



ADAPTABLE BUILDING DESIGN

Exploring sustainable and flexible construction solutions

WHAT IS ADAPTABILITY IN THE BUILT ENVIRONMENT?

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- Adaptability in the built environment refers to the capacity of buildings, spaces, and infrastructure to adjust efficiently to changing conditions over time.
- These changes may include shifts in occupant needs, environmental conditions, technological advancements, or economic and social transformations.

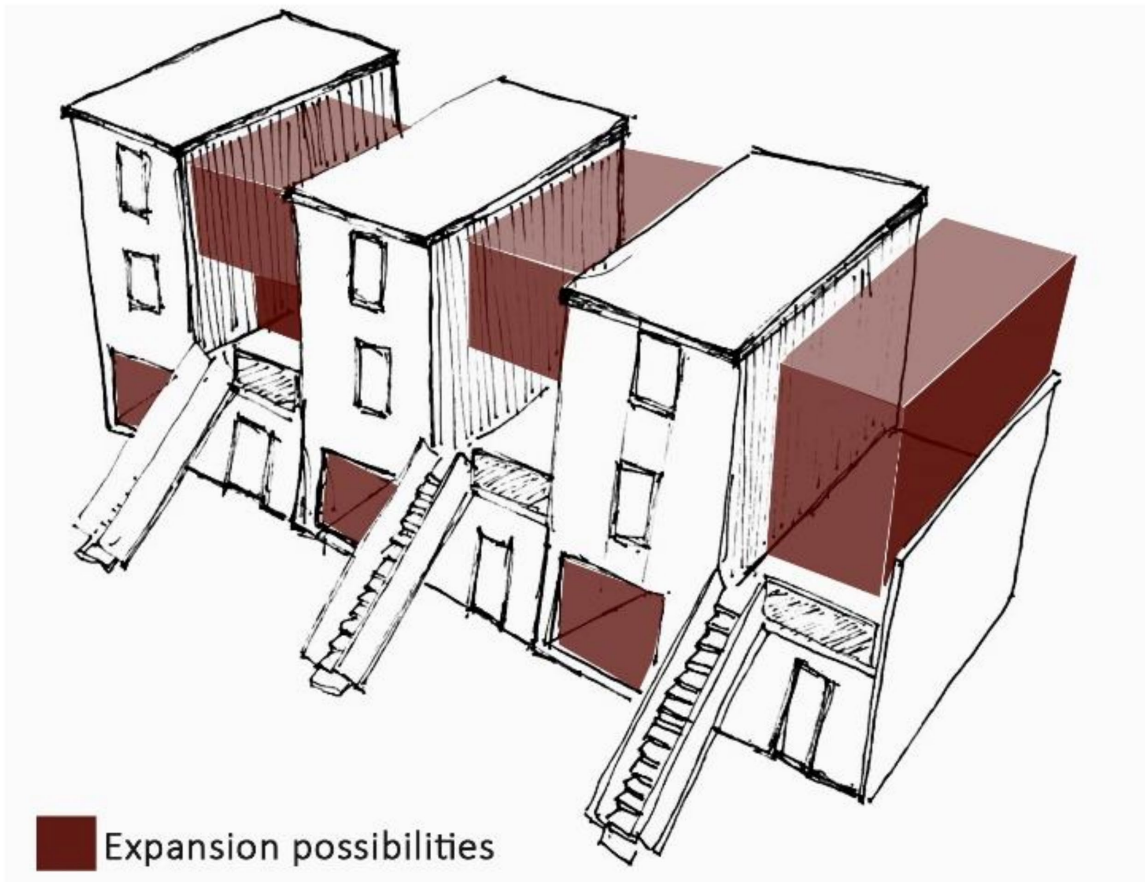


IMPORTANCE OF BUILDING ADAPTABILITY

The problem: We design for current specific use leading to obsolescence.

The solution: Intentional strategies that support multiple future uses with minimal disruption.

IMPORTANCE OF BUILDING ADAPTABILITY



- Adaptability is essential in modern building design due to rapidly changing social, economic, environmental, and technological factors.
- Buildings designed with adaptability in mind are more resilient, cost-effective, and sustainable, ensuring they remain functional and valuable over time

BENEFITS

- The primary goal of design for adaptability is to lengthen a building's lifespan by making it possible to adapt the space with minimal disruption and additional carbon. .
- This has many advantages, most notably the preservation of the building's cultural and economic value, as well as embodied carbon cost.

BENEFITS: ENVIRONMENTAL

- Design for adaptability reduces environmental impacts by avoiding demolition and the need for new materials, conserving resources, and preventing pollution and global warming associated with new construction.
- Extending the lifespan of materials and buildings conserves resources and reduces environmental pollution.



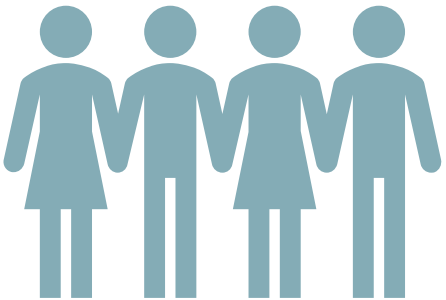
BENEFITS: RESILIENCE

- The use of simple, durable, low-maintenance materials also helps buildings stand up to the forces of nature, which are becoming stronger in many areas due to climate change.
- Making systems easier to repair and replace is also a benefit, in the event of damage from the elements.
- Having a more robust structural system can also provide greater resilience



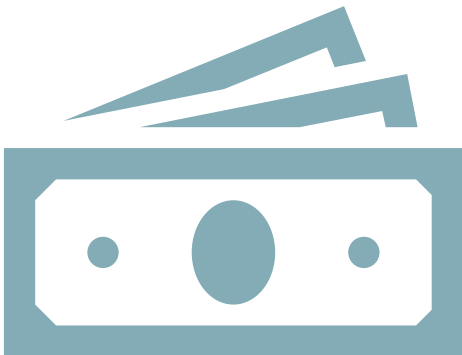
BENEFITS: COMMUNITY

- Designing buildings for adaptability benefits communities by reducing noise pollution and street disruptions, and the need for new construction.
- Adaptation is quicker and less disruptive than demolition and prevents vacant sites that attract crime and litter.
- It also helps avoid building abandonment due to economic or cultural reasons, reducing blight and supporting community infrastructure.
- Adaptable buildings can quickly accommodate new uses, preserve architectural significance, and contribute to vibrant, healthy communities.



