Project Level Design Principles

Using design principles to drive better project outcomes in asset management

Clare Donnelly & Madeleine Kessler

NIC Design Group

16 January 2025

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The National Infrastructure Commission

The Commission provides government with impartial, expert advice on major long term infrastructure challenges.

The Commission's objectives are to:

- support sustainable economic growth across all regions of the UK
- improve competitiveness
- improve quality of life
- support climate resilience and the transition to net zero

In fulfilling its purpose and objectives, the Commission:

- **sets the long-term agenda**
- **develops fresh approaches and ideas**
- **focuses on driving change**

National Infrastructure Assessment

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The Commission's Design Group

Prof. Sadie Morgan OBE *Chair*

Anthony Dewar

Clare Donnelly

Andrew Grant

Alister Kratt

Madeleine Kessler

Peter Maxwell

Judith Sykes

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Design Group

About the Design Group

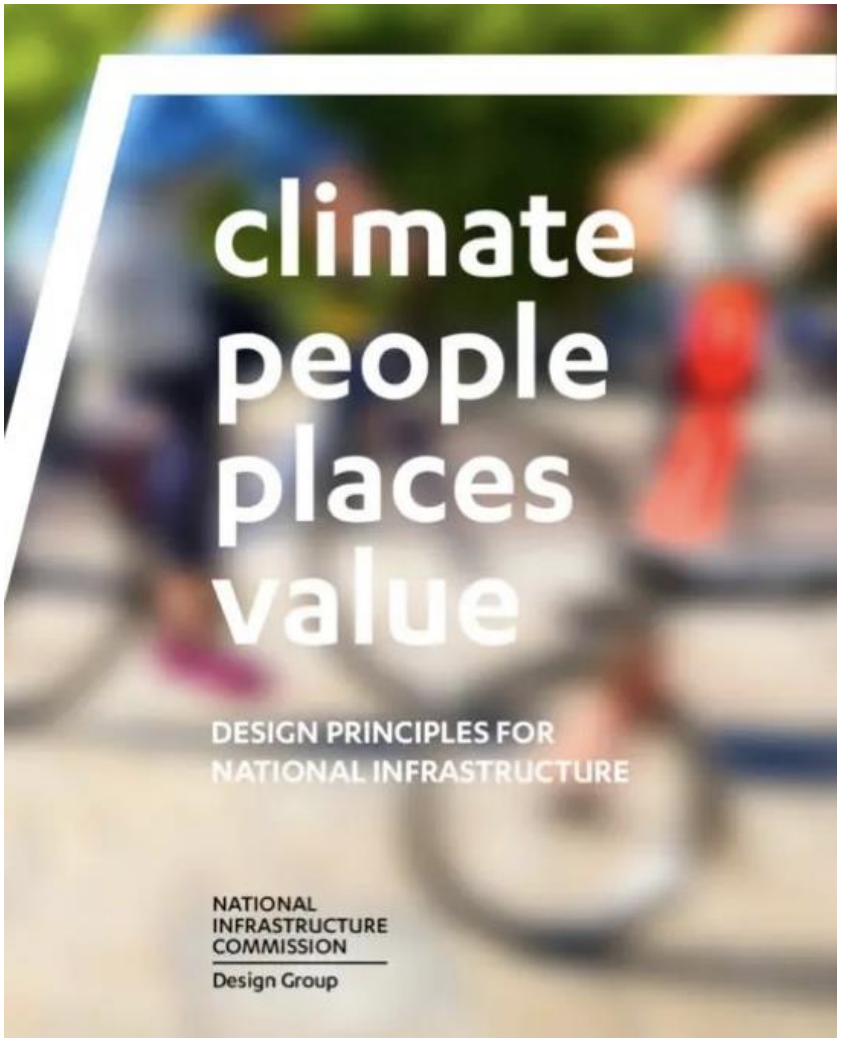
The Design Group was established formally in 2019 with the aim of inspiring renewed ambition for the quality of the UK's infrastructure. Its mission is to:

> ***Inspire, promote and champion design excellence in all nationally significant infrastructure*** *projects, helping to produce infrastructure which has social value and responds creatively to the needs of people, places and the environment.*

In the second National Infrastructure Assessment, the Design Group recommended:

> *The Design Group will develop further guidance that* ***explains how design leaders, using an effective, structured process, should develop and embed project specific design principles****. By 2024, the Infrastructure and Projects Authority should incorporate this guidance within its assurance review regime and expect all Nationally Significant Infrastructure Projects to follow it.*

