–29. They rely on public transport and visit outdoor recreation space on weekend evenings for social and leisure activities. They prefer Gardens by the Bay for gatherings.

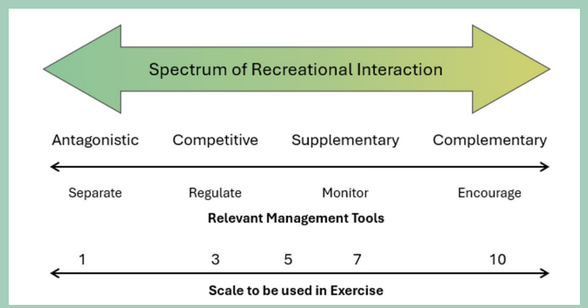
Source: Kato, Y., Chan, F., Wang, J., & Yuen, B. (2024). *Outdoor Recreation Space Community Survey Technical Report* (Unpublished technical report).

Yet others emphasise the importance of having "loose spaces" in urban parks that "allow for the chance encounter, the spontaneous event, the enjoyment of diversity and the discovery of the unexpected".[135] They caution against over-programming and over-control, which can reduce the diversity of users, uses, and experiences. Of concern is the need to minimise the risks of creating territoriality or segregation (exclusionary practices), and recreation conflict (where multiple recreation activities overlap in space and time) by understanding how user groups interact with one another (Box 6.4). Exclusion and conflicts are key concerns that can negatively impact user satisfaction, and lead to use avoidance if left unaddressed.[136]

Box 6.4. How to address recreation conflict

Recreational activities can interact in different ways, ranging from complementary to antagonistic. Managing these interactions is key to ensuring equitable and sustainable outdoor recreation. Effective management tools, from encouragement to regulation and separation, can help balance diverse recreational needs and minimise conflicts in shared spaces.

Interaction Type	Key Characteristics	Outcome	Activity Example
Complementary	Increasing rates of return with increased use	Positive sum and growing – No conflict	Canoeing and Fishing
Supplementary	Neutral interaction	Positive sum – linear Minor conflict	Snowmobiling and All Terrain Vehicle (ATV) Use
Competitive	Decreasing rates of return with increased use	Trending toward zero sum - Conflict	Fishing and jet skiing
Antagonistic	Any activity of one drives the other to zero	Negative sum -Strong Conflict	Wilderness camping and ATV use



Source: Marcouiller, D., Scott, I., & Prey, J. (2017). *Addressing Recreation Conflict: Providing a Conceptual Basis for Management.* Retrieved from https://dpla.wisc.edu/wp-content/uploads/sites/1021/2017/06/Introductoryfactsheetv6_0.pdf

134 Loukaitou-Sideris, A., & Mukhija, V. (2019). Promoting justice for underserved groups in periurban parks: The potential of state-community partnerships. *Leisure Studies, 38*(1), 43–57. https://doi.org/10.1080/02614367.2018.1559879

135 Franck, K., & Stevens, Q. (2007). Tying down loose space. In *Loose Space: Possibility and Diversity in Urban Life* (pp. 1–33). Routledge.; Fincher, R., Iveson, K., Leitner, H., & Preston, V. (2014). Planning in the multicultural city: Celebrating diversity or reinforcing difference? *Progress in Planning, 92*, 1–55. https://doi.org/10.1016/j.progress.2013.05.001

136 Arvidsen, J., Kristensen, M. S., Klein-Wengel, T. T., Præstholm, S., Iversen, E. B., & Olafsson, A. S. (2024). Factors predicting recreational conflicts in urban forests. *Urban Forestry & Urban Greening, 97*, 128383. https://doi.org/10.1016/j.ufug.2024.128383

CHAPTER 07

Developing Placekeeping for Sustainability

Develop Placekeeping for Sustainability

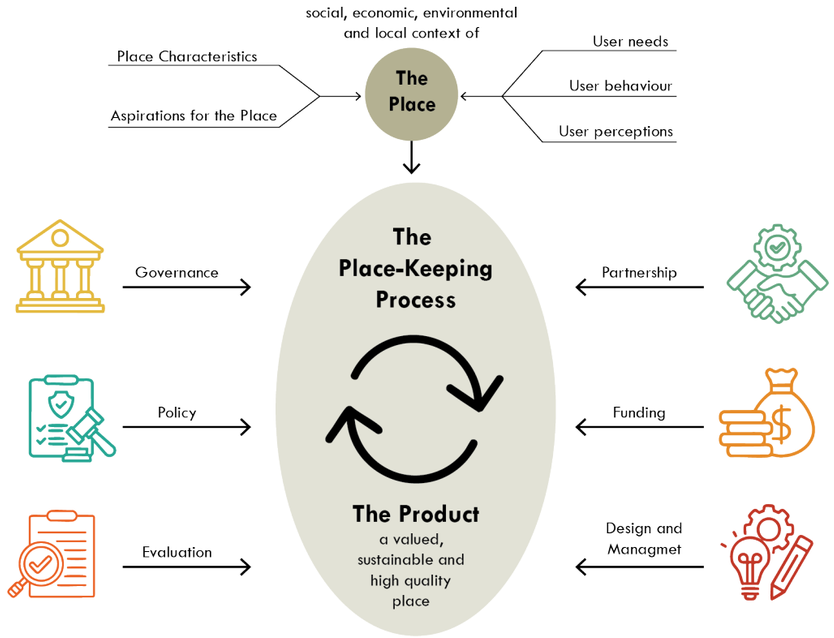
Placekeeping offers opportunities to engage and involve the community in the planning, design, and management of outdoor recreation spaces. Placekeeping refers to the long-term management of a place to ensure that its social, environmental, and economic benefits can be enjoyed by current and future generations.[137] Outdoor recreation space planning, design, and management processes are important pathways for placekeeping as they yield opportunities to involve the community, from co-creating a site plan to citizen science, volunteering and participating in various community stewardship activities.[138] Placekeeping provides a tool for creating functional, vibrant, inclusive, and sustainable places that foster community involvement, enhance wellbeing, and unique identity by addressing six interrelated dimensions of long-term place management (Figure 7.1).[139] Consideration is not just to plan and design the physical spaces but more importantly, to obtain a better understanding into how people interact with, and experience the outdoor recreation space.

137 Dempsey, N., & Burton, M. (2012). Defining place-keeping: The long-term management of public spaces. *Urban Forestry & Urban Greening, 11*(1), 11–20. https://doi.org/10.1016/j.ufug.2011.09.005

138 Burton, M., Dempsey, N., & Mathers, A. (2014). Connecting making and keeping: Design and management in place-keeping. In *Place-Keeping* (pp. 125–150). Routledge.