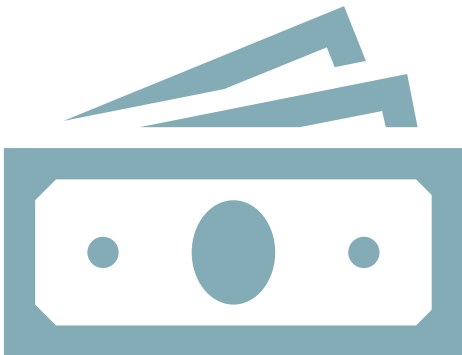
BENEFITS: ECONOMIC

- Adaptable buildings also have more inherent financial value because they can be economically adapted and renovated as occupant needs change, ensuring ongoing financial sustainability.
- The durable high-quality materials used to support design for adaptability can also provide long-term savings by avoiding basic repairs and replacement.



PITFALLS: ECONOMIC

- Designing for adaptability may involve higher initial soft and hard costs, including more robust structural systems and additional ceiling height to accommodate future uses and systems.
- This requires owner buy-in, greater engagement with structural engineers, and the use of higher-quality materials.



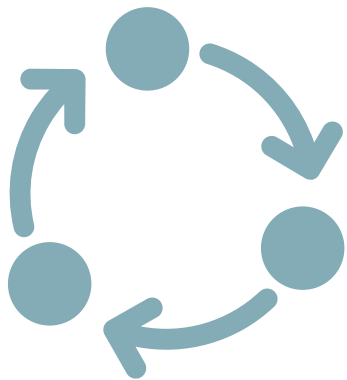
PITFALLS: ENVIRONMENTAL

- Because more materials may be required, the initial embodied impacts can also be higher and should therefore be considered in the Whole Life Carbon Assessment.
- This is an important consideration since avoiding later embodied impacts is a major goal of design for adaptability, and there are no guarantees.
- Although design for adaptability makes it more likely that a building will be reused, no one can predict whether that will really happen.



