

# P13 BLUEPRINT



# Introduction

Project 13 is an industry-led initiative to improve the way high-performing infrastructure is delivered and managed. It begins an industry-wide change programme which will deliver better outcomes for the public and customers of infrastructure, a more highly skilled, innovative workforce and lead to a more sustainable, productive construction industry. It is sponsored by the Infrastructure Client Group, a joint group of industry figures, academics and infrastructure owners with 19 members from 16 different client organisations representing public, private and regulated infrastructure sectors.

Project 13 seeks to establish a new approach – based on an enterprise, not on traditional transactional arrangements. Enterprises can be much more effective in bringing through the right skills and new technologies in infrastructure needed to deliver the right outcomes for customers when set up correctly.

Whilst the enterprise model is new, it draws on evidence of existing best practice, capabilities and behaviours already in use today in pockets across different projects and sectors. The Project 13 team and community has engaged widely, researching and gathering examples of what works and what doesn't since the publication of *From Transactions to Enterprises* in 2017. By using examples of the best current practice and applying these lessons across the whole industry we aim to create a step change that will deliver better outcomes across the board.

We have created a Blueprint for the future of our industry. This document covers the principles of that Blueprint. It describes the principles of the commercial approach and defines the roles, capabilities and responsibilities of the key stakeholders in this new Enterprise model – the investor, the owner, the integrator, the advisors and the suppliers.

Alongside the Blueprint we have launched a set of tools to help all organisations make the transition. This will include tools to assess the maturity of enterprises and a roadmap of how the UK's infrastructure can make the transition from current, unsustainable delivery models to high-performing enterprises delivering high-performing infrastructure.

We challenge industry and asset owners to adopt the Project 13 principles so we can begin working towards a more sustainable, productive future and we invite the government to work closely with industry as they adopt this new approach, to deliver better outcomes for the public and customers of infrastructure.

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## 1 What do we mean by enterprise?

An enterprise can be defined as an integrated organisation, aligned and commercially incentivised to deliver better outcomes for customers from infrastructure investment. Such organisations are characterised by sophisticated, maturing and typically longer-term relationships between owners, investors, integrators, advisors and suppliers. The roles, capabilities and behaviours of an enterprise differ from those in much of the construction industry today and success will be underpinned by developing organisations with increasingly diverse backgrounds and skill sets.

## 2 Who is involved in an enterprise?

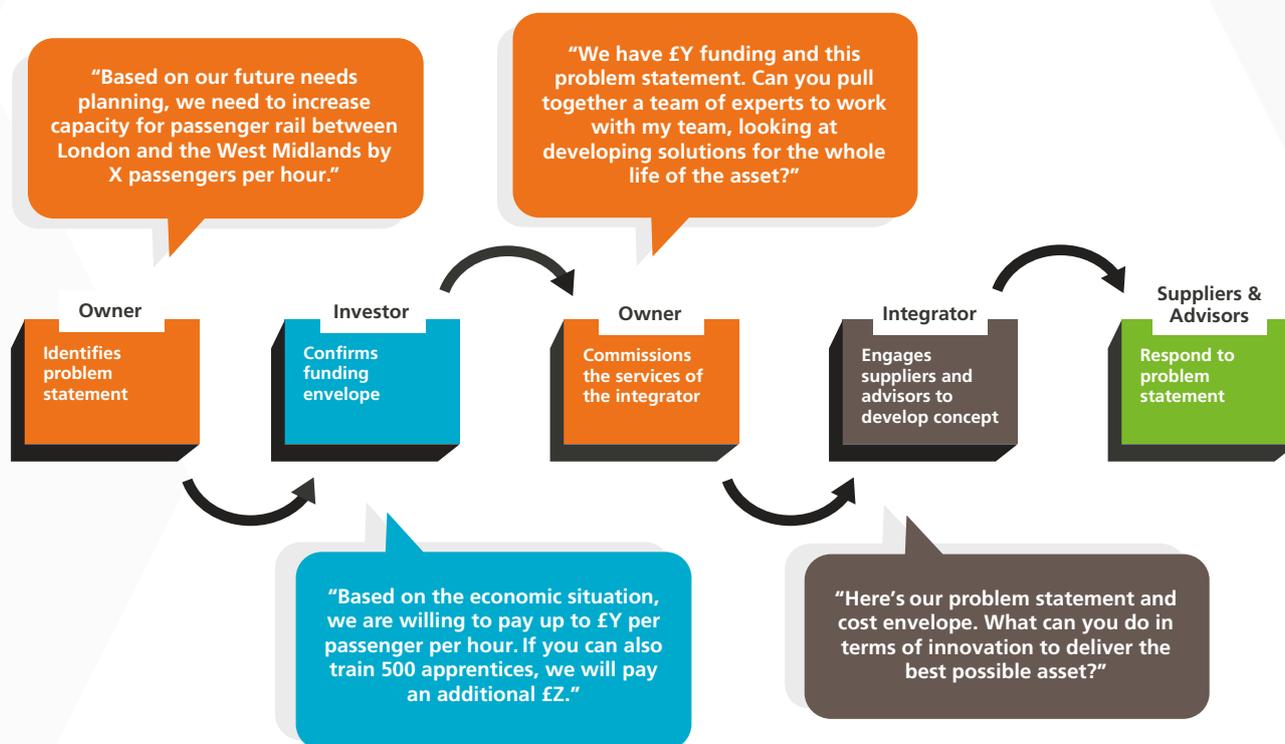
The enterprise is led by the owner who manages and operates the assets. The owner may be either an organisation who owns and manages multiple assets across several locations (for example a regulated utility) or may be an entirely new owner who is created alongside a brand-new asset (for example with the Olympic Park). They will lead in identifying the needs of the asset network and promote these to the investor.