139 Dempsey, N., & Burton, M. (2012). Defining place-keeping: The long-term management of public spaces. *Urban Forestry & Urban Greening, 11*(1), 11–20. https://doi.org/10.1016/j.ufug.2011.09.005

Figure 7.1. Concept of placekeeping



Source: Adapted from Dempsey and Burton (2012)

7.1. Addressing Community Needs

Community engagement is increasingly used to address community needs, from understanding user needs and interests to facilitating their involvement in the maintenance and stewardship of outdoor recreation space. Examples of community engagement activities in outdoor recreation space include,

- Needs assessment, e.g., conduct surveys, focus group discussions, citizen science, to understand residents' needs and interests, what spaces, facilities, and activities do residents value most.
- Participatory design to co-design and co-produce outdoor recreation spaces with the community including youth, older adults, special needs groups, e.g., in the planning process of new parks or renovations, design decisions, feature selection, and programming.
- Volunteer programmes to offer volunteer opportunities for residents to help maintain and enhance the outdoor recreation space, e.g., planting trees, cleaning up beaches, organizing community events (Box 7.1).

Box 7.1. Friends of the Parks, Singapore

Friends of the Parks is a community-led initiative in Singapore, inspired by the Friends of Ubin Network. It emerged from the SGFuture conversations in January 2016 where participants expressed a desire for greater community involvement in parks. Launched in April 2016, the initiative has expanded to 14 communities. It involves local stakeholders and volunteers who help support the park ecosystem through ground-led programmes such as habitat enhancement, guided walks, biodiversity surveys, and coastal cleanups,

A beach cleanup activity by Friends of Marine Park

Source: National Parks Board. (n.d.)

The initiative has several benefits,

- Promote a sense of ownership by giving communities a voice in park design, development, and management.
- Encourage participation in conservation, horticulture, events, and amenities planning, empowering communities to shape their parks, and ensures they meet local needs.
- Foster stewardship and responsible park use through community engagement and participation.
- Protect biodiversity and preserves the parks' unique environmental value by engaging in habitat enhancement.

Source: National Parks Board. (n.d.). *Friends of Chestnut Nature Park.* Retrieved from https://fotp.nparks.gov.sg/focnp/; National Parks Board. (n.d.). *Friends of Marine Park.* Retrieved from https://fotp.nparks.gov.sg/fomp/; Ministry of National Development. (2023). *"Friends" Networks.* Retrieved from https://www.mnd.gov.sg/our-work/engaging-our-communities/friends-networks; *Media Factsheet C: Friends of the Parks Scheme.* (n.d.). Retrieved from https://www.nas.gov.sg/archivesonline/data/pdfdoc/20161022001/4%20Media%20Factsheet%20C_Friends%20of%20the%20Parks.pdf

Many cities including Helsinki, Melbourne, Portland, have integrated community engagement across various stages of outdoor recreation space planning, design, development, and management (Box 7.2). Effective community engagement contributes to ensuring a diversity of people-centric outdoor recreation space across different sites. Experts warn against overly standardised "cookie-cutter designs", emphasising the importance of tailoring each space to reflect the specific needs and preferences of the surrounding community.[140]

140 Kato, Y., Chan, F., Wang, J., Lim, K., & Yuen, B. (2024). *Outdoor Recreation Space Key Informant Interview Technical Report* (Unpublished technical report).

Box 7.2. Portland public engagement and partnerships in park planning

Portland, USA, encourages inclusive and fair public engagement in planning parks and recreation spaces. The Portland Parks Board aims to create comprehensive plans for parks, natural areas, and recreational facilities. The goal is to create a park system that is accessible and meets the needs of all residents. Priorities include promoting physical activity with new programmes and expand river activities such as boating and docking, building indoor recreation facilities, and using renewable energy technologies in parks.

- To involve the community and ensure that decisions reflect the needs of residents, a range of communication is used—holds public forums and offers online comment forms.
- Public-private partnerships are implemented to improve parks and recreation services including improving visitor experiences through concessions and facility upgrades.

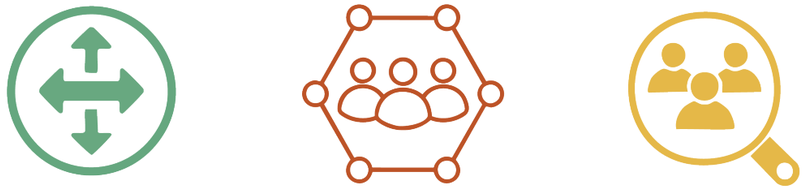
Source: City of Portland, Oregon. (n.d.). *Portland Parks Board.* Portland.gov. Retrieved from https://www.portland.gov/parks/portland-parks-board; City of Portland, Oregon (n.d.). *Friends and Partners.* Portland.gov. Retrieved from https://www.portland.gov/parks/friends

7.2. **Principles of Effective Community Engagement**

The key principles to effective community engagement in the provision of outdoor recreation space include (Figure 7.2),

- Flexibility and adaptability. Outdoor recreation spaces should be designed and maintained flexibly, responding to users' needs and feedback. For example, Singapore's rooftop greenery maintenance incorporates community input on tree selection and height to better match local preferences.
- Integrated approach. Community engagement should be embedded throughout the entire lifecycle of outdoor space planning and maintenance. In Jurong Lake Gardens, a regional park in Singapore, feedback was integrated at every stage via community centres and grassroots organisations, indicating the vital role of intermediary groups in fostering collaboration.
- Identify target social groups. It is crucial to also consider specific user groups rather than general population feedback. Balancing diverse perspectives is essential since different needs can conflict. Engagement methods should align with the outdoor recreation space size, context, and stakeholders, avoiding a one-size-fits-all approach.

Figure 7.2. Principles of effective community engagement



Approaches to Community Engagement

A range of community engagement approaches can be applied to outdoor recreation space, responding to different contexts (Figure 7.3).

Figure 7.3. Approaches for community engagement

Challenges

Despite numerous benefits, community engagement is not without challenges (Table 7.1).

Table 7.1. Challenges of community engagement

Challenges	Possible Actions
Community engagement can become tokenistic and symbolic, e.g., when planners and designers 'don't meaningfully include people in how we design parks',[141] and community feedback is not taken seriously or implemented.	Feedback mechanisms. Create opportunities for ongoing feedback, consider this feedback, and develop responsive plans and programmes based on community input. Partnerships. Collaborate with key stakeholders including the community, local organisations, schools, and businesses, to expand the reach and impact of participation. Participatory design. Co-design and co-produce with the community (Box 7.3). Encourage community-driven initiatives (Box 7.4). Inclusive engagement methods. Offer diverse communication strategies and accessible participation options, e.g., a mix of online and face-to-face meetings to accommodate people's different abilities and availability. Targeted engagement. Target engagement methods to involve diverse and specific community members in the planning, design and management process to ensure their needs are addressed.
Diverse community needs bring varied interests, perspectives, and difficulty in creating a universally appealing space, e.g., different demographic groups—children, youth, older adults, athletes, nature enthusiasts, may have different and even conflicting needs and preferences for park use.	Inclusive planning. Involve diverse community members in the planning, design and management process to ensure their needs are addressed. Participatory design. Co-design and co-produce with the community. Targeted engagement. Target engagement methods to involve specific community including hard to reach members, e.g., older adults, people with disabilities, in the planning, design, and management process to ensure their needs are addressed.
Lack of awareness and communication barriers. Several factors can affect this, e.g., people may find it difficult to engage due to language differences, limiting their participation. Another is where traditional communication methods, e.g., flyers, posters, may not reach all community members, especially in digital societies.	Implement effective communication. Use translated materials and multiple channels, including social media, community leaders, local media, to reach more and different segments of the community including hard to reach community. Capacity building. Provide public education, training, and support to the community to overcome barriers and encourage participation.
Lack of trust, e.g., past negative experiences with local governments or park management can lead to scepticism and reluctance to engage. Other factors include misinformation, lack of transparency.	Build trust. Engage in transparent, consistent, and respectful communication and interaction with the community. Feedback mechanisms. Clearly explain decision-making processes and provide regular updates on park projects. Create opportunities for ongoing feedback, consider this feedback, and develop responsive plans and programmes based on community input. Community leadership involvement. Partner with local leaders and organisations to facilitate meaningful connections and build trust.
Other barriers like consultation fatigue from repeated engagement, physical limitations, transportation and resource issues, can prevent people from participating in park engagement activities.	Capacity building. Provide public education, training, and support to the community to overcome barriers and encourage participation. Implement effective communication. Use translated materials and multiple channels, including social media, community leaders, local media, to reach more and different segments of the community including hard to reach community including older adults, people with disabilities. Stronger sense of ownership. Ensure that access to outdoor recreation space and facilities is equitable and accessible, offering meaningful engagement to users and residents.