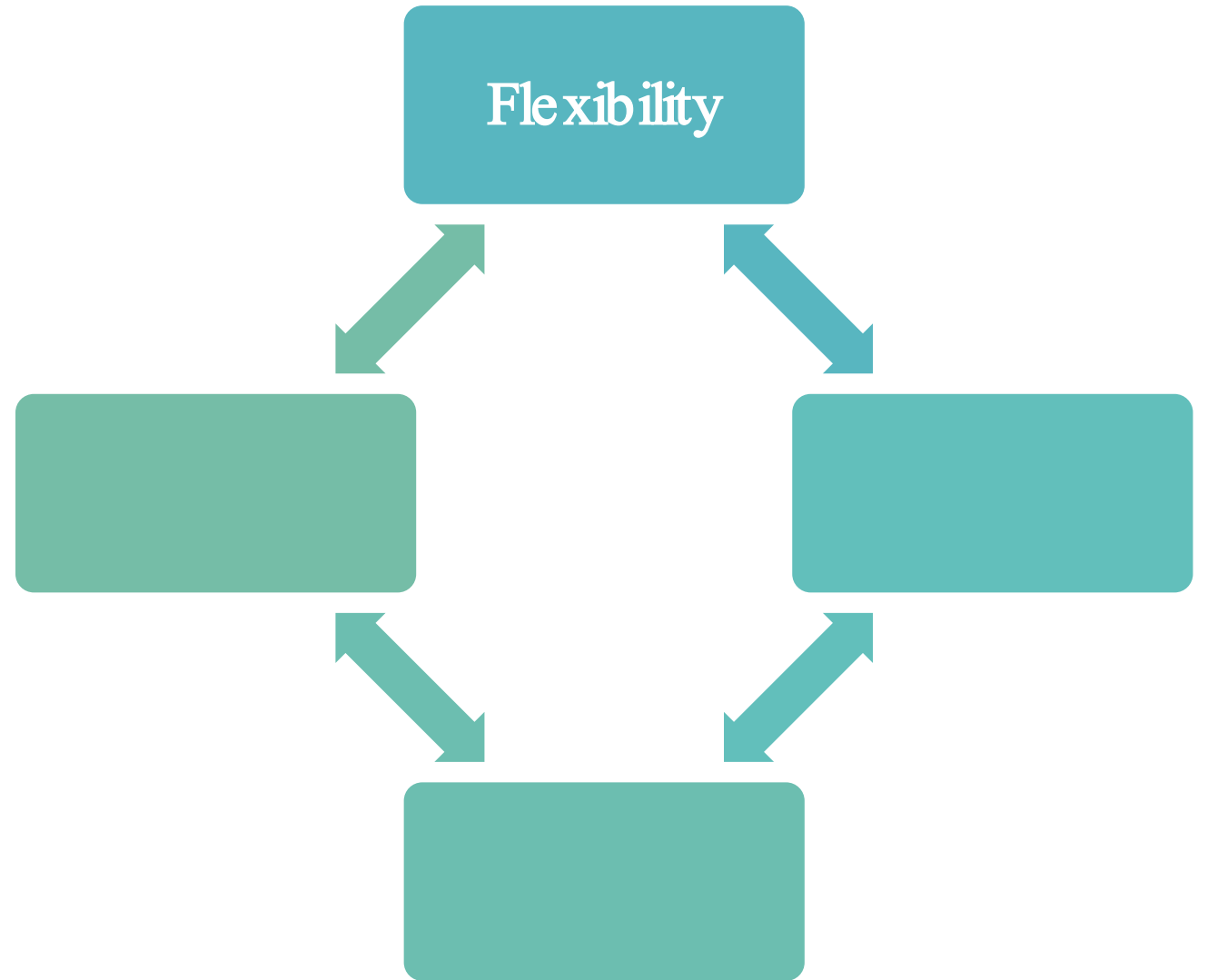
PITFALLS: PROCESS

- An integrative design and construction process, requiring early buy-in from owners, is essential for prioritising and implementing adaptability in projects.
- The process involves high communication and the architect leading the way, but if not considered early or if priorities conflict, adaptability may be overlooked.



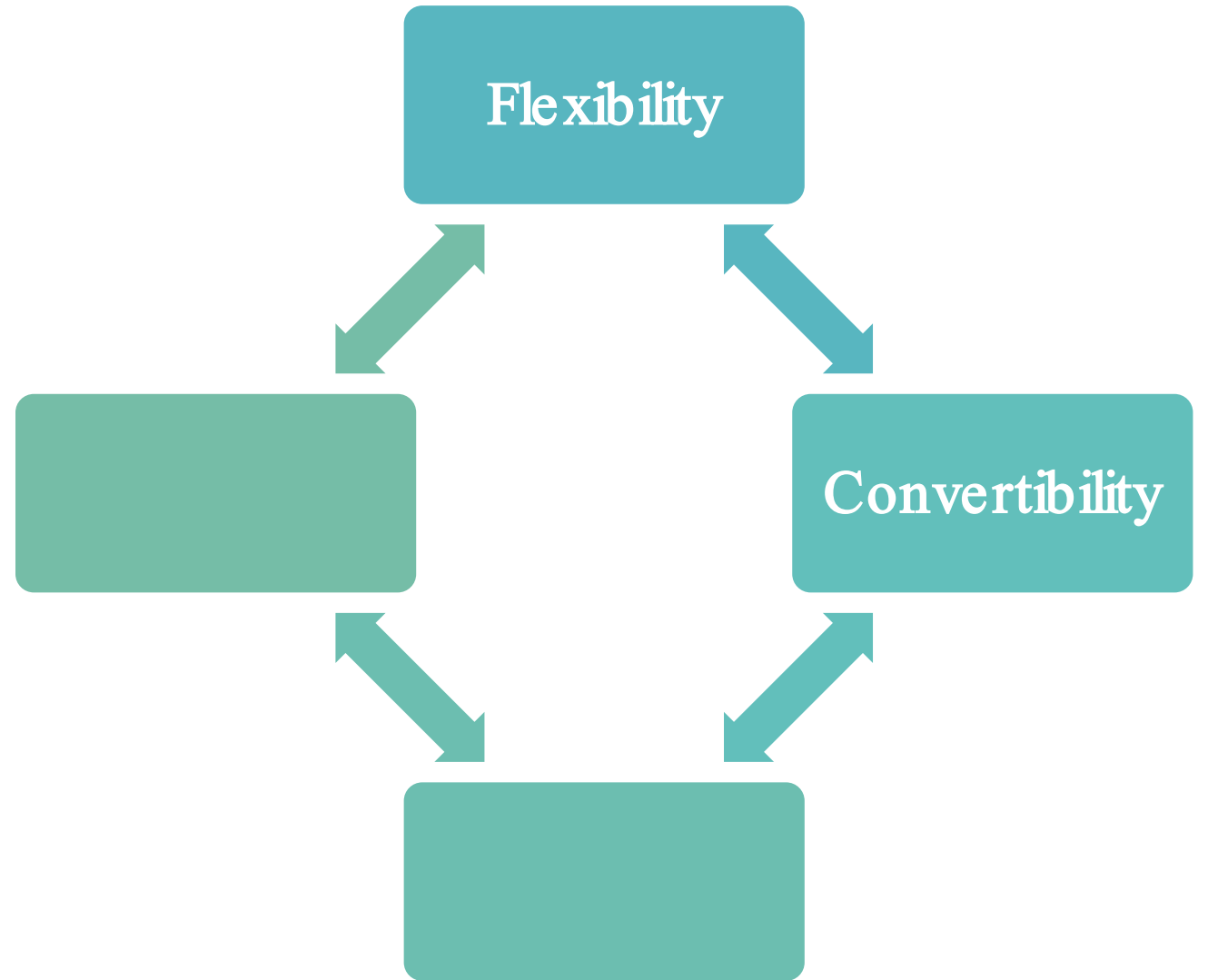
KEY PRINCIPLES

The ability to modify spaces and functions easily without significant structural changes.



