**Project Controls: Challenges and Solutions**

**Michael Nightingale**

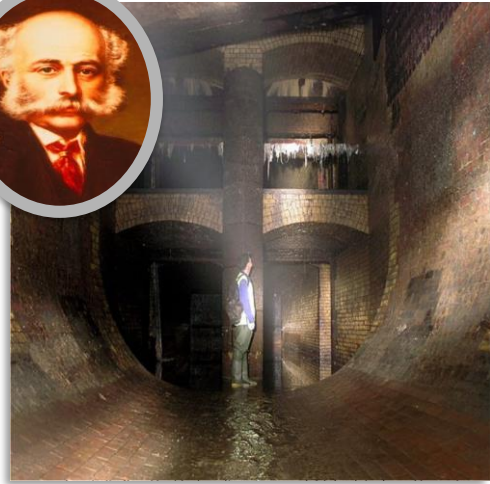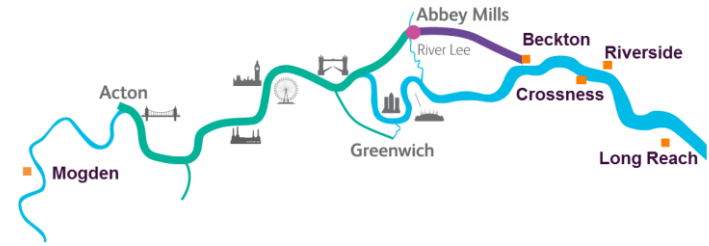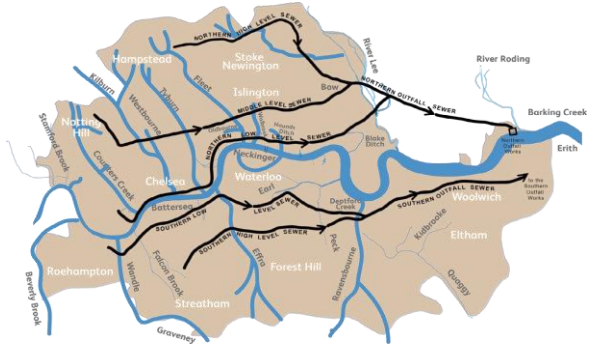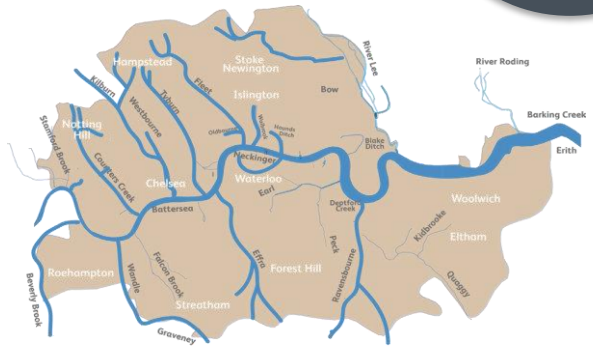**16th November 2016**

# History of London's Sewers

**1700**
**600k**

**1860**
**2 million**

**1910**
**4 million**

**2013**
**8 million**
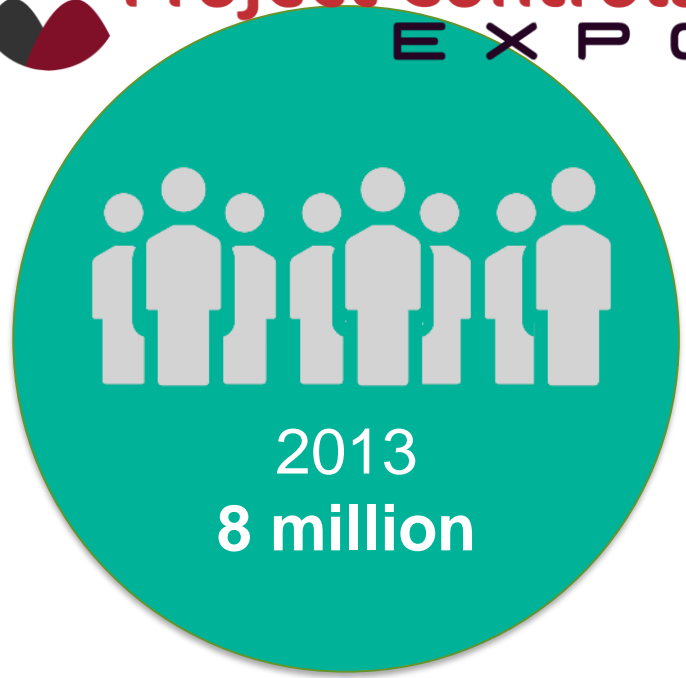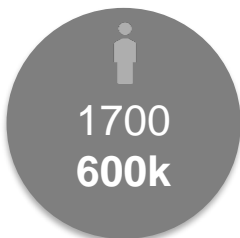
- In 2015, **62 million** cubic metres of sewage discharged to the tidal River Thames.

- 50 discharges on average in a typical year.

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# London Tideway Improvements



Legend:
- Sewage Works Upgrades
- Lee Tunnel
- Thames Tideway Tunnel

Abbey Mills

River Lee

Acton

Beckton

Riverside

Crossness

Greenwich

Mogden

Long Reach



Air Treatment
New reclaimed area
Existing sewerage network
Existing CSO
Vortex Shaft
Main Tunnel
Connection

Image: CSO interception



Project Controls EXPO

# Tunnelling challenges



Buildings: **1301**

Listed buildings: **24**

Water mains: **15km**

Gas mains: **34km**

Sewers: **18km**

Tunnels: **45**

Acton Storm Tanks

Carnwath Road Riverside

Kirtling Street

Chambers Wharf

Abbey Mills Pumping Station

30m

66m

Clay

Sand

Chalk

West

Central

East

Bridges: 75

River walls: **20km**

In-river structures: **50**

# Reconnecting London with the Thames

Our challenge is to build a new sewer for London, to prevent the frequent pollution of the River Thames.