141 Kato, Y., Chan, F., Wang, J., Lim, K., & Yuen, B. (2024). *Outdoor Recreation Space Key Informant Interview Technical Report* (Unpublished technical report).

Box 7.3. Design process of TOUCHpoint @Ang Mo Kio 433, Singapore

In 2019, the void deck at Block 433, Ang Mo Kio Avenue 10 , Singapore, was transformed into a 450-square metre community hub, TOUCHpoint@Ang Mo Kio 433. It was designed by private design practice, COLOURS (Collectively Ours) and Freight Architects, for TOUCH Community Services (a Singapore charity organisation). The retrofitted space offers both structured (gym tonic) and flexible community space for exercise and social activities for older adults and residents.

Community engagement is not a one-off activity. During the design process, over 200 residents participated in four workshops led by TOUCH and COLOURS. Residents shared their needs and ideas, helping designers to identify and evaluate potential locations for the community hub. A physical model of the proposed site was exhibited around the neighbourhood to gather further feedback. Once the design was conceptualised, residents were re-engaged and encouraged to participate in shaping the space features and facilities.

The design introduced a sheltered drop-off area and public spaces (in the void deck and surrounding open space) for relaxation, integrating indoor and outdoor spaces to reflect community preferences.

Source: Urban Redevelopment Authority. (2022). *Co-Creating Inclusive Spaces with Communities*. Retrieved from https://www.ura.gov.sg/Corporate/Resources/Ideas-and-Trends/Co-creating-inclusive-spaces; COLOURS. (n.d.). *Touchpoint @ ANG MO KIO 433*. Retrieved from https://www.col-ours.com/touchpointAng Mo Kio433

Box 7.4. Community-led Dover Crescent Community Garden, Singapore

The Dover Crescent Community Garden in Singapore is a resident-led initiative that fosters inclusivity and engagement by transforming an underutilised rooftop in a high-rise public housing apartment building into an open-access near-home greenspace. Established in 2011 with town council approval, the garden is designed with barrier-free features, empowering residents to grow ad harvest edible garden produce, and volunteer towards its maintenance. Community support through crowdfunding and events like *Green Day Out@One-North* and plant showcase during *Temasek Ecosperity Conference* in 2018, helps to expand resources, and raise awareness. The garden has received plant donations and multiple awards including the *National Parks Board Community in Bloom Platinum Award* in 2014 and 2020.

Source: Channel News Asia (2018)

Source: JTC Corporation. (2018). *Green Day Out @ One-north*. Retrieved from https://www.jtc.gov.sg/about-jtc/news-and-stories/press-releases/green-day-out-at-one-north; Paulo, D. A. (2018, July 29). The retiree behind the roof garden that brought back a kampung spirit. *Channel News Asia*. https://www.channelnewsasia.com/cnainsider/benjamin-ee-edible-community-garden-dover-crescent-open-concept-813956; National Parks Board. (2021). *Community in Bloom Awards 2020 (Housing Estate)*. Retrieved from https://file.go.gov.sg/ciba2020-results-dossier.pdf; South West CDC. (2021). *The Rooftop Garden at Dover Crescent. Facebook.* Retrieved from https://www.facebook.com/southwestcdc/posts/the-rooftop-garden-at-dover-crescent-houses-a-diversity-of-edible-flowers-and-he/10158974617526273/

7.3. **Stakeholders and Partnerships**

Stakeholders and partnerships are central to people-centric design and placekeeping. Outdoor recreation spaces have traditionally been designed and maintained by government authorities.[142] In recent decades, an increasing variety of actors—beyond government agencies—have begun participating in the planning, design, and management of outdoor recreation space. Varying partnership models—an association of two or more partners with shared responsibility for the long-term management of a place, have been explored and implemented (Table 7.2):[143]

- Public-private partnerships (PPPs) involve collaboration between the private and public sectors in the design, building, and funding of outdoor recreation space provision, sharing the risks between partners. There are several PPP models, e.g., outsourcing, leaseback from the private sector.[144]

142 Smith, H., Pereira, M., Hull, A., & van den Bosch, C. K. (2014). The governance of open space: Decision-making around place-keeping. In *Place-Keeping* (pp. 52–75). Routledge.

143 Burton, M., & Mathers, A. (2014). Collective responsibility for place-keeping: Are partnerships the solution for open space management? In *Place-Keeping* (pp. 76–99). Routledge.

144 Crompton, J. L. (2021). Public-private partnership models. *National Recreation and Park Association Monthly*

In Singapore, the National Parks Board (public) has partnered the landscape industry (private) to increase the use of technology and digitalisation in park management through a new model of greenery management administered by a landscape maintenance and management tender. [145]

- Collaborative management partnerships (CMPs) involve a government, private, or community authority working with a private or NGO through contractual arrangement to manage a park. There are several partnership models, e.g., co-management (bilateral or integrated), delegated.[146] These partnerships have been used in the restoration of national parks and reserves in Africa, advancing conservation and development goals, and decreasing tree cover loss.[147]
- Community partnerships involve community groups to help identify what residents want in their outdoor recreation space. In Singapore, the National Parks Board has set in motion plans and programmes to involve the community in co-creating parks, from conceptualisation and design to construction and management of the park[148] (Table 7.2). The goal is to produce parks with meaningful facilities that would cater to the community's needs and lifestyles.

While PPPs and CMPs are generally formal partnerships (through contracts and tenders), community partnerships tend to be informal based on a mutual understanding of roles and responsibilities.