The investor's remit is concerned with affordability, societal and financial benefits derived from optimal management of the assets, they are an enabler of the enterprise.

In management of the overarching system the owner has a direct relationship with the suppliers and advisors. The relationship is facilitated by the integrator.

The integrator brings in appropriate suppliers and advisors at relevant points within the enterprise as and when they can best add value. They employ a 'systems-thinking' approach which links individual capabilities to attainment of programme or project outcomes. The suppliers and advisors are experts in their subject area; they are accountable for delivery of specific aspects.

A more detailed description of each of the roles can be found in Chapter 4 of this document.



### 3 What are the most significant changes?

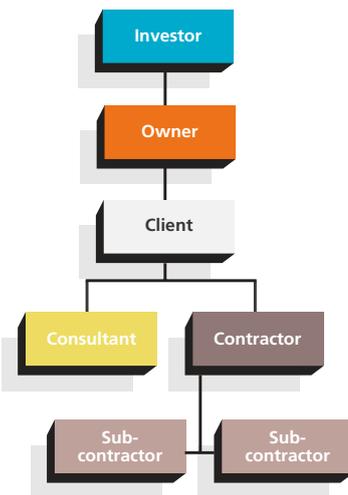
The most significant changes to the structure are:

- the owner is central and leads the enterprise, defining long-term value.
- suppliers and advisors have direct relationships with the owner.
- an Integrator actively engages and integrates all tiers of the market.
- the key suppliers, owner, advisor and integrator work as one team to optimise value.

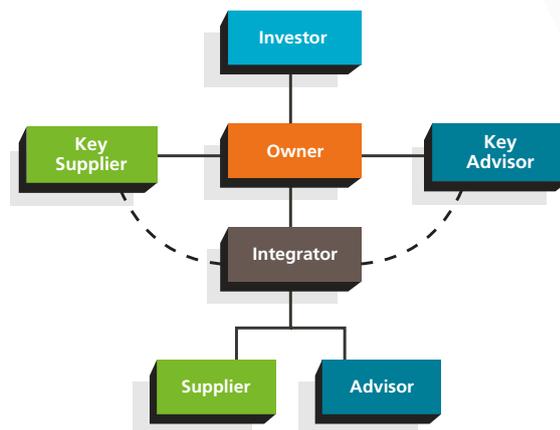
The main differences between an enterprise model and a traditional construction programme model are:

- Reward in the enterprise is based on value added to the overall outcomes, not service provided.
- There is greater understanding of cost drivers and risk across all organisations in the enterprise, with commercial incentives for collaboration to jointly mitigate risk, not transfer it.
- Establishing a high-performing enterprise requires fundamentally different leadership, governance, behaviours and skills to succeed. This will be underpinned by organisations with increasingly diverse skills and backgrounds.

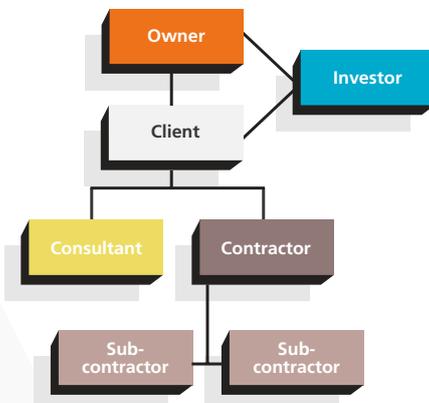
#### Transactional Structure (Private)



#### Project 13 Enterprise Structure



#### Transactional Structure (Public Sector)



## 4 What are the detailed enterprise roles and responsibilities?

### Owner

The organisation that owns and operates the infrastructure, promotes the investment in the infrastructure programme, receives the completed facilities and puts them into operation. In the case of creating a completely new network the owner role can be created in parallel with the development of the programme. For example, in large infrastructure programmes such as the Olympic and Paralympic Games the London Legacy Development Corporation was created. The role of the owner will include the individual or organisation called the 'Sponsor'.