The Design Principles for National Infrastructure



https://nic.org.uk/app/uploads/NIC-Design-Principles.pdf

The Importance of Design for Infrastructure

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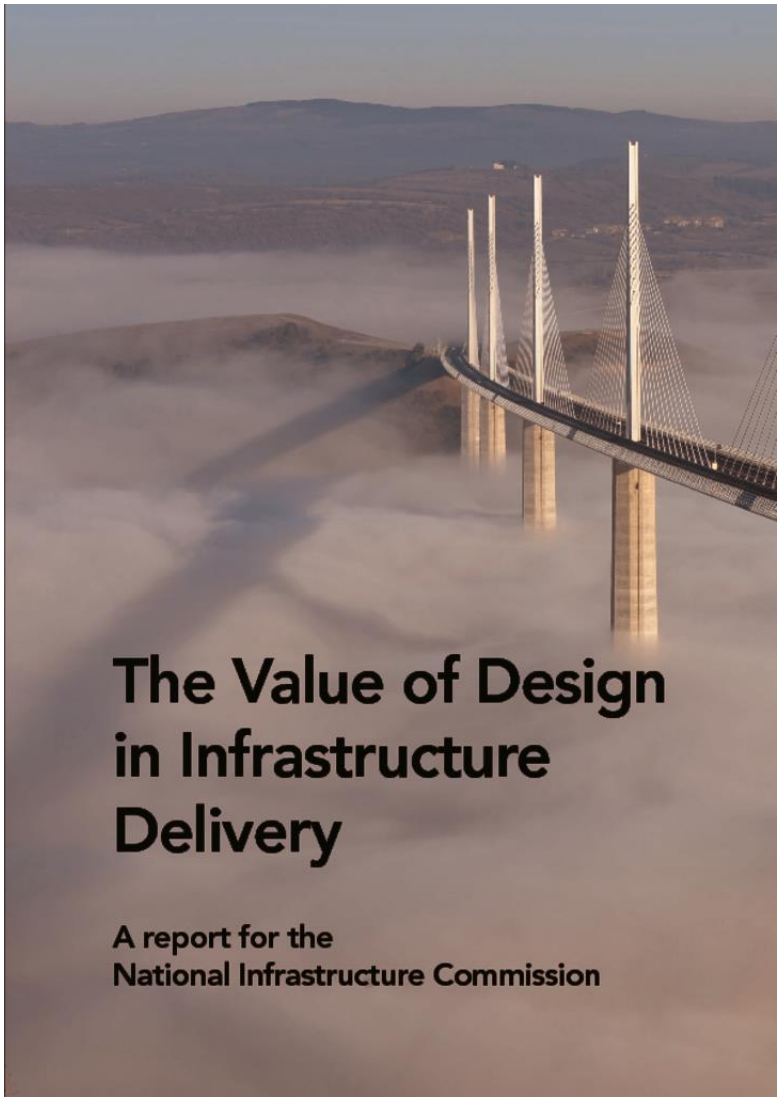
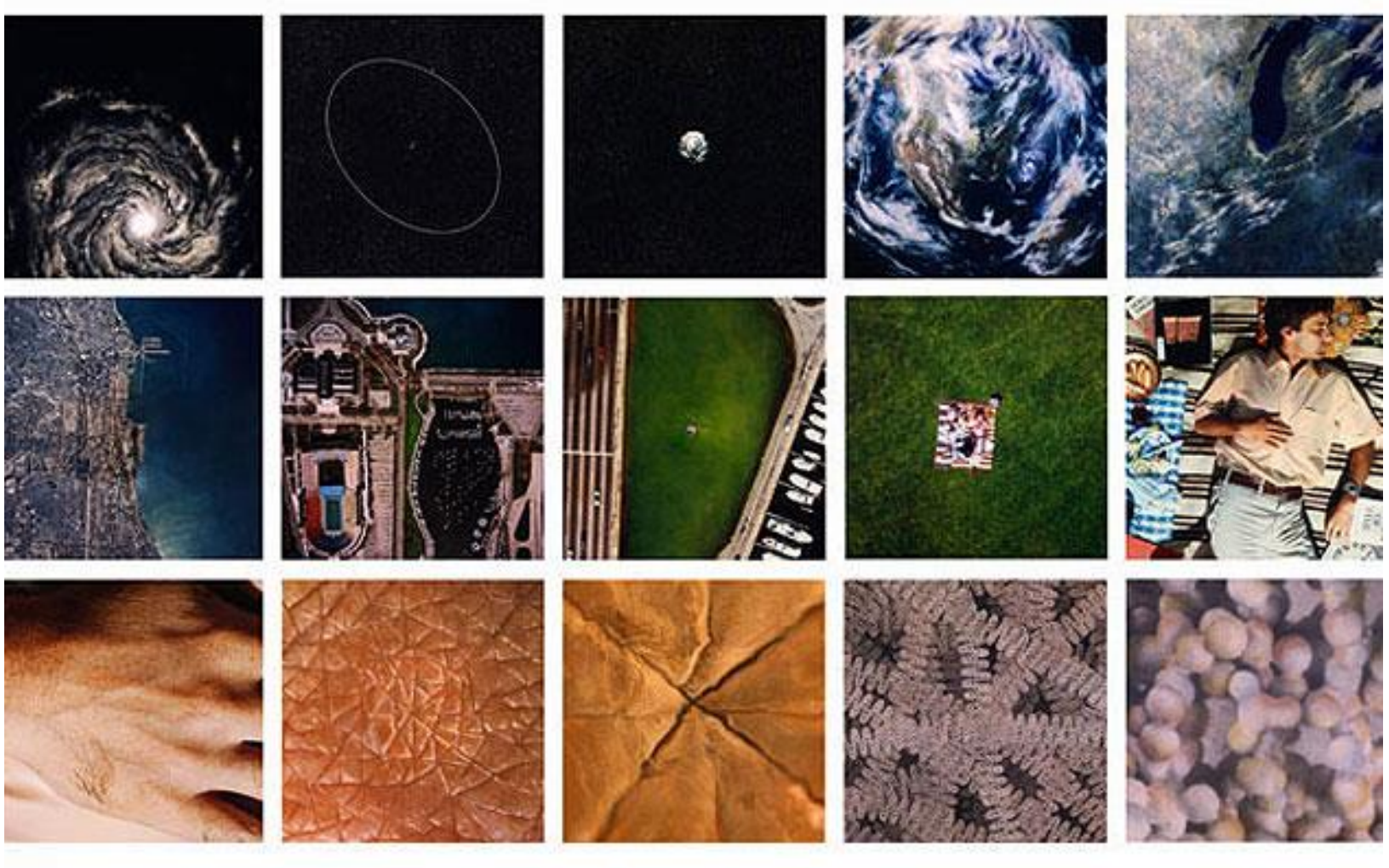
Design as process, not product