Multi-sectoral collaboration such as public-private partnerships, offer advantages by leveraging the strengths of each partner, expanding resources, knowledge, and expertise (Figure 7.4 and Table 7.3). There are, however, challenges, e.g., each partner may bring differing, sometimes conflicting interests that can complicate and derail the partnership—'little more than rhetoric'.[149] Community partnerships and involvement are not static, but evolve with partnership capacity, which can be influenced by factors like political intervention, socio-demographic context, and volunteerism.[150] For partnerships to work, it is important to understand both individual and collective motivations[151], and importantly, communication must be clear between and among all partners.[152]

Magazine, April. Retrieved from https://www.nrpa.org/parks-recreation-magazine/2021/april/public-private-partnership-models/

145 National Parks Board. (2023). *NParks Rolls Out New Model of Greenery Management for Parks and Streetscape That Leverages Suite of Digital Tools Developed with Landscape Industry*. Retrieved from https://www.nparks.gov.sg/news/news-detail/nparks-rolls-out-new-model-of-greenery-management-for-parks-and-streetscape-that-leverages-suite-of-digital-tools-developed-with-landscape-industry

146 Fitzgerald, K. H. (2022). *Collaborative Management Partnership Toolkit*. The World Bank.

147 Desbureaux, S., et al. (2024). Collaborative management partnerships strongly decreased deforestation in the most at-risk protected areas in Africa since 2000. *PNAS, 122*(1), e2411348121. https://doi.org/10.1073/pnas.2411348121

148 National Parks Board. (n.d.). *Engaging the community*. Retrieved from https://fotp.nparks.gov.sg/engagement/

149 Carnwell, R., & Carson, A. (2008). The concepts of partnership and collaboration. In R. Carnwell & J. Buchanan (Eds.), *Effective Practice in Health, Social Care and Criminal Justice: A Partnership Approach* (p. 4). Open University Press.

150 Osborne, S. P. (Ed.). (2010). *The New Public Governance? Emerging Perspectives on the Theory and Practice of Public Governance*. Routledge.

151 Mannarini, T., Fedi, A., & Trippetti, S. (2010). Public involvement: How to encourage citizen participation. *Journal of Community & Applied Social Psychology, 20*, 262–274. https://doi.org/10.1002/casp.1030

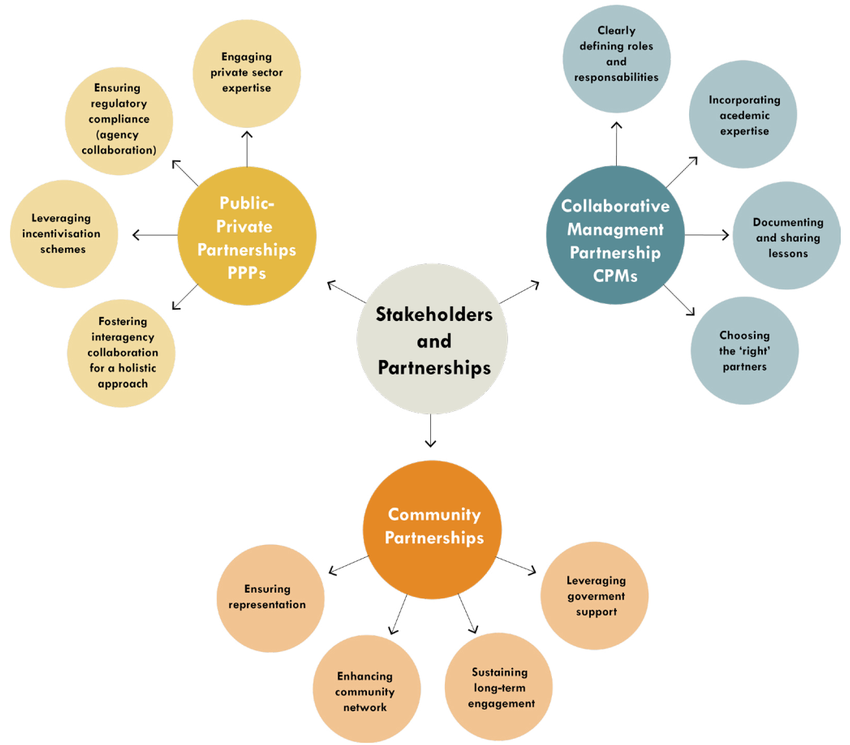
152 Dekker, K., & Van Kempen, R. (2004). Urban governance within the Big Cities Policy: Ideals and practice in Den Haag, the Netherlands. *Cities, 21*, 109–117. https://doi.org/10.1016/j.cities.2004.01.003

Table 7.2. Community partnerships in Singapore parks

Community partnerships	Target Audience	Activities
Community in Nature	Families, schools, volunteers, and the public	Umbrella initiative that unites nature-related activities and programmes.
Families for Nature	Families	Encourage family bonding through nature exploration and activities.
School Initiatives	Schools (students and educators)	Integrate biodiversity topics into school curricula to develop appreciation for nature.
Citizen Science Projects	General public	Include activities like the Garden Bird Count and SGBioAtlas app for biodiversity data collection.
Friends of Ubin Network	Diverse stakeholders	Engage stakeholders to protect Pulau Ubin's heritage and ecology, serving as a model for conservation.

Source: Various Sources[153]

Figure 7.4. Partnership models



153 Centre for Liveable Cities, Singapore, National Parks Board (Singapore), & Cengage Learning (Firm) (Eds.). (2015). *Biodiversity: Nature Conservation in the Greening of Singapore*. Cengage Learning.; National Parks Board. (2015). *Nature Conservation Masterplan (NCMP)*. Retrieved from https://www.nparks.gov.sg/-/media/nature-conservation-master-plan.pdf

Table 7.3. Partnership model considerations

Public-Private Partnerships	
Balancing Public and Private Interests	Private partners may prioritise commercial gains over public benefits, leading to conflicts in service delivery and accessibility.[154] To mitigate this, contractual agreements should enforce clear public interest protections, accessibility mandates, and service quality benchmarks.
Ensuring Transparency and Accountability	Clear oversight mechanisms on service delivery and maintenance—such as joint management boards, regular audits, and public reporting—help maintain transparency and prevent undue corporate influence. Engaging local stakeholders in monitoring processes fosters trust and ensures that partnerships align with public interests.[155]
Leveraging Incentivisation Schemes	Incentivisation schemes encourage developers to integrate public amenities, art, and greenspaces, promoting private sector involvement in enhancing public spaces while mitigating the exclusion and commodification of public spaces.[156] Such approaches align with strategies in cities such as the zoning bonus system and transfer of development rights, successfully implemented in New York since the 1970s.[157]
Fostering Interagency Collaboration for a Holistic Approach	Collaborative efforts among public agencies and private sectors are critical to addressing complex challenges in outdoor recreation space development. These partnerships ensure comprehensive planning, regulatory alignment, and resource optimisation. A shared strategic approach includes clear definitions of the purpose and scope of these spaces as well as guidelines for their planning, implementation, development, and usage.[158]
Collaborative Management Partnerships	
Choosing The 'Right' Partners	To adapt to evolving needs and contexts, involving the right partners from the outset is crucial for effective placekeeping. Partner selection should be guided by three key questions: "Who has a voice (can contribute their views), who can vote (can take part in decision-making), and who can act (can contribute to delivery)?"[159]
Clearly Defining Roles and Responsibilities	To maximise the expertise and contributions of each stakeholder in the CMP, their roles and responsibilities must be clearly defined. Without a formal agreement, ambiguity can lead to conflict, mistrust, and accountability gaps. Thus, a formal agreement should be in place from the outset, explicitly outlining each partner's roles and responsibilities.[160]
Incorporating Academic Expertise	Partnering with academic institutions brings research-driven insights and innovative solutions to technical challenges. Academic contributions such as research on ecological assessments, strengthen the planning and execution of projects.[161]
Documenting and Sharing Lessons	While cross-sector partnerships offer benefits, diverse stakeholders bring added challenges including coordination, trust-building, and balancing diverging motivations. As partnership challenges vary by context and partner configurations, documenting and sharing lessons from both successes and failures is essential. This fosters empirical knowledge and helps avoid common pitfalls.[162]
Community Partnerships	
Ensuring Representation	Ensuring broad community representation in placekeeping is essential yet challenging. Engaging local stakeholders—such as schools for children, third places (cafés and restaurants) for youth, and senior activity and active ageing centres for older adults—can enhance outreach and sustain participation.[163]
Enhancing Community Network	External factors such as shifts in local leadership, sociodemographic changes, and economic crises, pose challenges to the long-term management of outdoor recreation spaces.[164] Local authorities should facilitate networks between community groups to enable resource and knowledge sharing, enhancing community capacity.[165]
Sustaining Long-Term Engagement	Community-driven initiatives often face burnout and inconsistent participation. Structured programmes with incentives—such as training, stipends, and recognition events—help maintain engagement and build local capacity.[166] In Sheffield, UK, the Friends of Parks network offers training and awards to sustain community involvement in greenspace maintenance.[167]
Leveraging Government Support	Government authorities can play a crucial role even in community-led placekeeping, initiated and driven by community members. They provide stability to such initiatives through regulatory frameworks, mutual agreements, and ongoing communications.[168]