Our vision is not just to clean up the Thames but to promote a change in the relationship between London (and Londoners) and their river.

Overflow weir chamber

Connection culvert from overflow weir chamber

Existing Low Level Sewer No. 1

Fleet Main CSO interception chamber

Connection culvert from Fleet main CSO

Waterloo and City Line

New storm overflow

Valve chambers

Air treatment chamber

Main tunnel to Chambers Wharf

CSO Drop shaft

Main tunnel from Kirtling Street
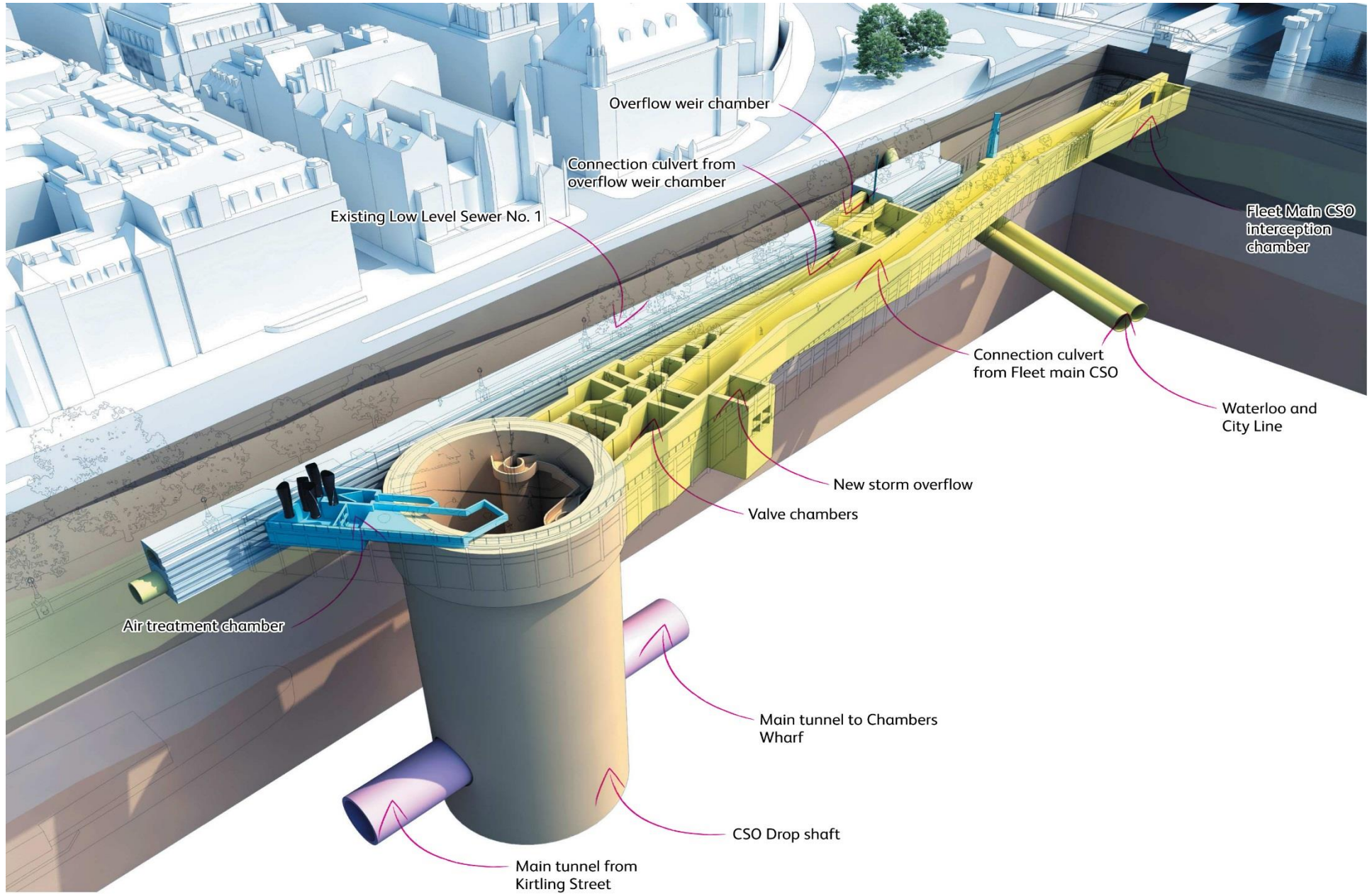
# The Tideway project directly impacts multiple stakeholders

GOV.UK

**Business Case**

- Strategic Benefits
- Investment in Resources
- Business Risk

Investors

Contractors

Stakeholders

CONTRACT

Our challenge is to be **'in control'** of our Project during delivery in order to:

✓ Protect the Business Case

✓ Maintain the validity of the commitment and investment decisions

**It's been a long road just to get to the start line…**

# Challenge: developing a robust delivery baseline

## A lot to be proud of…

- ✓ Multiple revisions of the evolving estimate
- ✓ Securing the IP Licence Award
- ✓ Confidence for Investors
- ✓ Regulatory Settlement
- ✓ Building strong foundations
- ✓ An integrated, incentivised schedule