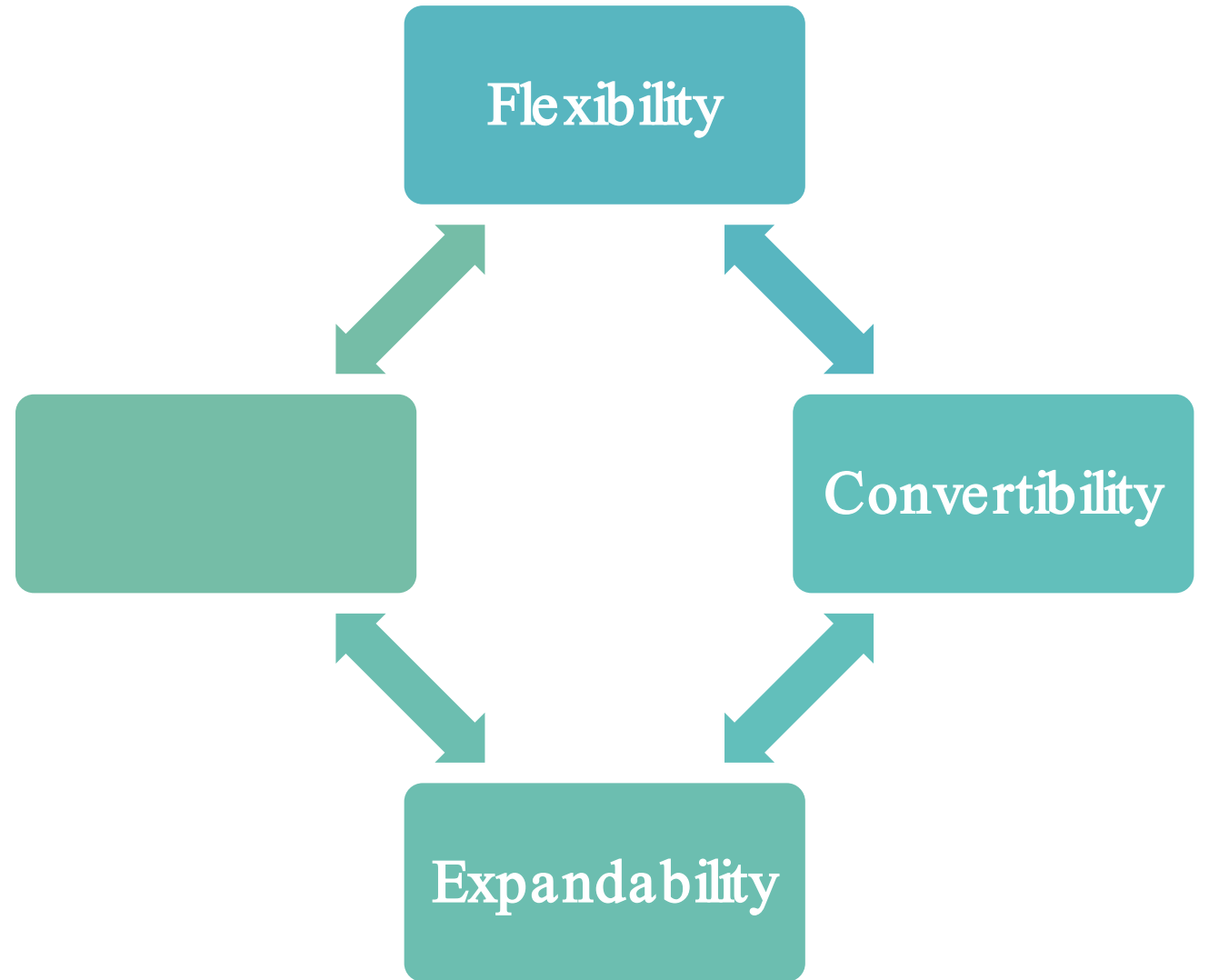
KEY PRINCIPLES

The capability of a building or space to change its function with minimal intervention.