#### The responsibilities of the 'owner' are to:

- lead the enterprise, defining long-term value
- clearly articulate the voice of the customer and operations
- reconcile and consolidate value to the system with other network owners
- agree the value outcome with the investor through the business case\*
- define the outcomes and constraints
- approve the business case and delivery strategy\*
- understand the demands and capabilities of the existing network
- work collaboratively with the whole delivery team
- be responsible for business continuity
- manage functional specifications
- manage internal and external stakeholders: public relations and corporate affairs
- select the right integrator
- operate and maintain the network.

\*in conjunction with the Investor

#### Important skills:

- » capable of defining values
- » clear understanding how their network responds to and fulfils the needs of their customer
- » relationship management with internal and external stakeholders
- » capable of using data and performance metric to better understand their network
- » skilled in integrating systems, increasingly physical/digital systems.

#### Important behaviours:

- » leadership
- » embracing diversity, including skills from different sectors and all levels of the supply chain
- » open to innovation and alternative solutions through digital transformation
- » embrace change with enthusiasm.

### Why would each organisation make the transition? What are the benefits to them?

#### Benefits to the programme

Continuous improvement and efficiency of network therefore maintaining investment appeal.

Better solutions, more reliable and appropriate infrastructure.

Increased confidence in realisation of long-term benefits.

#### Benefits to the organisation(s) acting as the owner

Creation of assets that are easier to operate and manage as whole life is considered from the start.

Much better access to knowledge and innovation in the supply chain.

Improved performance; safety; efficiency; carbon reduction; customer service.

## CASE STUDY

### **Surrey County Council (SCC) Roads Renewal Programme – Surrey County Council's role as an owner**

SCC as the network owner aimed to save £20m on a roads renewal programme utilising the Alliancing Code of Best Practice to create an Enterprise. This was achieved through a collaborative model that included both tier 1 and 2 of the supply chain. The original cost of the works was £120m over five years. By introducing the principles of Infrastructure Alliancing SCC managed to reduce price in the region of 15%, while ensuring that the whole life value was maintained.

Total savings from the first two years totalled £7m enabling the council to resurface an additional 30 miles of road. And by the end of the programme 15% savings was achieved.

#### **Ingredients of success**

- Utilised learning from others through the Alliancing Code of Practice.
- Extended procurement cycles from annual to five years.
- Enabled market to be focused on innovation, waste reduction and quality.
- Co-location of the team and development of interpersonal relationships of team members.
- Early involvement of specialist suppliers.

#### **What they did**

SCC recognised that the three key enablers to the programme's successful delivery were:

- clearly defined outcomes
- a broader procurement cycle of five years
- a close alignment between the owner and the key suppliers and advisors.

The outcomes to be delivered were clearly defined by SCC, and early discussions were held between SCC and their Integrator (Keir) to discuss the programme and the potential opportunities for savings. These discussions indicated that savings in the region of 15% were possible, if long-term certainty could be provided, and if constraints on delivery were minimised. Agreement was then sought from SCC's Cabinet (the investor) to commit to a five-year budget, rather than an annual budget. Initial approval to this was given, subject to a clear demonstration that this would provide the claimed benefits.

**Benefits and outcomes**

The programme is now into its third year, and to date nearly £60m of work has been successfully completed. Total savings in years one and two of the programme have amounted to over £7m, enabling Surrey to resurface an additional 30 miles of roads.

**Improved quality**

In addition, the teams have achieved significantly improved quality of work, meaning that over 95% of schemes are covered by the ten-year warranty, and also resulting in improved satisfaction of the highway service amongst Surrey's residents. The long-term commitment has also enabled an additional investment in apprenticeships as part of the Employment and Skills Plan.

**Moving forward**

As the programme completes SCC expanded the scope beyond road maintenance to the whole capital maintenance portfolio. SCC also extended their supplier engagement to build a supply chain alliance. The SCC have also set out their desired outcomes of assets over the next 15 years (assisted by Atkins).

## Investor

The organisation(s) that reviews the infrastructure programme for viability, secures funding and dictates policy on how finance will be secured. They also contribute to the definition of value with indirect benefits such as socio-economic outcomes.