## Watch out for…

- ! A hard slog
- ! Communication with other teams
- ! Dealing with uncertainty
- ! Record assumptions and source data
- ! Evolve the maturity of data and processes
- ! Effective data 'handshakes' between systems
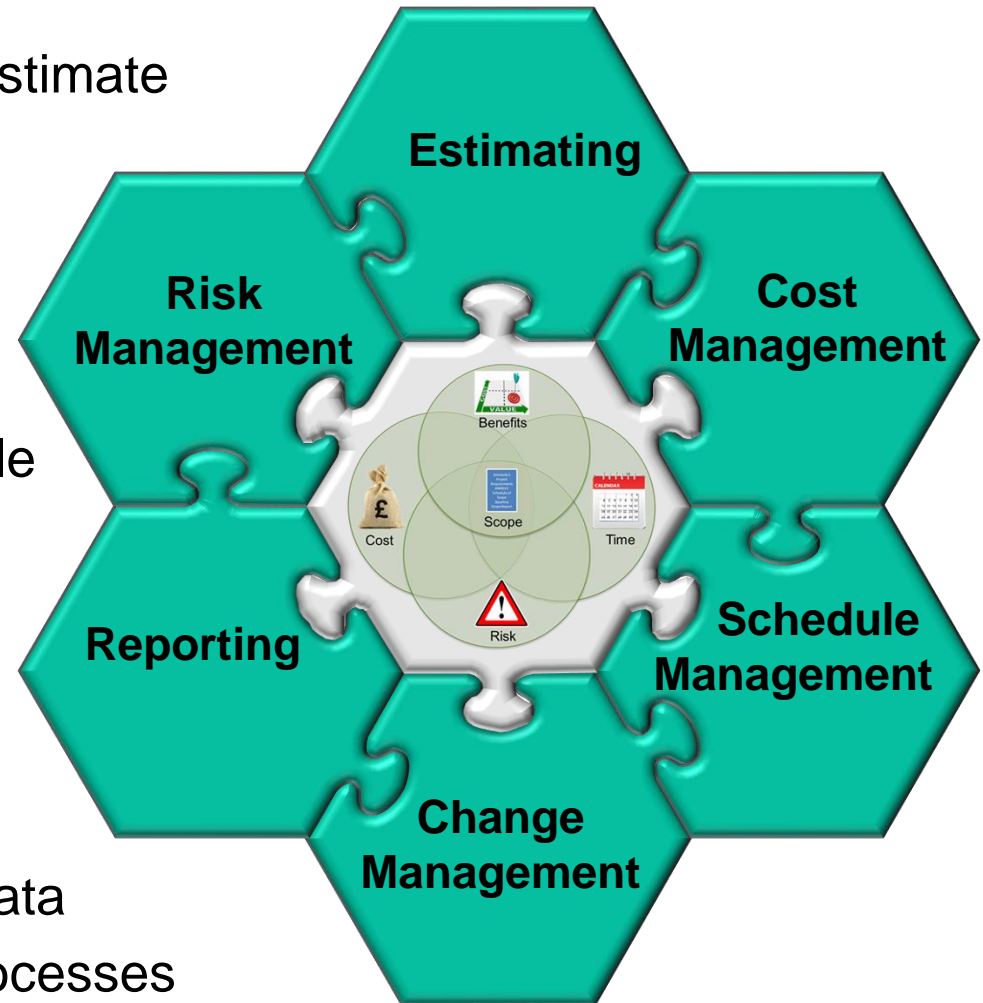
# Solution: Building a coherent structure for the baseline

- The project's scope is articulated in the Project Breakdown Structure.
- The PBS integrates the WBS, OBS and CBS.
- The consistent structure supports control, data analysis & reporting.

## The PBS levels

Level 1: Project (e.g. Thames Tideway Tunnel)

Level 2: Organisation (e.g. TTTL / TWUL)

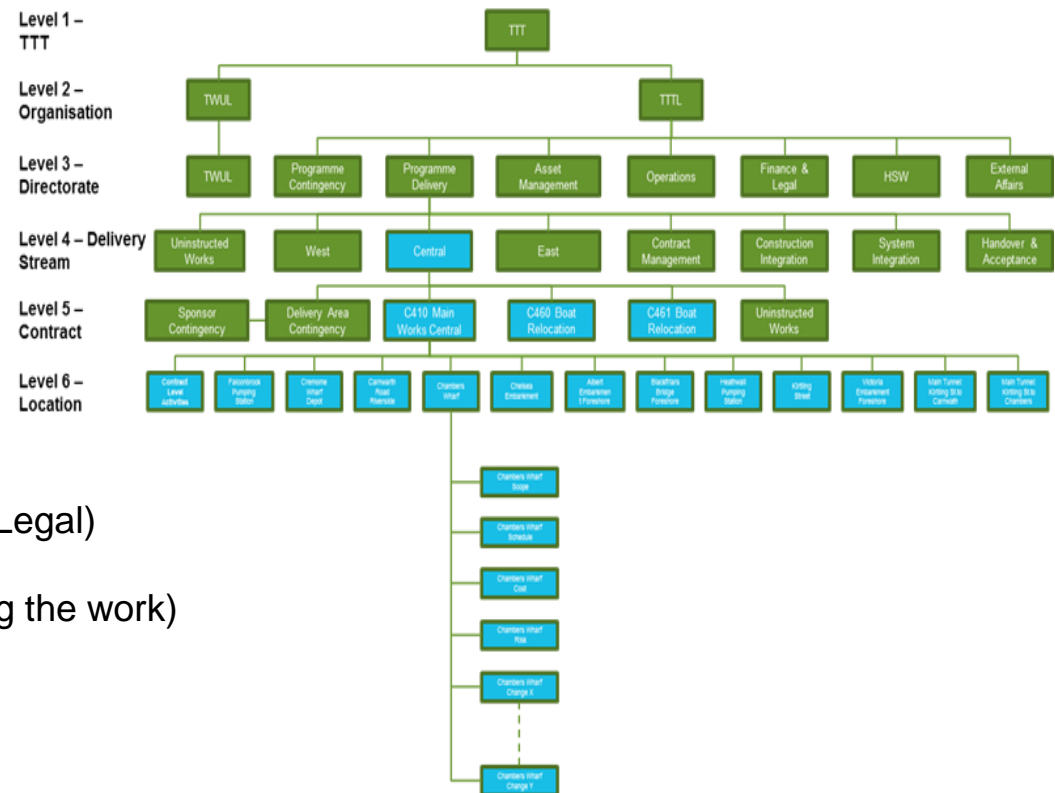Level 3: Directorate (e.g. West / Central)

Level 4: Delivery Stream / Function (e.g. Finance / Legal)