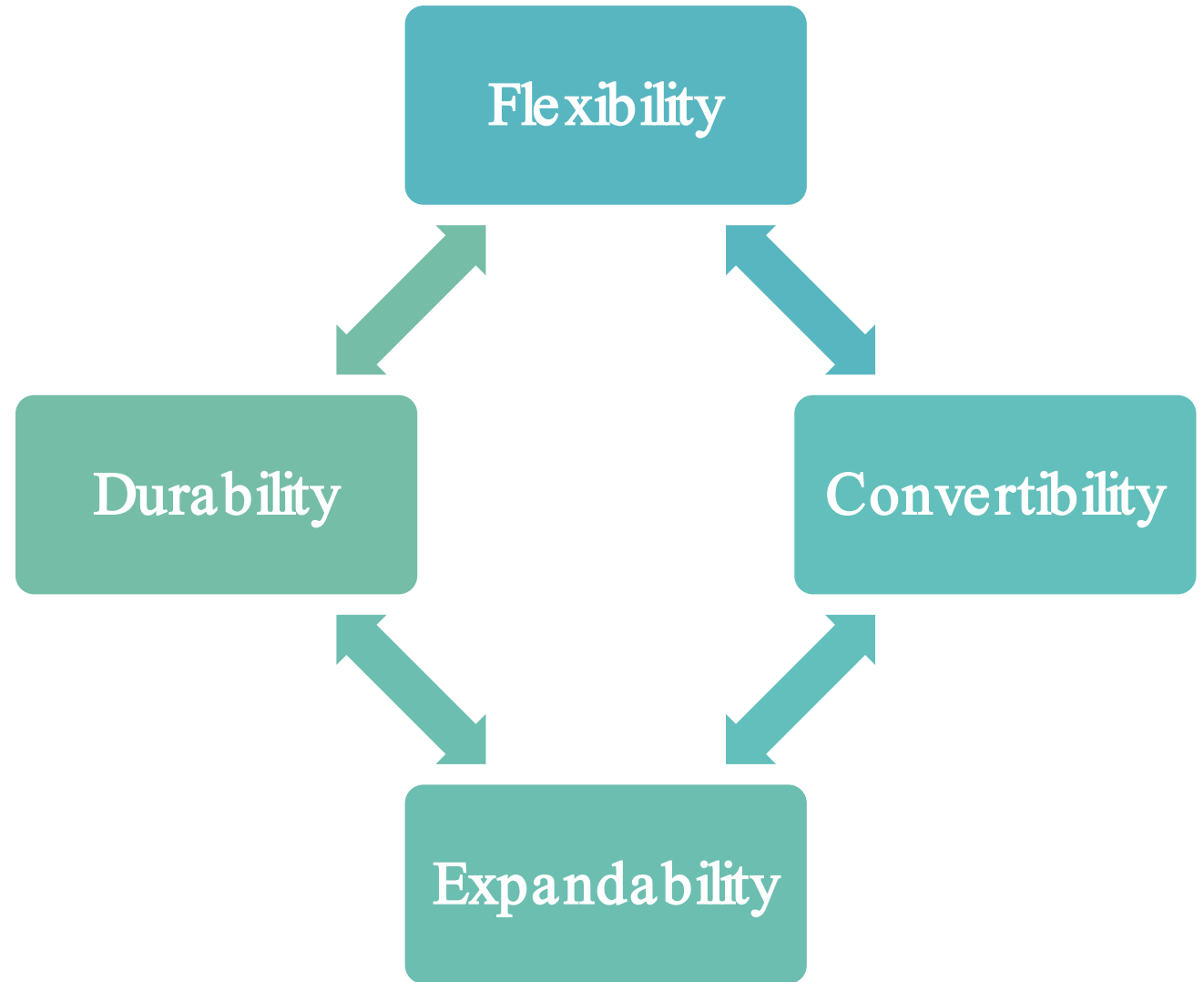
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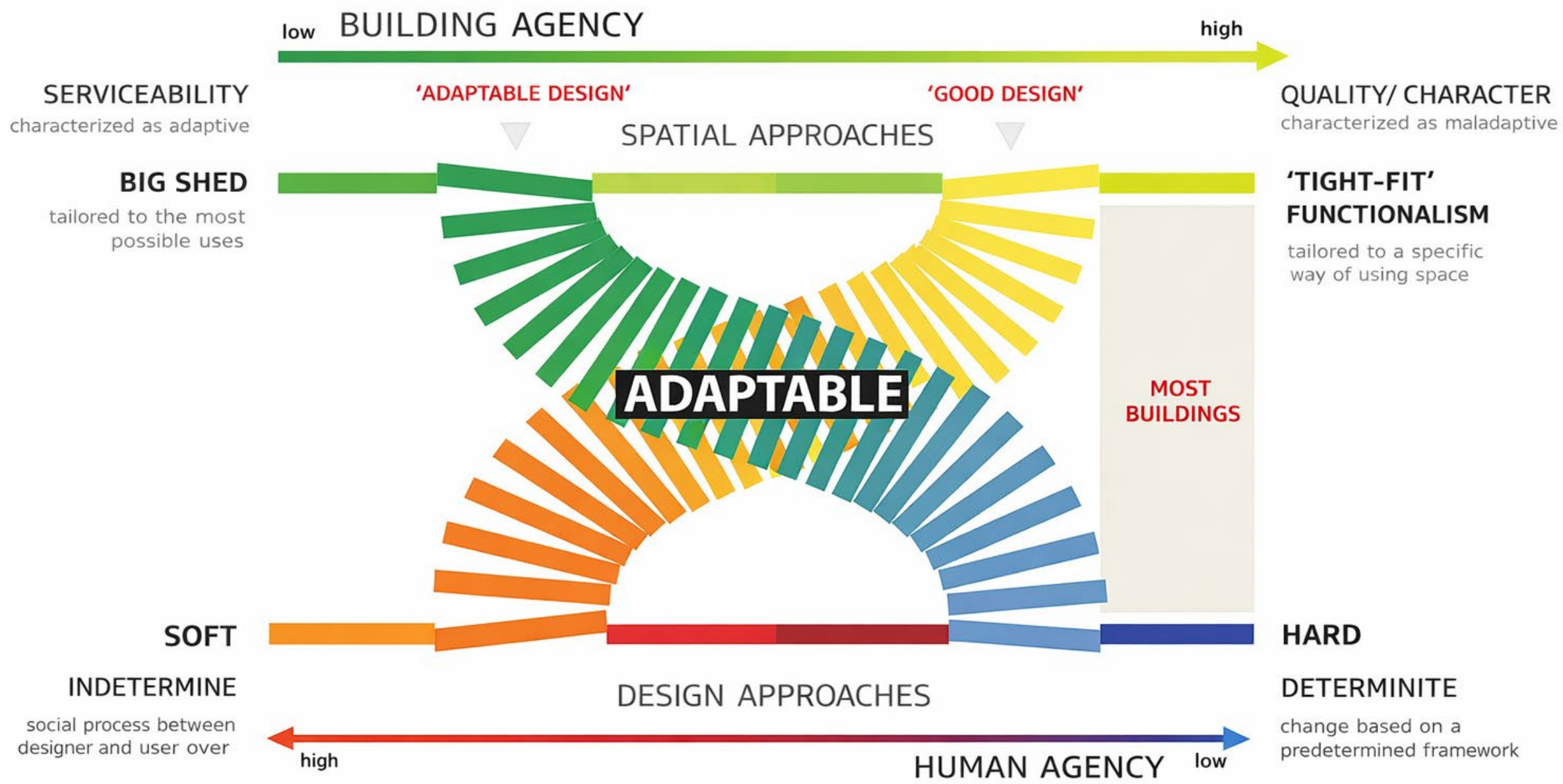
The potential to add or remove space as needs evolve.