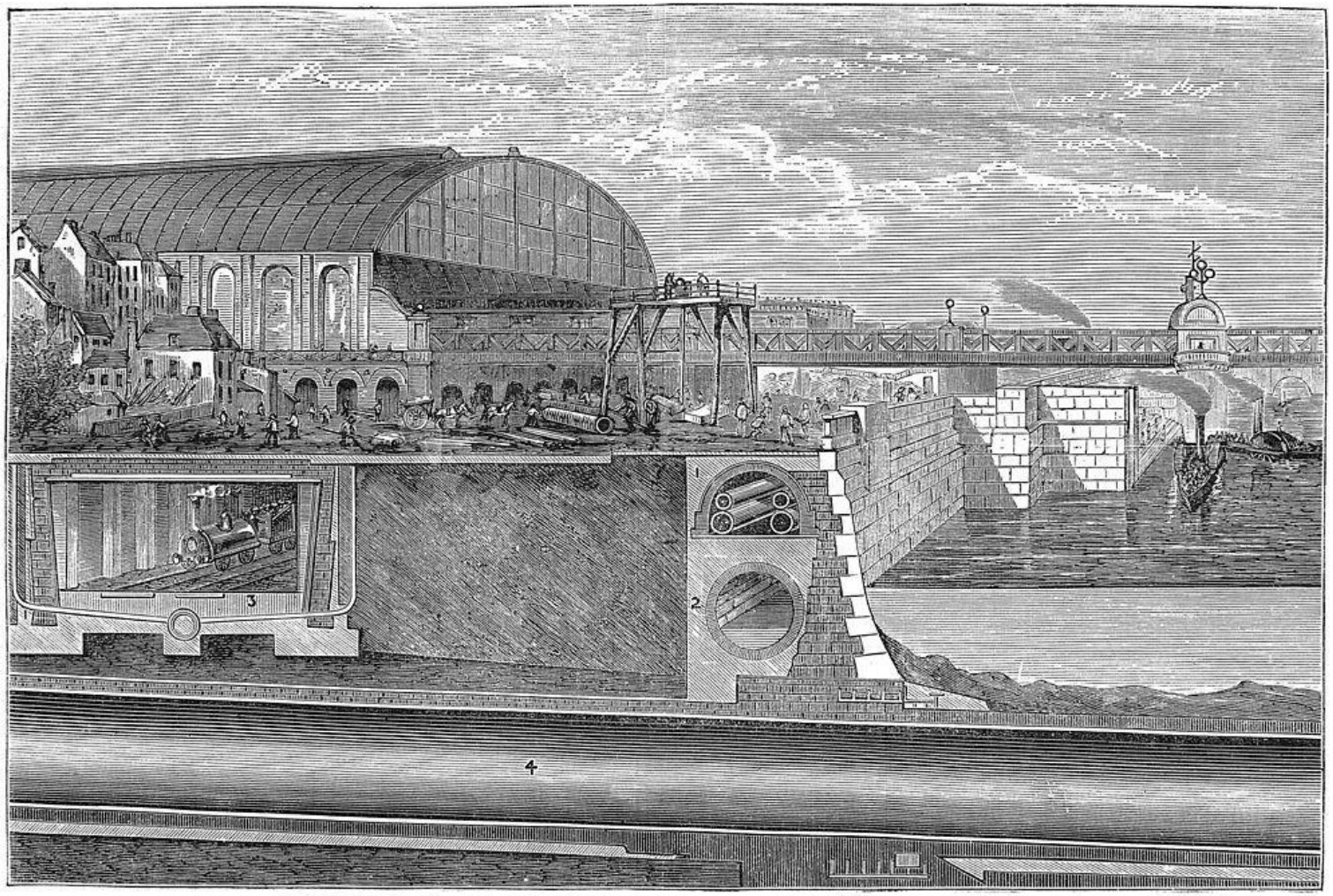
- Infrastructure design is about so much more than aesthetics.
- Design ensures that projects are delivered efficiently, underpinned by clear objectives.
- Using an iterative, structured design process from project outset can deliver multiple environmental, social, and economic benefits, while limiting adverse impacts.