Level 5: Contract / Department; (the entity delivering the work)

Level 6: Location; (e.g. Putney)

Level 7: Life Cycle (e.g. Design, Commissioning)

Level 8: Work Type (e.g. Drop Shafts, Main Tunnel)



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# Project Delivery Model

Licence

**Ofwat**

NB Other Project Documents
Other APAs
DCO Powers Transfer
s106 Agreements

Deed of Appointment

**defra**
Department for Environment
Food and Rural Affairs

Deed of Appointment

ITA (Mott MacDonald)

Deed of Appointment

Liaison Agreement

Project Management Contract

**ch2m**

**Tideway**

Interface/O&M Agreement
Revenue Agreement
Asset Protection Agreement
Agreement to Lease

**Thames Water**

Deed of Appointment

Main Works Contracts

SI Contract

BMB

FLO

CVB

Amey

Alliance Agreement

# Challenge: Balancing the conflicting priorities

Have we covered all of our project's legal, regulatory and process requirements?

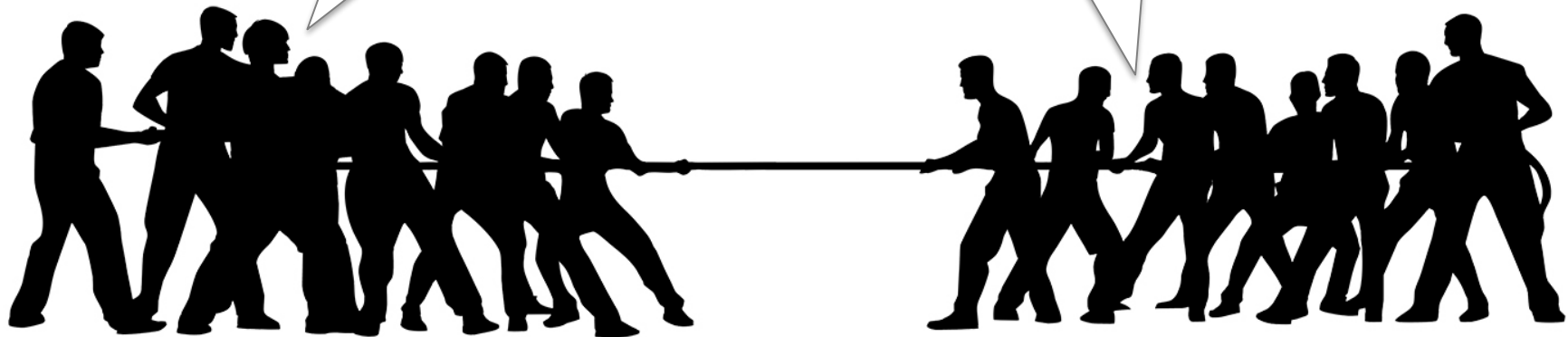We need to maintain progress and deliver the works; what's the decision so we can crack on?

**Recognising these priorities is key to engaging correctly with Project teams**

# Challenge: finding a realistic level of control

Managing contract change within a NEC3 framework requires prompt decision-making.

Project change processes may require more detail and further consultation.

A decision from the Variation procedure may take nearly 6 months to come through.

Human nature suggests that the line of least resistance will normally be followed, but key issues may not be disclosed or dealt with if the right process is not followed...

The Trend process is used to ensure pending changes are disclosed along with other cost and schedule pressures.