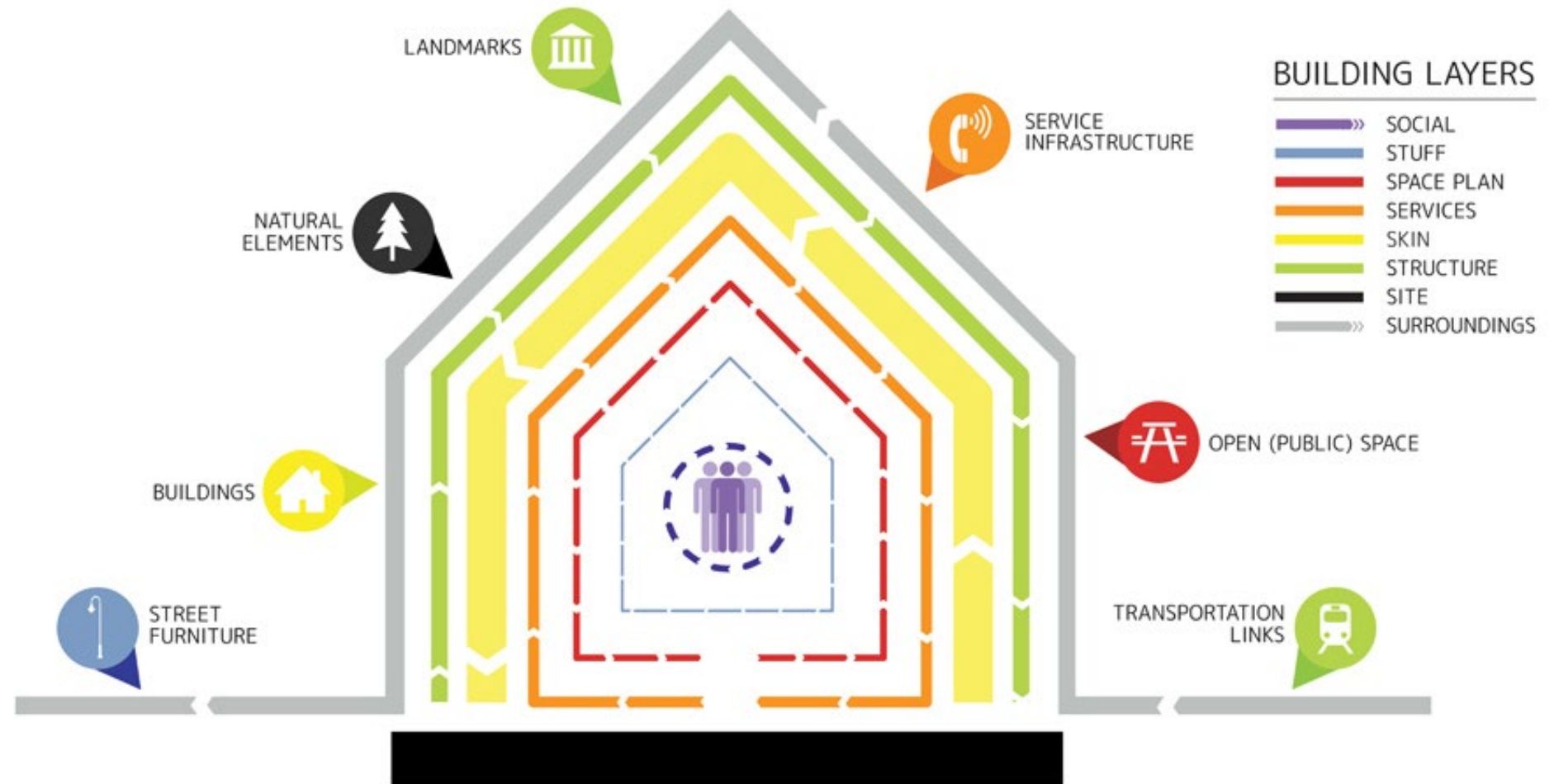
KEY PRINCIPLES

The use of materials and construction methods that ensure longevity while allowing future modifications.