### The responsibilities of the 'investor' are to:

- lead the financial strategy
- realise the financial benefits/return on investment
- approve the business case and delivery strategy\*
- agree the value outcome with the owner through the business case\*
- respond to external environment/risks
- develop policy and strategic plans
- define value and non-asset outcomes expected from the investment (e.g. socio-economic benefits expected) in line with the corporate responsibilities in Section 172 of the Companies Act for Private Sector Investors
- develop a highly aligned (and longer-term) relationship with the owner.

\*in conjunction with the owner

### Important skills:

- » strategic risk management
- » legal and financial
- » long-term planning and scenario assessments
- » corporate/public sector finance expertise.

### Important behaviours:

- » trust
- » value driven
- » evidence based.

### Why would each organisation make the transition? What are the benefits to them?

Benefits to the Programme	Benefits to the organisation(s) acting as the investor
Clarity on the outcomes sought by the investor.	Improved return on investment.
Better informed investment decisions as greater accountability for achieving investment outcomes.	Transparency on 'what' is being paid for, and when to intervene.
A programme that requires less investment for the same return (because it is geared to the owner operations not the construction phase).	Clarity on risk exposure through commercial strategy and programme shares system, avoiding paying for risks that don't materialise.

## CASE STUDY

### **Her Majesty's Treasury as an investor in Environment Agency's National six-year programme – collaborating on funding strategy with the owner**

The Department of Environment, Food and Affairs (Defra) and The Environment Agency (EA) as owners made the case to Her Majesty's Treasury (HMT) to secure a unique six-year settlement having agreed a funding envelope contingent on delivery of the high-level outcomes of 300,000 homes protected from flooding, a 10% efficiency target and an external funding contribution of 15%. Their collaboration on a funding strategy with the investor (HMT) has been heralded as exemplifying the Project 13 principles.

HMT considered the capability and organisational change required in return for the improved performance through the efficiency and contributions targets. A 10% efficiency saving was agreed as part of these negotiations during the six-year investment programme based on a detailed plan setting out how the EA and its delivery partners would develop further collaborative relationships as a result of the longer-term funding commitment from the investor. It therefore put in place a new system of governance, high-level targets and forecasts for savings categories based upon the components of the programme, evidence to support each of the forecast savings and associated risks. The development of this approach was supported by the application of the Project Initiation Routemap tool which supported the collaborative development of the plan between HMT as the investors and Defra and the EA as the owner.

This approach reflects four of the Project 13 work streams: governance, organisation, integration and the actions of a capable owner.

The decision taken by HMT delivered certainty of the funding pipeline which enabled the effective targeting of research and increased savings. There was also the opportunity to adapt the commercial strategy to include greater early contractor involvement, longer-term relationships and use of pain/gain contracts to incentivise the suppliers and advisors to deliver efficiently. In addition, the suppliers and advisors developed a strategic approach to sharing and embedding new technology.

This approach is laudable for both the ambition and the trust displayed by all parties. The detailed planning and risk activity required collaboration and a common view of outcomes which might not have been achieved through more traditional short-term transactional approaches. To date the programme has delivered £119m of efficiency savings and better protected 142,850 homes from flooding, three years into the six-year settlement.

## CASE STUDY

### Case Study – Manchester Metrolink

The ten Greater Manchester Local Authorities have long known of the need to improve connectivity and reduce congestion in and around Manchester. Apart from the benefits of reductions in journey times and improvements to air quality, the expected encouragement to local economic growth was recognised as a key desired outcome.

Unfortunately, long-term investment to realise new transport solutions was elusive. Greater Manchester had difficulty with fragmented annual funding horizons and a lack of options to raise revenue or bid for funding. Further, in 1985 the single city authority was divided into ten district councils who shared responsibility for transport. The solution was the creation of the Greater Manchester Transport Fund (GMTF) and Transport for Greater Manchester (TfGM).

The GMTF was created to build new capacity through MetroLink (an integrator), expanding the new rail lines in four phases to accommodate six new lines. With a total investment package of £1.5 billion, they brought disparate financing options; block grants from the Department for Transport, a 'top slice' from the Greater Manchester Integrated Transport Block and Local Transport Plans and borrowing, both from private institutions and the European Investment Bank.

The operating costs of TfGM, which owns Metrolink, operated through a supplier, are met from; an additional levy on council tax from each of the ten Greater Manchester local authorities, reserves from the GMTF and grants from the Department for Transport. The revenue from fares is sufficient to meet any additional costs and repay all capital funding incurred by GMTF by 2045. The local authorities are able to levy more through council tax if needed which helped to secure funding.