Design as a conversation at every scale



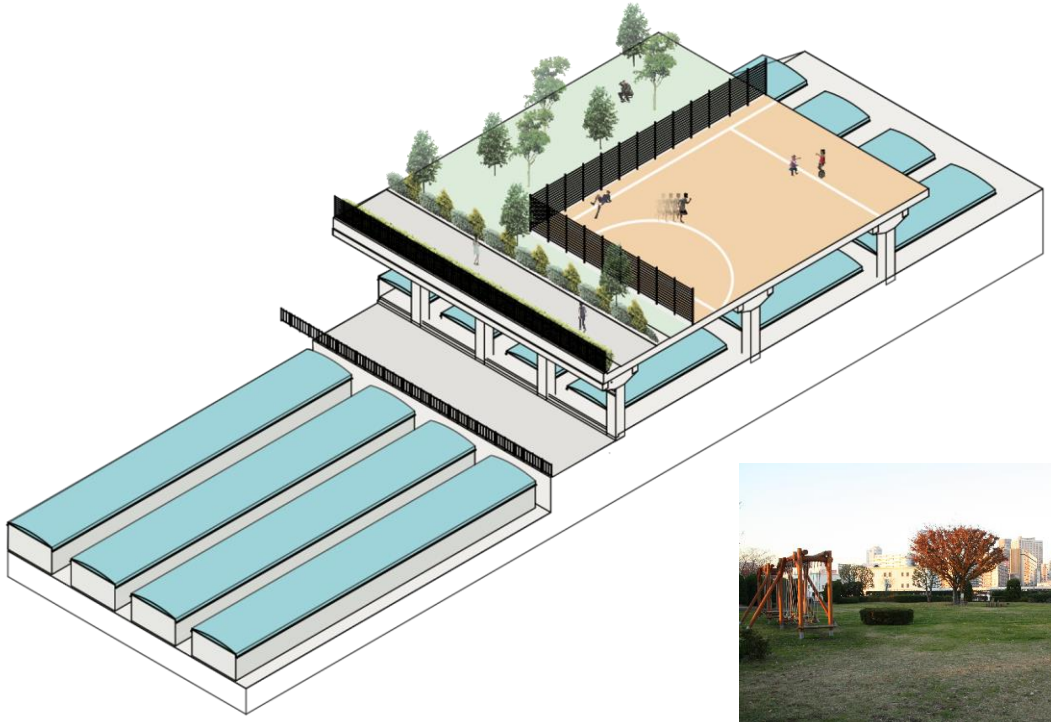
Embankment

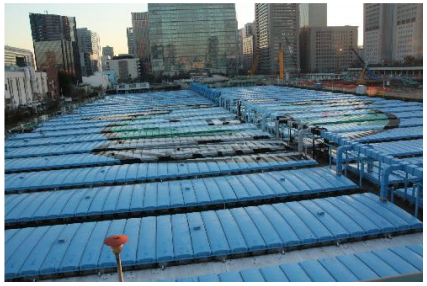


SECTION OF THE THAMES EMBANKMENT, 1867.

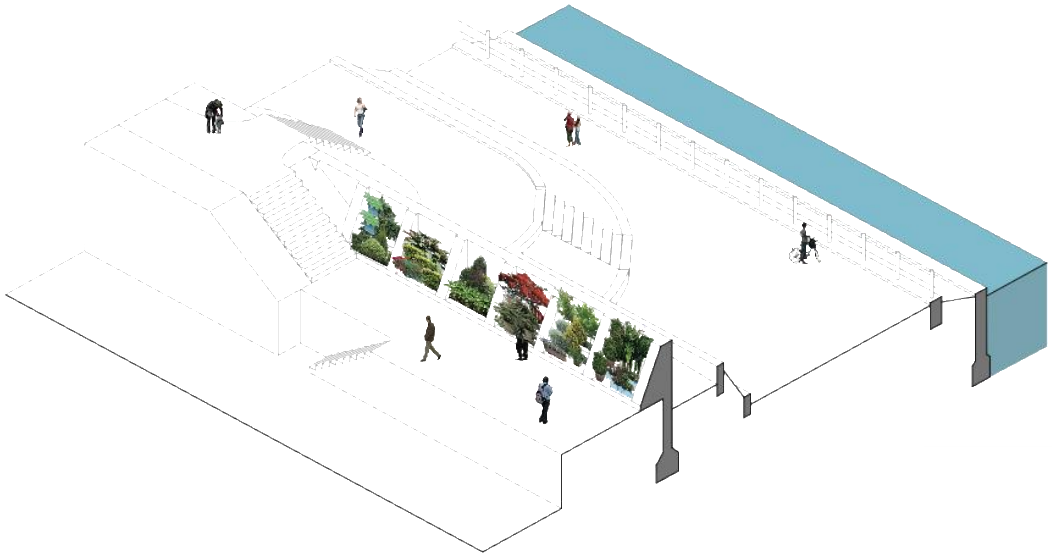
Showing (1) The Subway. (2) The Low-Level Sewer. (3) The Metropolitan District Railway. (4) The Pneumatic Railway.