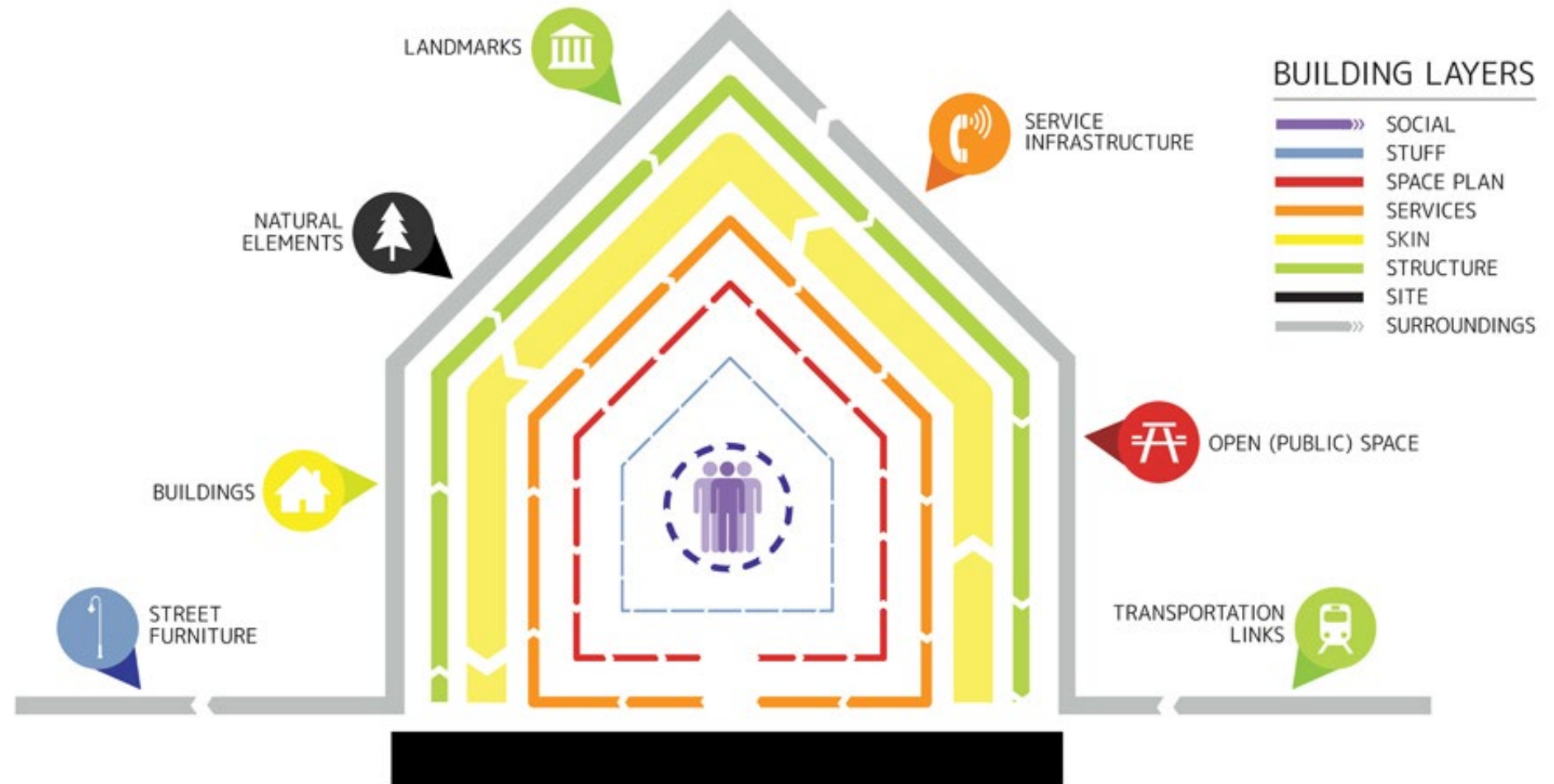




BUILDING LAYERS



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Layer	Components	Timescale
Stuff	Furniture, Equipment, Possessions	Daily
Space Plan	Internal Layout, Partitions, Finishes	3 – 30 Years
Services	Heating, Ventilation, Plumbing	7 – 15 Years
Skin	Cladding, Roof, Glazing	20 Years
Structure	Beams, Columns, Foundations	30 – 300 Years
Site	Physical Location	∞

APPROACHES

- Clear Spans



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- Generous Floor-to-Floor Heights



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- Generous Floor-to-Floor Heights
- Flat Floors



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- Flat Floors
- Interior Non-Load Bearing Partitions



APPROACHES

- Clear Spans
- Generous Floor-to-Floor Heights
- Flat Floors
- Interior Non-Load Bearing Partitions
- Regular Spaced Structural Elements

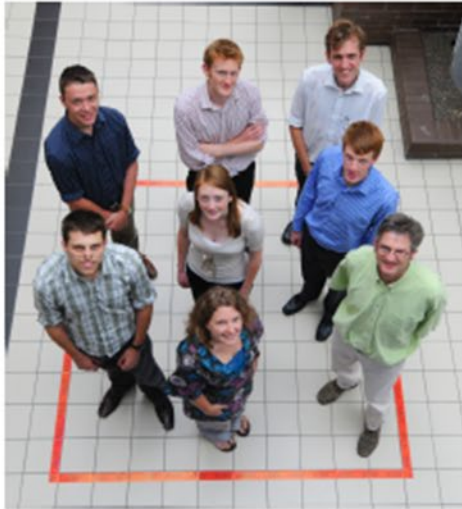




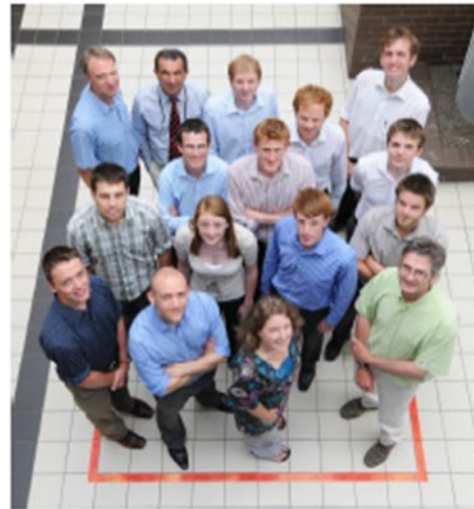
STRATEGIES

- A Stronger Structural System

OVERLOADING



1.5kN/m²



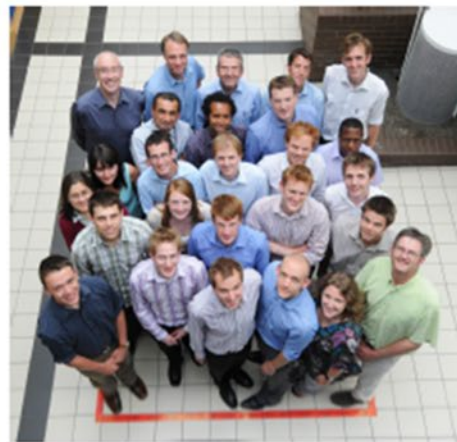
3kN/m²



7.5kN/m²



4kN/m²



5kN/m²

Typical domestic loading = 1.5kN/m²

Shopping centre + partitions = 4.0kN/m²

Plant room = 7.5kN/m²



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- A Stronger Structural System
- Early Engineer Engagement