7.4. Scaling Up and Maintaining Outdoor Recreation Space

Systematic monitoring and evaluation are essential to keeping outdoor recreation spaces relevant and aligned with national and local development needs. A critical tool is rules and government frameworks that support these efforts, ensure quality, and sustain robust funding and management structures for both the implementation of new projects and upkeep of existing spaces. For example, management frameworks can provide clear short-term operational guidance and long-term strategic direction, balancing user-focused facilities with environmental concerns. Prioritising functionality, user needs, maintenance feasibility, and stakeholder interests is essential. Sustainable practices must be fully integrated, particularly during management transitions or redevelopment, to

154 Carmona, M., & De Magalhaes, C. (2006). Public space management: present and potential. *Journal of Environmental Planning and Management*, *49*(1), 75-99.

155 Love, H., & Kok, C. (2021). How place governance impacts the civic potential of public places. *Brookings*. Retrieved from https://www.brookings.edu/articles/how-place-governance-impacts-the-civic-potential-of-public-places/

156 Burton, M., & Mathers, A. (2014). Collective responsibility for place-keeping: are partnerships the solution for open space management? In *Place-Keeping* (pp. 76-99). Routledge

157 Wang, M. (2022). The compact city in a local area. In *Building a compact city*. *Springer Briefs in Geography*. Springer, Cham. https://doi.org/10.1007/978-3-030-91282-6_2; City of New York. (2021, July 1). *Privately Owned Public Space Overview*. NYC Planning. Retrieved April 18, 2023, from https://www.nyc.gov/site/planning/plans/pops/pops.page

158 Kato, Y., Chan, F., Wang, J., Lim, K., & Yuen, B. (2024). *Outdoor Recreation Space Key Informant Interview Technical Report* (Unpublished technical report).

159 Burton, M., & Mathers, A. (2014). Collective responsibility for place-keeping: are partnerships the solution for open space management? In *Place-Keeping* (pp. 76-99). Routledge.

160 Fitzgerald, K. H. (2022). *Collaborative* Management P*artnership Toolkit*. The World Bank.

161 Kato, Y., Chan, F., Wang, J., Lim, K., & Yuen, B. (2024). *Outdoor Recreation Space Key Informant Interview Technical Report* (Unpublished technical report).

162 Kato, Y., Chan, F., Wang, J., Lim, K., & Yuen, B. (2024). *Outdoor Recreation Space Key Informant Interview Technical Report* (Unpublished technical report).

163 Mathers, A., Dempsey, N., & Molin, J. F. (2015). Place-keeping in action: Evaluating the capacity of green space partnerships in England. *Landscape and Urban Planning*, *139*, 126-136.

164 Mattijssen, T. J. M., Van der Jagt, A. P. N., Buijs, A. E., Elands, B. H. M., Erlwein, S., & Lafortezza, R. (2017). The long-term prospects of citizens managing urban green space: From place making to place-keeping?. *Urban Forestry & Urban Greening*, *26*, 78-84

165 Mathers, A., Dempsey, N., & Molin, J. F. (2015). Place-keeping in action: Evaluating the capacity of green space partnerships in England. *Landscape and Urban Planning*, *139*, 126-136.

166 Buijs, A. E., Mattijssen, T. J., Van der Jagt, A. P., Ambrose-Oji, B., Andersson, E., Elands, B. H., & Møller, M. S. (2016). Active citizenship for urban green infrastructure: fostering the diversity and dynamics of citizen contributions through mosaic governance. *Current Opinion in Environmental Sustainability*, *22*, 1-6.

167 Carmona, M., & De Magalhaes, C. (2006). Public space management: present and potential. *Journal of Environmental Planning and Management*, *49*(1), 75-99

168 Mattijssen, T. J. M., Van der Jagt, A. P. N., Buijs, A. E., Elands, B. H. M., Erlwein, S., & Lafortezza, R. (2017). The long-term prospects of citizens managing urban green space: From place making to place-keeping?. *Urban Forestry & Urban Greening*, *26*, 78-84.

ensure adaptability and long-term environmental alignment.

Systematic Monitoring and Evaluation

Monitoring and evaluation of outdoor recreation space involves systematic data collection and analysis on various aspects of the space and facility—condition, usage, and impact, to assess their effectiveness in achieving the intended goals, e.g., providing recreation, environmental conservation, community involvement, and to inform decision-making, e.g., identify improvement areas. Space-specific monitoring include:

- Ecological monitoring, e.g., vegetation heath, wildlife population trends, habitat integrity, water quality.
- Recreational usage monitoring, e.g., visitor count, activity and space usage, user satisfaction, accessibility analysis.
- Community engagement monitoring, e.g., community outreach activities, participation rates and outcomes, partnerships.

A range of methods are available, depending on the monitoring aspect, e.g., surveys, citizen science, big data, and real-time sensor data. The use of comprehensive measurement and assessment tools is a vital component of comprehensive planning and long-term management for outdoor recreation space. Singapore's meticulous approach to outdoor recreation space planning incorporates systematic monitoring and evaluation, drawing on a range of national and local targets to ensure alignment with broader development goals (Box 7.5).

7.5. Enhancing and Maintaining High Quality Outdoor Recreation Spaces

The primary objective of placekeeping is to enhance and maintain the quality of outdoor recreation space. A decline in quality can discourage use and foster negative perceptions, which, in turn, may lead to misuse, use avoidance and reinforce an image of neglect, creating a vicious cycle of decline. While the definition of high-quality outdoor recreation space varies by context, ensuring diverse spaces, facilities, and programming with improved accessibility is essential (see Chapters 4, 5, and 6 for details). Additionally, regular maintenance of public infrastructure is crucial to the use and enjoyment of outdoor recreation space, ensuring safety, functionality, and community wellbeing. Littering (e.g., dog wate litter), untidiness (fallen leaves not cleared), and poor maintenance (faulty equipment and lighting not repaired, dirty or malfunction facilities) can diminish visual appeal, usability, and lead to safety hazards, and use avoidance if not addressed. Safety should be prioritised for diverse users including children, pets, and older adults, by addressing environmental risks, setting use conditions, and eliminating safety barriers (Figure 7.5).