Water Treatment Plant





Sea Wall



Design can help projects maximise benefits and limit risk

- **Adhering to a structured design process, underpinned by design principles, should not be seen as 'cost additional'** – instead, it can avoid the reactive, ill-conceived, late changes to infrastructure projects that often cause cost escalation and programme delay
- When infrastructure projects are not set up well, whole-life benefits are unlikely to ever be fully realised, and the original business case may be undermined
- When projects use an effective design process and work in a collaborative, open way, then infrastructure can be delivered that will work for climate, people and places

How do we apply these… Design Symposium

Eight roundtables, with ten partner organisations

Institution of Civil Engineers, Infrastructure and Projects Authority, Major Projects Association, Design Council, Royal Institute of British Architects, Design Council, Landscape Institute, Institute of Asset Management and Global Infrastructure Investor Association

Aiming to:

1. Promote Design Principles, Design Champions, value of design
2. Engage key leaders and decision makers
3. Encourage interdisciplinary conversations about design
4. Highlight best practice and case studies
5. Build relationships

What issues did we explore?

- We explored design across each of the sectors for which the Commission has a remit: digital, energy, floods, transport, waste and water
- We sought examples of good and bad practice
- We asked how design principles could be better embedded at the earliest stages of projects
- We tested how well the importance of good design is recognised by senior leaders
- We explored how projects had successfully secured community support
- We asked for international case studies so that we could learn from approaches in other countries

What did we learn?

Findings around the importance of:

1. Project appraisal
2. Project funding
3. Procurement
4. Risk
5. Data
6. Maintenance
7. Engagement
8. Leadership
9. Design maturity
10. Macro approach

Leading to our next body of work…

Project Level Design Principles

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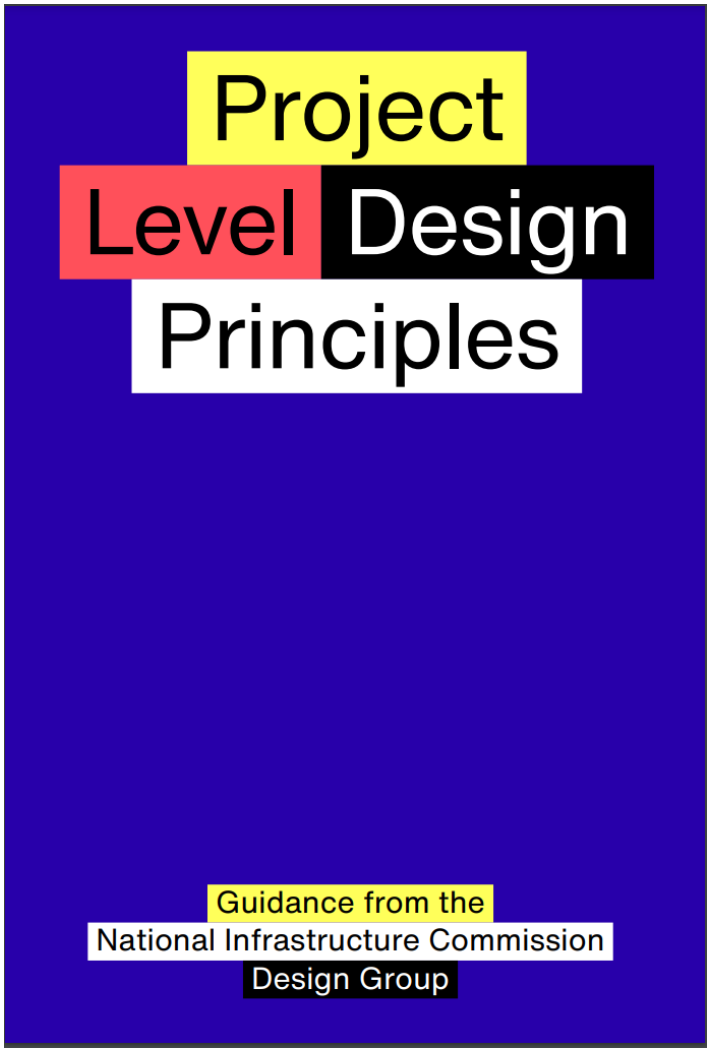
What are Project Level Design Principles?

- Project Level Design Principles should be derived from the overarching Design Principles for National Infrastructure, directly addressing a project's specific requirements, benefits and outcomes
- Design principles should form a key part of project governance, driving design decisions from the project outset
- NIC DG Guidance published May 2024