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- Separation of Systems



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- Use of Durable Materials



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- Use of Mechanical Fasteners



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- Separation of Systems
- Use of Durable Materials
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- Clear and Effective Documentation



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- A Stronger Structural System
- Early Engineer Engagement
- Separation of Systems
- Use of Durable Materials
- Use of Mechanical Fasteners
- Clear and Effective Documentation
- Aesthetics and Quality Design



POMPIDOU CENTRE

Structural and mechanical systems—ducts, pipes, escalators—were placed on the exterior and color-coded (blue for air, green for water, yellow for electricity, red for circulation).

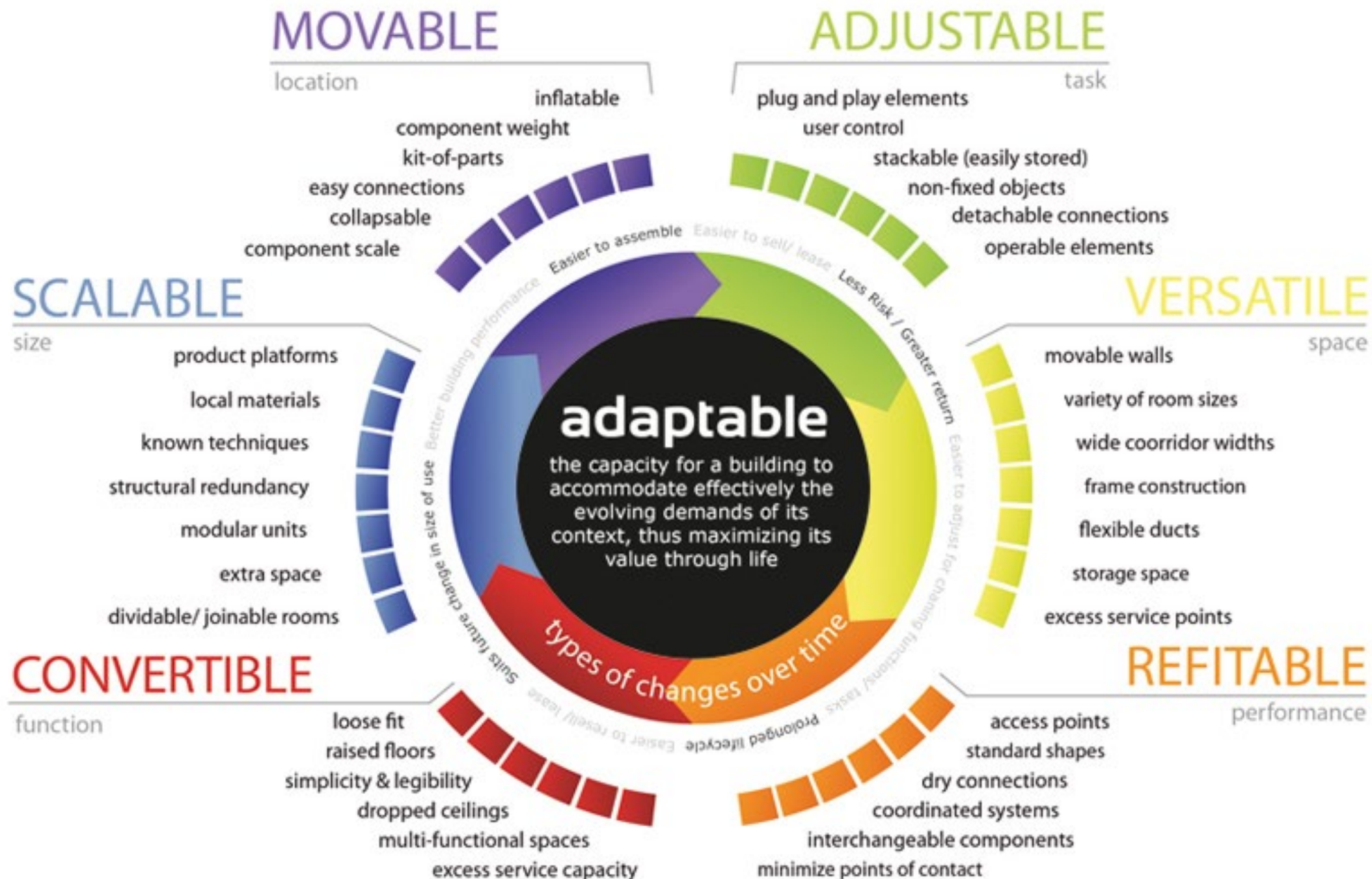
This freed vast interior spaces for exhibitions



THE CRYSTAL

The Crystal was commissioned by Siemens and designed by WilkinsonEyre originally as an exhibition centre and think tank.

In 2022 it reopened as London's new City Hall and is now the home of the London Assembly.



ACTIVITY

- A flexible office hub for start-ups, freelancers, and small businesses.
- Initial Office Requirements:
 - Co-working spaces with open-plan and private offices
 - Meeting rooms of various sizes
 - Event and collaboration spaces for workshops and networking
 - Shared amenities (e.g., kitchen, lounge, bike storage)

The design must allow for:

- Conversion into residential units (e.g., apartments or co-living spaces)
- Reconfiguration for other uses (e.g., education centre, medical offices, or community hub)

Deliverables: A concept sketch showing the initial office layout and how it can be adapted