Box 7.5. Evaluation and monitoring of parks in Singapore

At the national level, government authorities in Singapore set several targets (e.g., relating to accessibility of greenspace and spatial provisions), offering a ready measure to assess progress in outdoor recreation space provision. Major targets include,

- Providing 0.8 hectares of greenery per 1000 population.
- Achieving a 10-minute walk to a park for every household.
- Establishing 500 km of park connector.

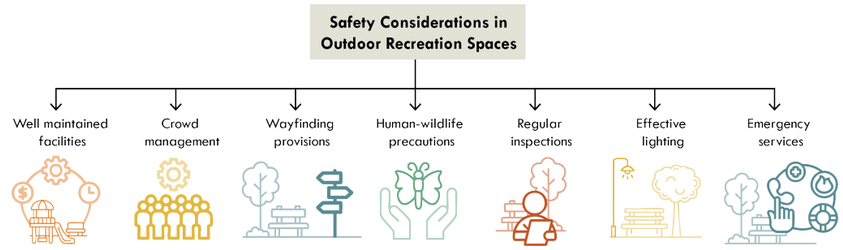
There are design guidelines from the National Parks Board, e.g., for contemplative landscapes. These guidelines are intended to influence the design and quality of outdoor spaces and recreation areas, with the goal of enhancing wellbeing and therapeutic benefits.

At the local level, a range of methods are implemented to track and measure the performance of parks including citywide surveys on park usage and satisfaction, and sensors in parks. Regular monitoring and evaluation is conducted relating to the national biodiversity strategy and action plan, and the results are reviewed as part of national planning process to ensure that implementation efforts meet national objectives on biodiversity and contributions to ecosystem services and user needs.

To encourage ecologically, climatically and socially resilient parks and developments in Singapore's urban landscape, the National Parks Board has introduced the Landscape Excellence Assessment Framework (LEAF), a certification scheme to recognise good landscape design, construction and management of parks and development projects. Projects are assessed on several aspects—accessibility, biodiversity conservation, community wellbeing & engagement, design & landscaping, environmental sustainability, and maintenance.

Source: National Parks Board. (n.d.). *National Biodiversity Strategy & Action Plan: Overview*. Retrieved from https://www.nparks.gov.sg/nature/national-biodiversity-strategy-action-plan/overview; National Parks Board. (n.d.). *Landscape Excellence Assessment Framework (LEAF)*. Retrieved from https://www.nparks.gov.sg/cuge/programmes-schemes/schemes/leaf

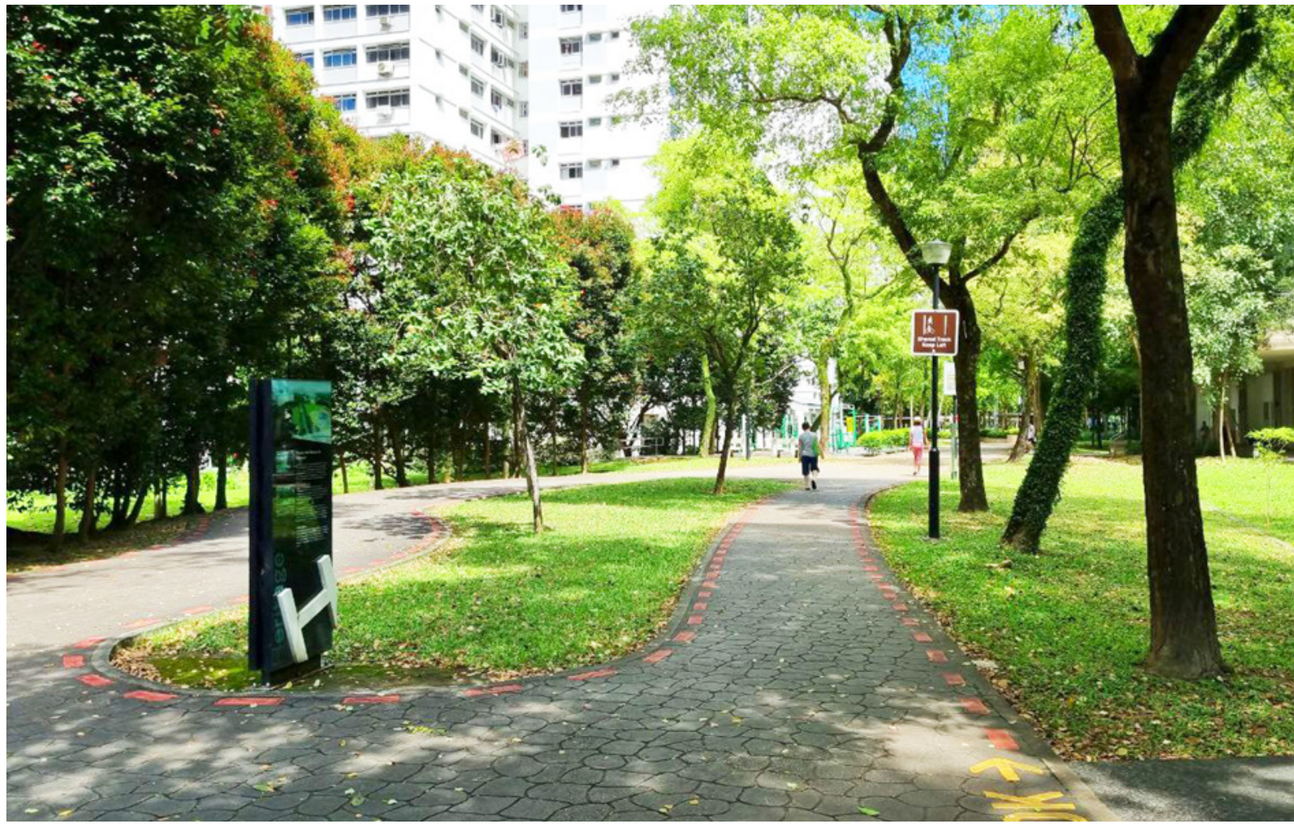
Figure 7.5. Safety consideration in outdoor recreation spaces



Consideration includes aspects of landscaping, water management and repairs.