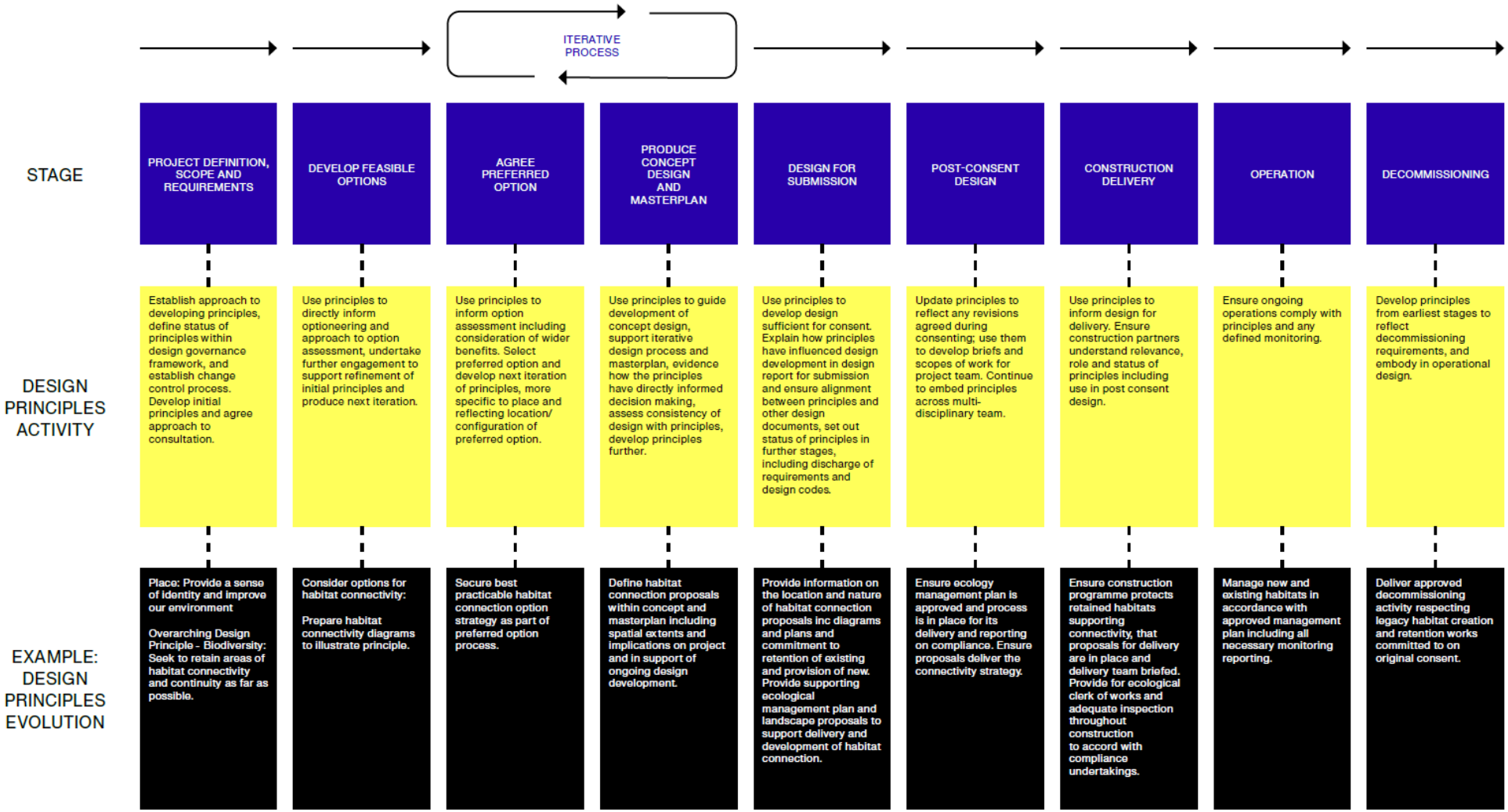


https://nic.org.uk/app/uploads/NIC-Design-Principles-Handbook-Digital-PDF.pdf

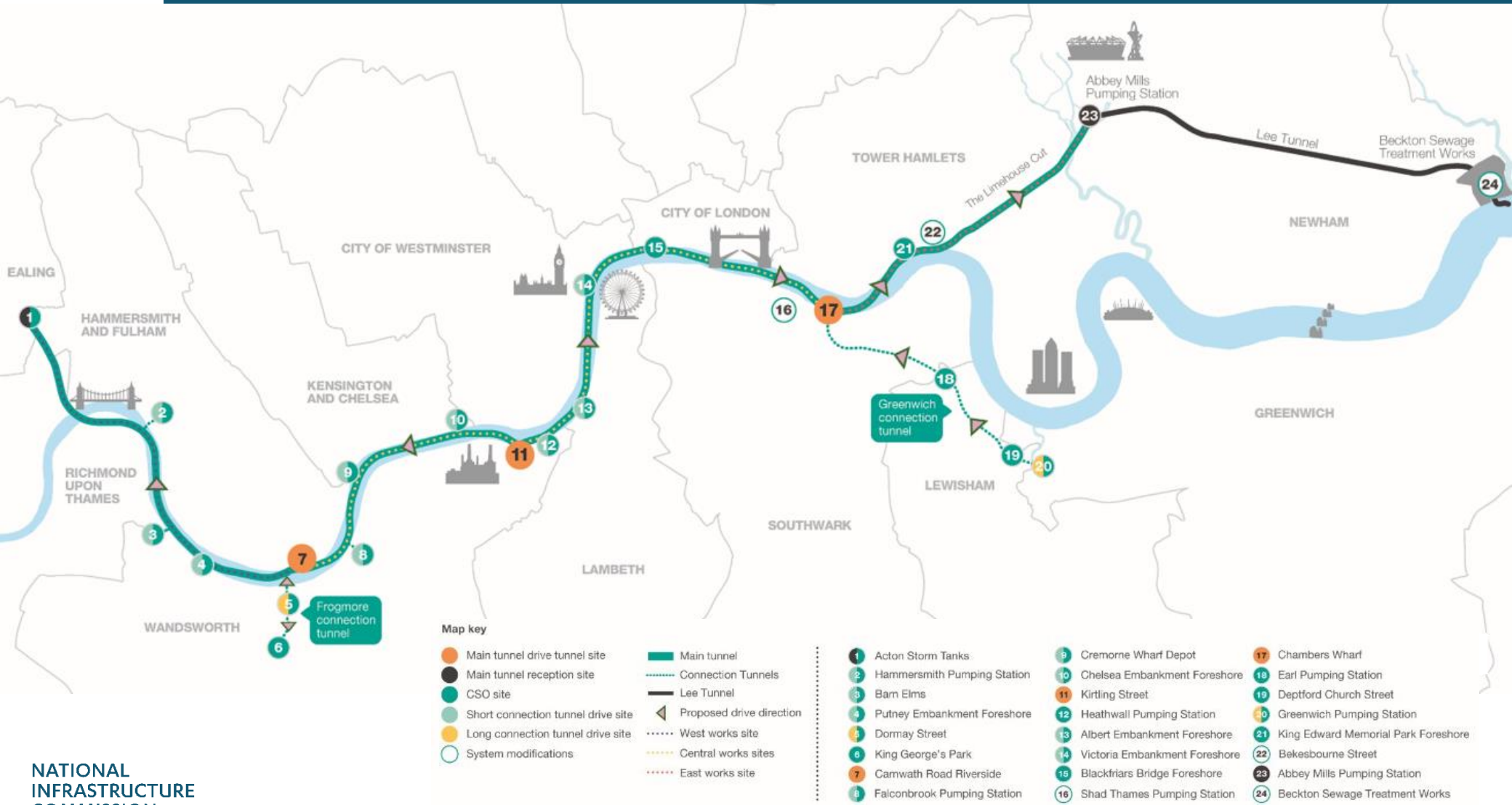
PLDPs evolve as projects progress, but should keep stakeholders and teams unified

- The development of design principles is an iterative, ongoing activity throughout any project. While it is important for principles to be developed from the very earliest stages, they must also evolve
- Principles should not just ‘sit on the shelf’ but drive decision making on the project day-to-day