Easy Way →

← Hard Way

**Is everything we ask for necessary? What can't be avoided?**
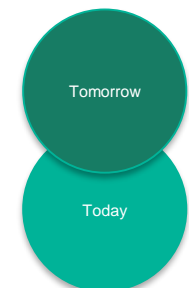
# Challenge: The quest for perfect information
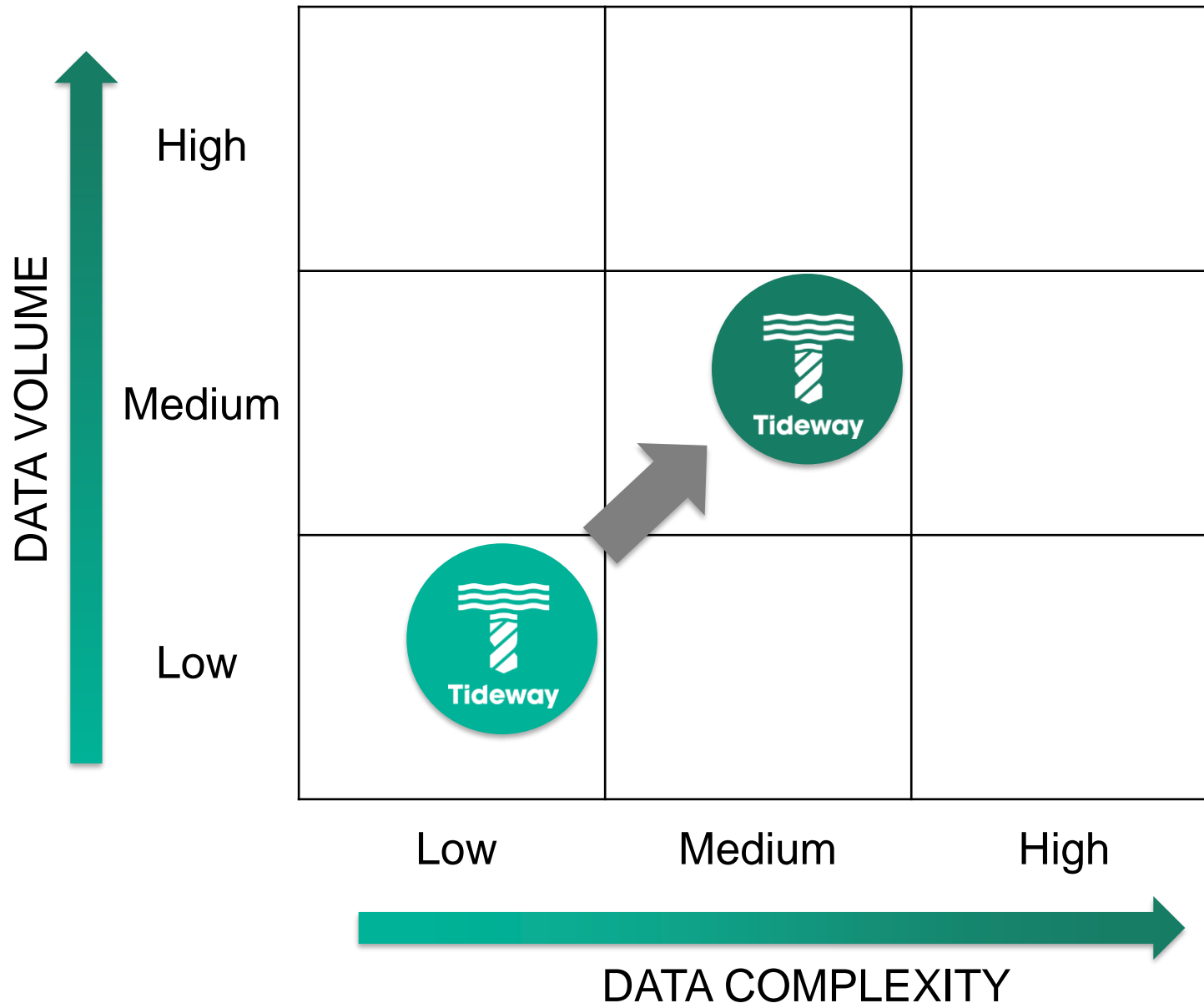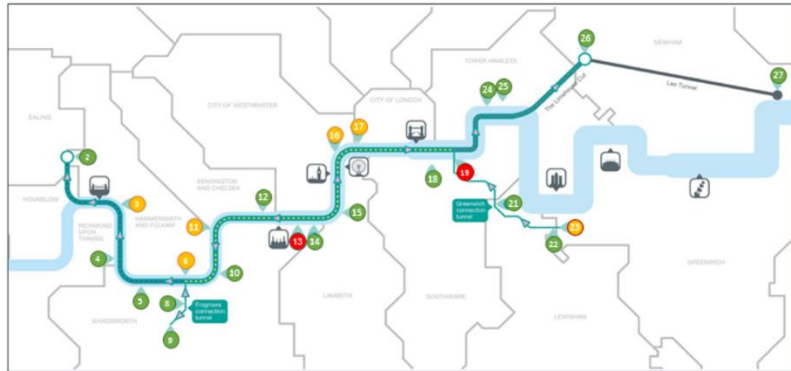


*Where do we need to get to?*

*What is a 'nice to have' but not essential?*
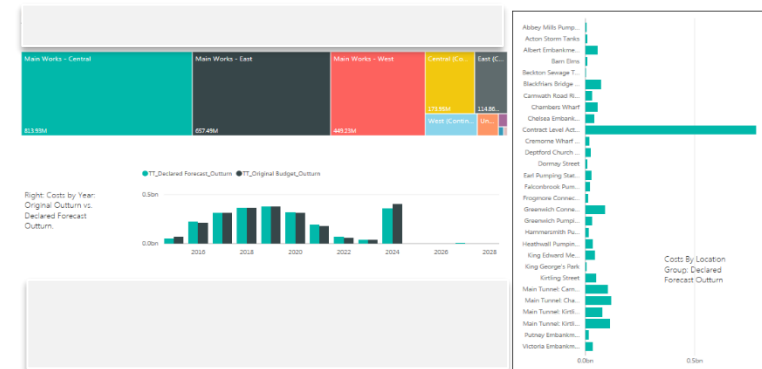
*Will we actually use everything we ask for?*

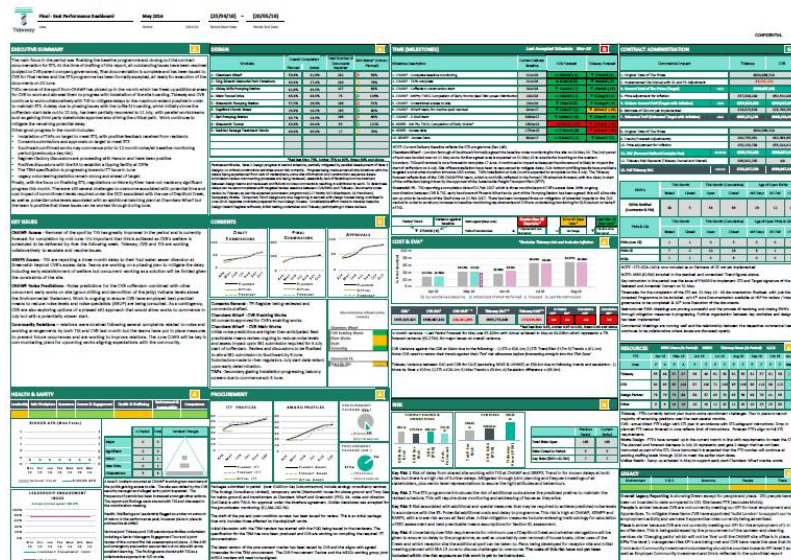# Performance Reporting – an area of development