- High-use areas benefit from frequent redevelopment to adapt to evolving needs
- Balance sustainability and functionality

- Plan for long term care, develop a maintenance plan to ensure the outdoor recreation space remains comfortable, inviting, safe, and functional over time
- Embrace experimental designs, e.g., explore light, quick, low-cost pop-up experiments like mobile café truck, temporary flower bed display, to offer variety, and test community receptivity before wider implementation
- Select low maintenance features and materials, e.g., eco-friendly, climate-sensitive designs and materials
- Limit high-maintenance features like formal gardens to manageable areas
- Balance fiscal feasibility with quality
- Build community ownership, foster a sense of pride and ownership among users and adjoining residents by involving them in maintenance efforts



CHAPTER 08

Moving Forward

Moving Forward

8.1. **Make a Vision**

Setting a vision for outdoor recreation space provision is a frequently used strategy to illustrate a broad picture of the preferred future for outdoor recreation space and opportunities to guide the development of recreation space, facilities, and services. The vision provides a basis for clarifying the aims and actions needed to meet community needs. For example, the City of Melbourne Parks, Recreation, and Golf Department, Australia, which manages the city's parks and recreational facilities, has the vision,

> *…to become a premier park and recreation destination that welcomes and engages residents and visitors.*

The vision will be implemented through a set of goals (outcomes) and objectives (directions). Developed based on staff and community input, the goals and objectives can provide a means of measuring delivery performance.

> *Through parks and recreation opportunities, we strive to enhance the quality of life and nurture the health and welfare of our community, our environment, and our economy. The Department will create a quality system by engaging the community, meeting national standards, providing excellent customer service, as well as providing diverse and affordable amenities and programs.*[169]

Besides community and expert input, the recommended strategies and actions can benefit from city-to-city learning, e.g., sharing good practices, discussing challenges, brainstorming solutions. Another is learning from past mistakes and failures and use those insights to make better decisions in planning, design, and management of outdoor recreation space, facilities, and programmes.[170]

8.2. **Create Indicators**

Measuring the use of outdoor recreation space serves two broad purposes,

- Helps planners, designers, and managers to understand what is taking place in the space, and to better plan, design and manage these space and facility based on evidence-informed findings.
- Demonstrates the value and role of outdoor recreation space provision in the community and city.

Performance indicators for outdoor recreation space typically include measures of,

- Park usage (e.g., visitor numbers, frequency of visits, visit duration, accessibility, inclusion).
- User satisfaction (e.g., number of complaints received, user satisfaction level/score, net promoter score or likelihood of visitors recommending the space to others).
- Community engagement (e.g., event and activity participation, facility usage, volunteer involvement, community-driven initiatives).
- Environmental impact (e.g., tree canopy cover, water quality, sustainable practices like Percentage of energy used that comes from renewable sources).
- Facility maintenance (e.g., facility/equipment downtime, maintenance backlog, repair response time).
- Programming diversity (e.g., programme participation rates and profile, range of programmes and activities organised, percentage of these that are rescheduled or cancelled, volunteer engagement).

These aspects can be measured through a variety of methods, e.g., surveys, systematic observations, sensors. The City of Melbourne measures and reports its goal delivery performance through its annual report and quarterly services dashboard. It is using sensors and other smart devices to measure and monitor how its city parks are used (see Chapter 4), while USA uses ParkScore index to evaluate city parks in 100 US cities annually (see Chapter 5).

169 City of Melbourne. (n.d.). *Parks & Recreation*. Retrieved March 6, 2025, from https://www.melbourneflorida.org/departments/parks-recreation#:~:text=To%20provide%20quality%20recreational%20facilities,and%20affordable%20amenities%20and%20programs

170 Edmondson, A. C. (2011). Strategies for learning from failure. *Harvard Business Review, 89*(4), 48–55.

8.3. **Learn from Good Practices**

Our analysis of outdoor recreation space satisfaction levels, key qualities, and usage patterns in Singapore identified five key factors in outdoor recreation space usage (Figure 8.1).

Figure 8.1. Key factors in outdoor recreation space usage

Convenience and Co-Location	Proximity to homes and essential amenities makes outdoor spaces easy to integrate into daily routines, particularly for older adults and those with mobility aids. Features like well-lit paths and integration with public transport boost accessibility and encourage use. Issues such as poor lighting and conflicts between pedestrians and cyclists can deter users.
Nature, Wildlife, and Thermal Comfort	Cool, breezy conditions, quiet settings, and scenic landscapes attract visitors, particularly during cooler hours. Interactions with wildlife and natural features promote mental wellbeing, nostalgia, and place attachment. Maintenance and rule enforcement are critical to ensuring safety and satisfaction.
Facilities and Maintenance	Well-maintained amenities like fitness corners, playgrounds, and sheltered areas cater to diverse users, enhancing recreation and relaxation. Cleanliness and upkeep are vital, while community-centric features like art murals, landmark and heritage structures strengthen identity and emotional connections.
Programming	Organised events and activities such as festivals, exercise classes, and social gatherings, enrich user experiences and foster community engagement. These events draw crowds and encourage visits by providing opportunities for social interaction and cultural expression.
Social Interactions	Outdoor recreation spaces serve as social hubs, fostering friendships, community ties, and a sense of belonging. Intergenerational spaces enhance vibrancy and bonding, with users developing strong emotional connections through shared family and community experiences.

Having a checklist of good practices on these aspects can draw support from tested solutions, promote quality, and minimise the risk of overlooking key details (Table 8.1).

Table 8.1. Checklist of good practices

Good Practices
Accessibility and Connectivity
Proximity to public transport such as bus stops and mass rapid transit stations
Direct, barrier-free access from residential areas including ramps, wide paths, and safe crossings
Seamless pathways and barrier-free access for individuals with different mobility needs
Integration with greenspaces and park connectors to provide continuous, safe walking routes
Integration of informal spaces such as void decks and footpaths to ensure everyday access to green areas
A Diverse Range of Spaces
Tranquil and quiet spaces for rest and relaxation
Multi-functional spaces that can adapt to various uses and activities
Spaces for active activities such as fitness stations, cycling paths, and sports facilities
Dedicated event spaces for community-led activities and seasonal events
Intergenerational facilities such as playgrounds, fitness zones, and therapeutic gardens
Inclusive community gardens that promote social interaction and sustainability
Activities and Programming
A diversity of organised activities and events to engage different demographics
Varied programming including cultural, educational, and recreational, and wellness activities
Opportunities and space for community-led initiatives
Introduce temporary features like pop-up libraries or seasonal decorations that encourage repeat visits and spontaneous exploration
Placekeeping and Social Interactions
Provide open, flexible spaces for spontaneous activities
Encourage residents and local groups to take ownership of outdoor recreation space by supporting community-driven activities
Include features like giant chess board, movable chairs to support spontaneous social interaction
Contact With Nature
Preserve and enhance natural habitats to maintain biodiversity and support wildlife
Provide sensory experiences such as soundscapes, fragrant plants, and water features
Incorporate educational signage and storyboard with information about plants and local ecosystems
Use nature-based solutions for climate resilience including rain gardens, natural drainage systems, and biophilic design elements
Aesthetics
Variation in flora and fauna including native vegetation to create unique and visually appealing landscapes
Interesting, unique landscape design and identity for different outdoor recreation space
Use of lighting, seating, architectural and aesthetic details to make spaces more inviting and safer
Photogenic beauty spots to attract visitors and enhance social media visibility
Design for a Sense of Nostalgia and Belonging
Incorporate design features that reflect the local context and history of each outdoor recreation space
Preserve, enhance, and incorporate historic elements into landscape design
Create spaces that evoke nostalgia through storytelling, cultural references, or traditional activities
Foster a sense of belonging by involving the community in the design and programming
Stakeholders and Partnerships
Engage and leverage private sector, community, NGO expertise and resource
Promote cross-sectoral coordination and collaboration between government departments
Establish and display clear rules on outdoor recreation space usage
Leverage incentivisation schemes to support technology use in outdoor recreation space design and management
Establish vision, national targets, framework, action plans and guidelines
Addressing Community Needs
Ensure transparency, inclusivity, and clear communication in community engagement process
Employ an integrated approach to engage diverse community members and build trust and address community needs holistically
Identify and outreach to target social groups including hard to reach groups
Apply context-appropriate approaches (e.g., expert-led, bottom-up, moderated)
Encourage active participation of community throughout the outdoor recreation space design process, from planning to development and management
Scaling Up and Maintaining Outdoor Recreation Space
Conduct systematic monitoring and evaluation of outdoor recreation space quality and usage
Establish and apply national and local-scale targets to maintain quality outdoor recreation space
Develop rules and guidelines for accessibility, cleanliness, and safety that balance functionality with flexibility and delight
Integrate regular, routine maintenance, e.g., safety inspections, particularly for playgrounds and fitness stations
Incorporate low-maintenance greenery and adopt technology and smart systems to enhance long-term maintenance and operations
Incorporate climate- and context-sensitive design, sustainable materials and nature-based solutions