- The design principles should be capable of aligning all parties around agreed, shared outcomes
- The principles will also help to foster a shared understanding across the whole project team of the outputs and outcomes being sought

PLDPs are used throughout the project lifecycle



Case Studies – Thames Tideway Tunnel…



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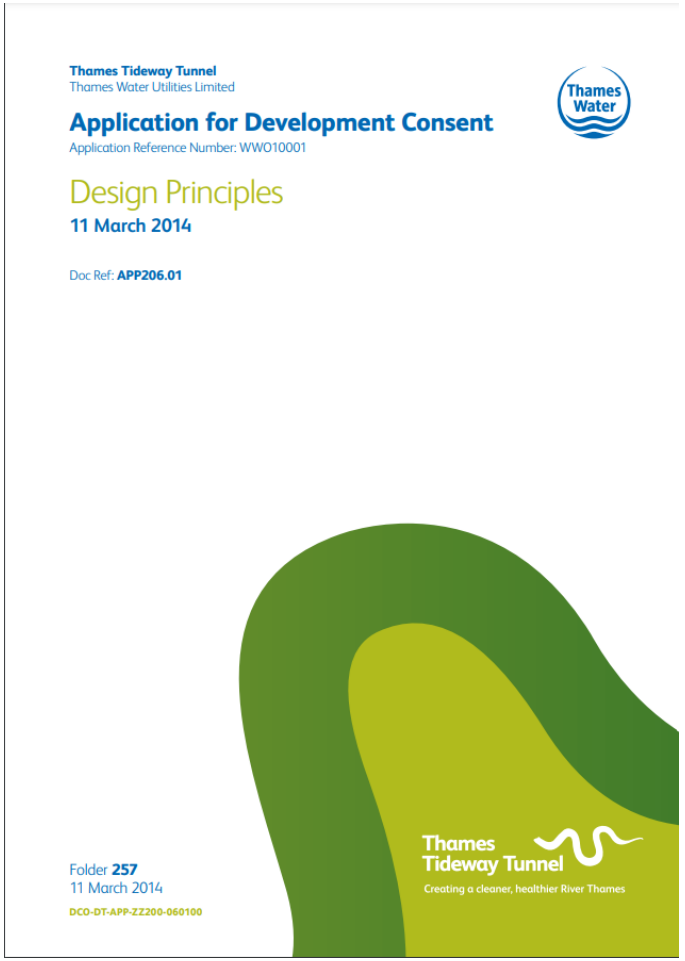
Case Studies – Thames Tideway Tunnel… 2010