## Heat Map



## Cost Profile



## Contract Dashboard



## Construction Programme
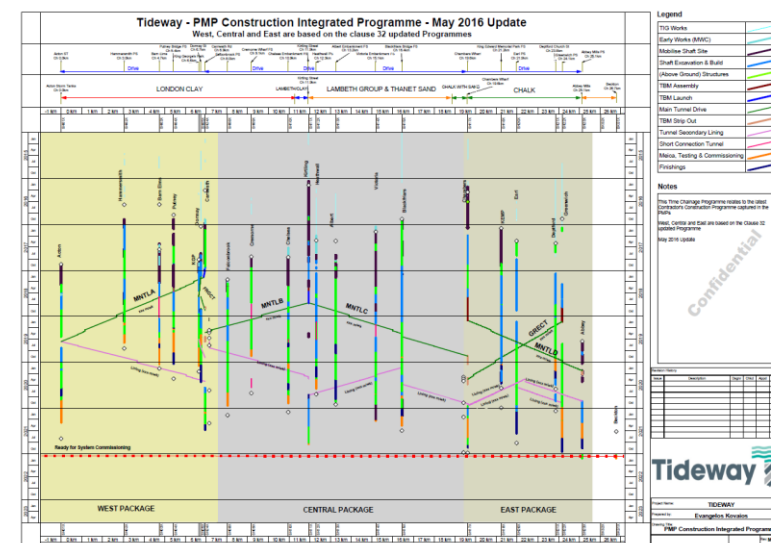
# Data Management: What is it and Why is needed?

**Data management underpins the work of the Controls function**

| Data | → | Information | → | Knowledge | → | Performance Management |
|------|---|-------------|---|-----------|---|------------------------|

**Data** is the representation of facts as numbers, text, images, sound or video

**Information** is data in context

**Knowledge** is information in perspective

**"You can't manage what you don't measure"**
*(W. Edwards Deming)*

**"Knowledge is Power"**
*Francis Bacon (c.1600)*

*"To do things better"*

| ID | Item | £ | Volume | Date |
|----|------|---|--------|------|
| 01 | AAA | £y | n | xx/xx |
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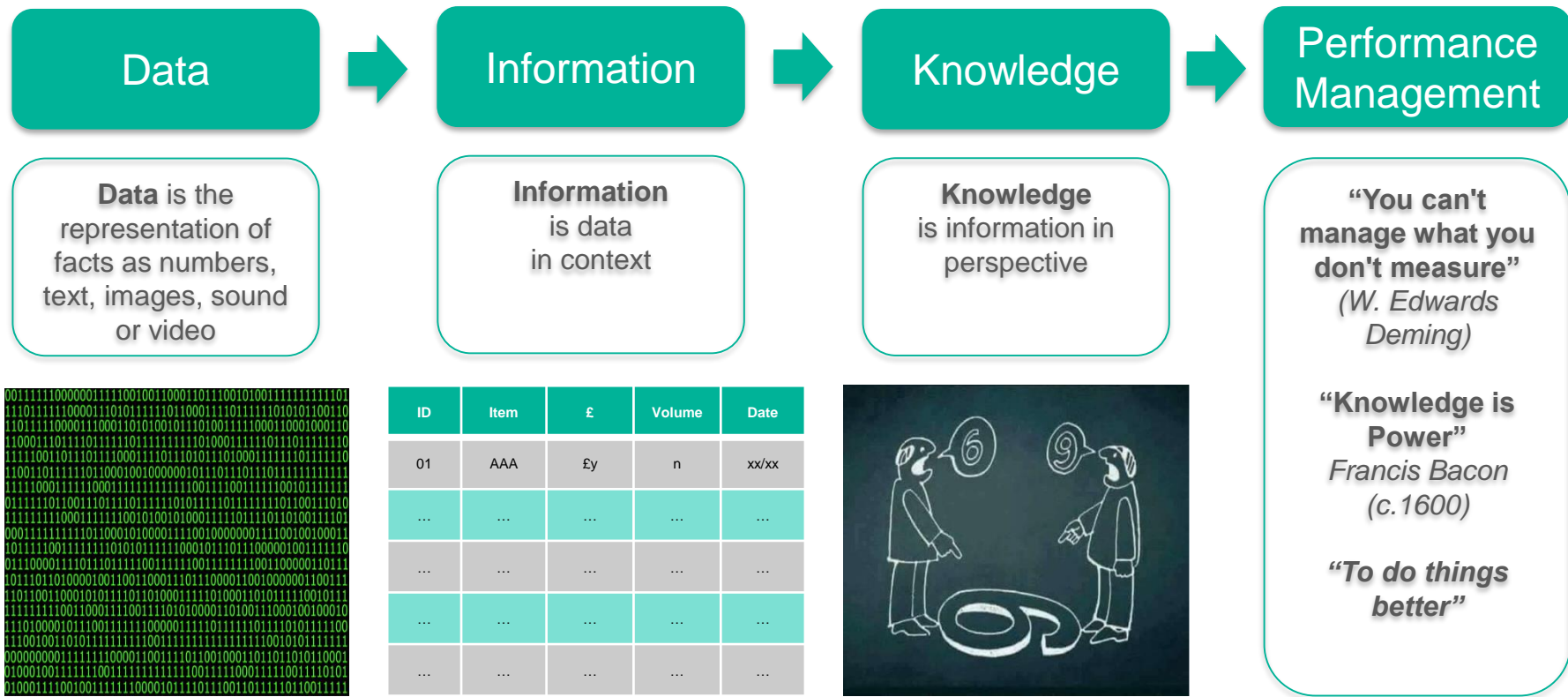
# Performance Reporting: Less is More
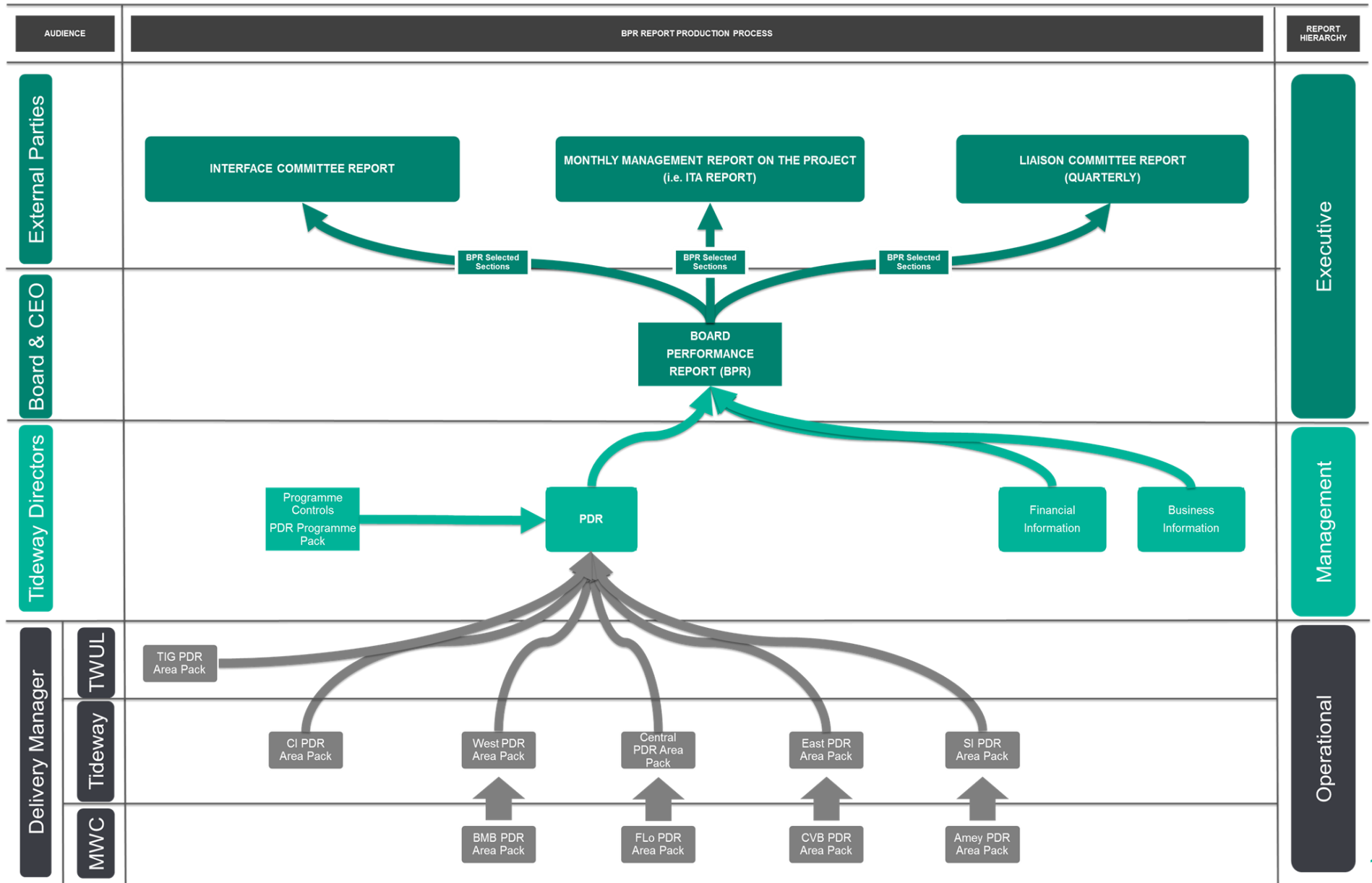
# But….do we give the people what they want….?!