8.4. **Address Barriers**

Barriers can negatively impact user experience and satisfaction. If left unaddressed, they can lead to use avoidance. It is important to investigate and understand what challenges are encountered by people when visiting the outdoor recreation space, and how to address these barriers (Table 8.2).

Barriers to outdoor recreation space can take several forms including,

- Physical barriers, e.g., accessibility—lack of access to and within the outdoor recreation space, uneven distribution across neighbourhoods.
- Social barriers, e.g., lack of social connection opportunity, feeling unsafe, especially girls, young women, older adults, health-related concerns that prevent them from enjoying the space and facility, lack of interest, knowledge, and resource to use outdoor recreation space, fear of wildlife.

Table 8.2. Checklist for some common barriers

Barriers	Possible Actions
Accessibility Issues	
Hard to move around within the space, getting lost within the outdoor recreation space, usually in larger parks	Improve wayfinding and signage system to provide clear direction to aid moving in the outdoor recreation space comfortably. Provide barrier-free access.
Lack of access to outdoor recreation space	Ensure outdoor recreation space are within a 10-minute walk of homes. Provide connection and clear direction to public transport nodes. Provide nearby car parking space to facilitate users with ambulant needs. Provide direct, sheltered/shaded pathways to the outdoor recreation space for all-weather use. Provide public education on availability and access to raise public awareness.
Maintenance Issues	
Littering and untidiness	Implement regular cleaning schedules. Increase public awareness and adoption of anti-littering practices. Involve the community and volunteers in maintenance and management, e.g., park watch group, friends of the park. Provide more trash bins and recycling points.
Lack of maintenance of exercise equipment	Conduct routine maintenance checks. Display contact information for users to report faulty equipment.
Dog waste	Provide more dog waste bins and signage to encourage responsible pet ownership. Provide public education to raise awareness.
Safety Concerns	
Poor lighting	Install sufficient lighting in key areas, particularly along paths, at entrances/exits, activity areas, in quiet areas. Prioritise safety and functionality, ensure paths and play areas are well-lit, consider appropriate lighting types like ambient lighting, floodlight, step light, bollard light, LED, motion sensor, and smart lighting systems.
Potential harm from animals (e.g. monkeys)	Maintain a clean environment, dispose of food waste properly, respect their habitat and space
Sense of security	Install CCTV monitoring. Implement natural surveillance, park watch group and security patrols. I Improve lighting at night and in quiet areas. Adopt inclusive design, e.g., create clear vista and sightlines, ensure site legibility, use easy to understand signage and wayfinding, consider low-growing plants to provide greenery and aesthetics without blocking views, access to assistance, encourage foot traffic and social engagement. Promote community patrolling efforts (e.g. Citizen on Patrol).
Pedestrian Safety	
Conflicts between pedestrians and cyclists	Shared paths with clear markings and provide separate lanes where possible. Provide public education and educational signage to promote safe sharing of paths.
Narrow walkways	Widen paths to accommodate both pedestrians and cyclists. Clearly demarcate lanes to reduce conflicts.
Fall Safety	
Slippery and uneven surfaces	Use anti-slip and even pavement materials. Conduct regular inspections and repairs. Activate citizen science to identify problem hotspots.
Stairs and curbs at access points	Ensure barrier-free access with ramps, gentle slopes, and alternative pathways. Prioritise universal design for all mobility needs.
Environmental Quality	
Uncomfortable benches and lack of seating	Design and install durable ergonomic outdoor furniture with suitable materials for comfortable seating. Ensure shaded seating areas are available.
Lack of resting points for older people	Provide resting points with benches at regular intervals. Include senior-friendly features like backrests and armrests. Invite older adults to co-design the seating and rest areas.
Lack of shade and shelter	Plant more trees with large canopy to create natural shade. Install covered shelter in key commuting and seating areas.
Lack of water points and toilets	Install water coolers and toilets in larger parks and provide clear wayfinding signage to these amenities.
Overcrowding	
Overuse of popular spaces	Distribute programming and activities across multiple parks or locations to reduce crowding. Encourage use of lesser-known outdoor recreation space through campaigns and advertisement.
Noise Disturbance	
Noise from organised exercise, e.g. basketball or loud play by youth	Educate users on noise control. Implement quiet zones or time restrictions for certain activities. Display and enforce park use rules.
Park Management	
Unenforced park rules	Use signage to communicate rules clearly. Create feedback channels for users to report issues, e.g., website, hotline, etc.
Inclusivity	
Lack of senior-friendly spaces	Design parks with senior-friendly features such as shaded seating, gentle walking paths, and fitness stations tailored for older adults. Provide meeting places, intergenerational spaces, and opportunities for people watching and social interaction.
Lack of accessibility features	Implement universal design principles including ramps, accessible toilets, etc.
Lack of inclusive activities and spaces	Co-locate amenities to encourage interaction between different user groups. Provide multigenerational facilities and programmes. Support social interaction opportunities and enable options and choice through space design, activities, and programming. Provide fair access and welcoming environment to space and activities. Provide availability and access information so people can know what to expect before visiting.
Lack of varied programming	Offer a range of cultural, educational, recreational, and wellness activities to cater to diverse user needs. Provide both organised and informal programmes.

However, addressing barriers is usually not a simple task as qualities of outdoor recreation space do not exist in isolation; tensions may exist between the qualities valued by residents, e.g.,

- **Crowding vs. Quietness**—While attracting more visitors enhances engagement, it can lead to overcrowding, disrupting those seeking privacy and tranquillity.
- **Nature Connection vs. Wildlife Concerns**—Residents appreciate natural spaces but express concerns about foul smells, safety risks, and close encounters with animals.
- **Spaciousness vs. Shade**—Balancing open, spacious areas with adequate shade is a challenge, with natural shade (e.g., tree canopy cover) proposed as a possible solution.

The urgent and present task, whether retrofitting existing outdoor recreation space or developing new spaces, is to understand user needs and engage people in the planning, design, and management processes to enhance satisfaction and person-environment fit.