- Design Principles Drafted pre-consents (2010-2014) and are secured through DCO
- Articulated the vision and principles for the project in a (relatively) concise way
- Gave the contractor a framework for the detailed design within which they could innovate.
- Acted as a guide for the (approximately) 20,000 people have worked to deliver the project.



https://tideway.london/media/1896/app20601-design-principles.pdf

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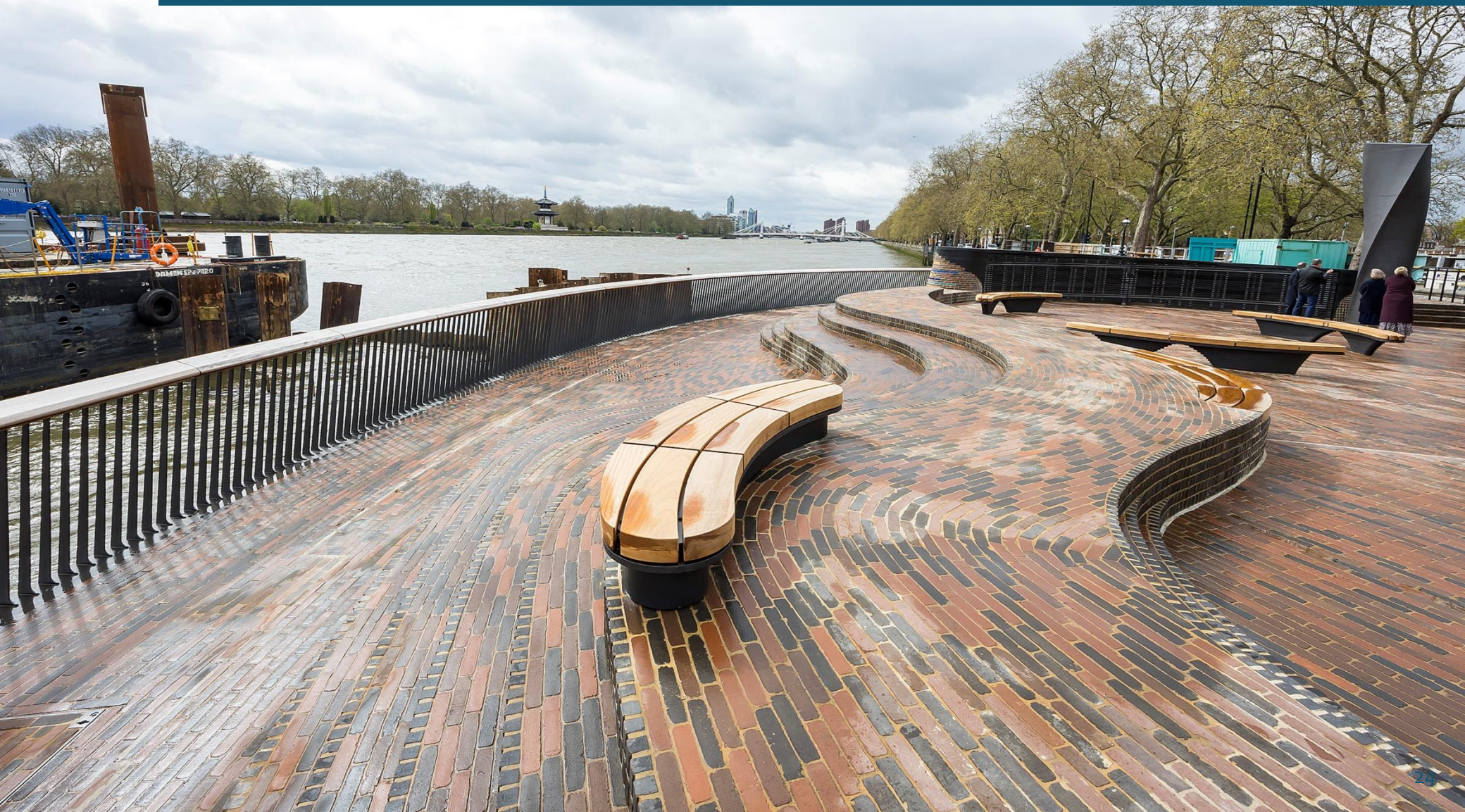
Case Studies – Thames Tideway Tunnel…

Case Studies – Thames Tideway Tunnel… 2024



Design and Asset Management

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The design process supports thinking around maintenance and resilience

- Projects should follow the design process from the very outset through to operation and decommissioning
- PLDPs can help define ongoing monitoring regimes for landscape management and building maintenance
- PLDPs can also ensure that end-of-life considerations are factored into scheme design from the earliest stages, and that engagement activity at the start of the project incorporates discussion about the decommissioning phase – even if it may be decades later

Discussion

- To what extent do design principles or similar underpin your current day-to-day activity?
- Could the widespread use of design principles for new infrastructure developments help drive more effective, efficient, long-term asset management?
- From a design perspective, what would make your jobs easier?
- Where are the best examples of innovative, early design thinking helping to support effective asset management? What was the key factor behind the success?

Thank You!

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