Processes, team cohesion and internal culture are immature at the start of the project. Everyone has their own ideas.

The temptation is to continually evolve how things are done, but there's no time for things to settle down….

Find the balance:

Stability ⟷ Evolution

To Do List:
1. Reports
2. Analysis
3. Process updates
4. Systems
5. Templates
6. Team structure
7. Strategic approach

? ?
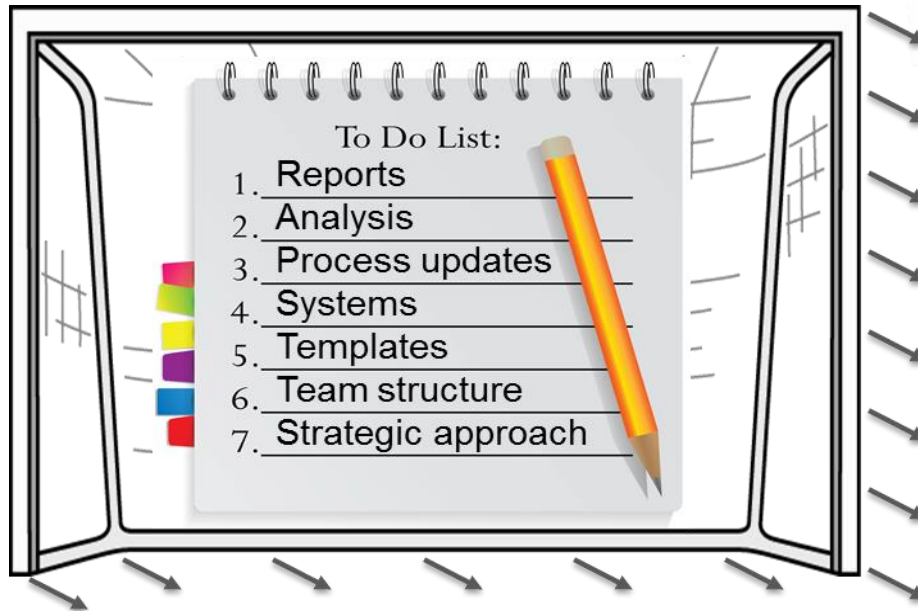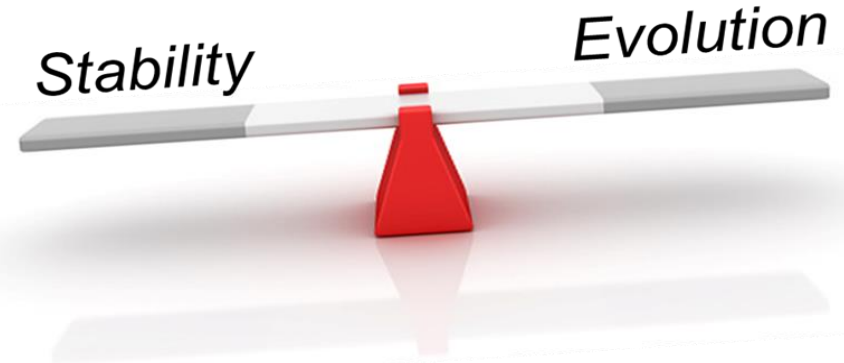
**Teams will struggle to perform until reaching steady state**

# The end game: maintaining a strategic focus

**The project will enable tangible benefits:**

- Is the Project 'just' delivering a tunnel?
  - Strategic objectives.
  - 3rd party stakeholders.
  - Legacy commitments.
- Robust scope management protects the project's intended long term impact.
- The impact on these strategic commitments is considered:
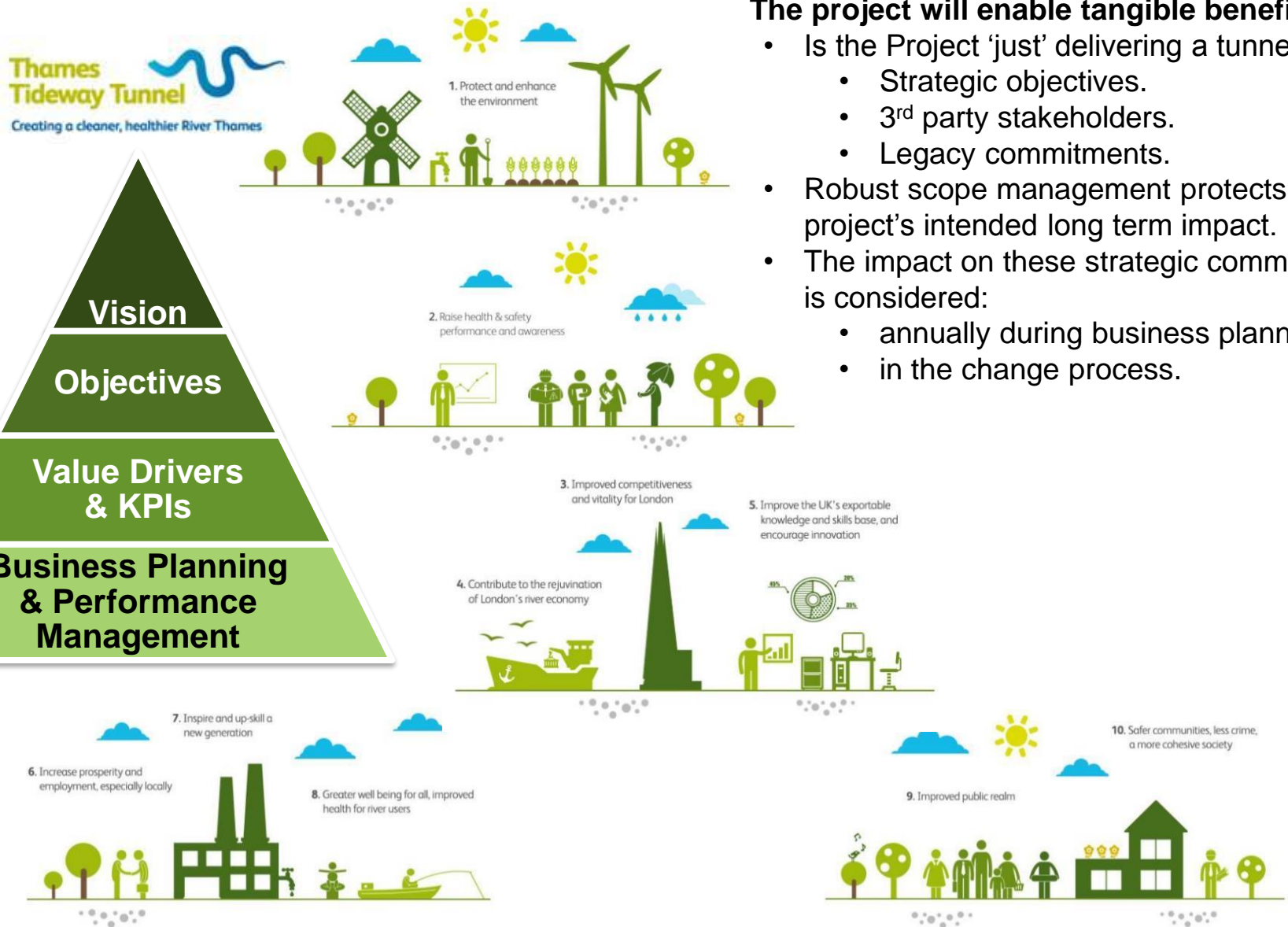  - annually during business planning;
  - in the change process.

**Thames Tideway Tunnel**
Creating a cleaner, healthier River Thames

Pyramid (top to bottom):
- Vision
- Objectives
- Value Drivers & KPIs
- Business Planning & Performance Management

1. Protect and enhance the environment

2. Raise health & safety performance and awareness

3. Improved competitiveness and vitality for London

5. Improve the UK's exportable knowledge and skills base, and encourage innovation

4. Contribute to the rejuvination of London's river economy

7. Inspire and up-skill a new generation

6. Increase prosperity and employment, especially locally

8. Greater well being for all, improved health for river users

9. Improved public realm

10. Safer communities, less crime, a more cohesive society

# What are the key learning points we would pass on?

*'Plug and play' where possible, but...*

*Every context is different. Allow time from the outset to fully understand and communicate the specific Controls requirements.*

*Play 'away' as well as 'home' – close integration between functions within Controls, and across the wider organisation.*

*Consider the golden thread across all aspects of the baseline; how does changing one aspect change the others?*

*Processes & systems alone won't succeed; invest time in people.*

*Succession planning – staff & contractors will move on.*

*Learn lessons and share them: record & update assumptions.*

*Seek to manage the continual evolution of requirements.*

# Thank you for listening!

michael.nightingale@arcadis.com

07823 369887

michael.nightingale@tideway.london

07823 369887