Development of phases one and two of the project in the 1980's took on 15 million passenger journeys when initially deployed, some 5 million more than initially anticipated. This greater than expected patronage, coupled with parallel reductions in road congestion and evidence of regeneration along the new routes, helped to prove the business case for further extension through phase three in the late 1990s.

The local authorities manage risk through quarterly reporting and monitoring of changing circumstances. For instance, Greater Manchester Combined Authority, representing the ten district councils and the Mayor as the investor, monitors changing grant conditions, a significant proportion of the current capital budget, to mitigate the risk of monetary clawback from central government. The various bodies also maintain a reserve fund, ring fenced to pay for and manage the capital cost risks of delivery of service expansion.

Metrolink has successfully helped to revive areas of the city and region as intended at the outset, and the line has played a large part in the revitalisation of south Manchester around MediaCityUK, Oldham Mumps and Oldham town centre and has increased overall traffic capacity into the city centre by 5%, helping to boost productivity and stimulate growth. This funding model has resulted in a network which serves 97 stations, the largest light-rail system in the UK, with 27 million journeys in 2016. By pooling resources, thinking long term, having a clear plan, expanding capacity and transferring profit back into further expansion, Manchester has developed an extensive light-rail system which benefits the city's environment, economy and social cohesion.

## Integrator

The organisation that plans and delivers the infrastructure programme. It manages the suppliers and advisors, coordinates planning, oversees design, construction, maintenance and operations as requested by the owner. This could be made up of a single company, or a collective performing the integrator function.

### The responsibilities of the 'Integrator' are to:

- understand the value defined by the investors and the owners and the outcomes required from the programme
- respond to the definition of value and constraints by integrating services, engineering, supply, production and manufacturing
- provide the management capability and system to enable the enterprise to operate as an integrated organisation
- to put in place systems, processes and capability to drive productivity
- own systems integration
- During the delivery phase integrate:
  - engineering and planning
  - supply of components and resources
  - production on site
- encourage and promote innovation into the enterprise
- build high-performing teams
- establish the procurement strategy and incentivised commercial agreements
- manage performance of advisors and suppliers.

### Important skills:

- » management
- » developing the culture of the enterprise
- » ability to engineer
- » capability and network to integrate wider supply chain
- » effective organisation
- » delivering and optimising outcomes.

### Important behaviours:

- » embrace diversity
- » develop others to ensure the enterprise realises its potential
- » build trusting relationships across the enterprise.

**Why would each organisation make the transition? What are the benefits to them?**

Benefits to the programme	Benefits to the organisation(s) acting as the integrator
Better integration equals better performance.	Fewer management roles sub-contracted.
Improve climate for innovation.	Development of real knowledge of logistics and production.
Selection of partners is based on capability and culture.	Earlier sharing of risk benefit; sharing of innovation return.
	More satisfied staff, more learning, better returns.
	More concentrated longer-term customer relationships.
	Larger programmes therefore less tendering.

**CASE STUDY**

**Anglian Water as an asset owner**

Anglian Water provides water services to an area stretching from the Thames Estuary to the Humber. It provides 1.2 billion litres of water a day, to six million customers, through 112,000 kilometres of pipe and 1,257 water treatment sites. Anglian Water is responsible for maintaining and improving this network, delivering high-quality drinking water to its customers and recycling the resulting waste water.

Anglian Water’s programme is defined in five-year Asset Management Periods (AMPs), typically investing £4.5bn in each AMP, covering replacement and refurbishment of above and below ground assets.

Historically, in line with infrastructure generally, projects were delivered in a largely transactional manner with Anglian tendering works and selecting the most economically advantageous proposal. AMP 3, whilst successfully delivering the required outputs through a partnering approach, was felt to be less effective than it could have been. With AMP4 requiring a further focus on efficiency, effective solutions and customer service, Anglian Water decided to shift to a different delivery model, developing both its capability as an asset owner and more effective relationships with its partners. A review of best practice across different sectors and an identification of the underpinning best-practice characteristics led to Anglian adopting a strategy based on more integrated and collaborative working and the development of long-term supply-chain relationships.

These relationships were aligned directly with Anglian Water’s customer outcomes, which had already been defined through a process of engagement and consultation with customers. Partners were selected against their capability to deliver these outcomes and

incentivised to deliver improvements against historic baseline performance. Anglian and the main partners were brought together in an alliance. This alliance, as an integrated and collaborative organisation, was engaged at outcome level, not at project or scope, giving partners and the wider supply chain the opportunity to develop more innovative solutions and to challenge standards.

The alliance team is the integrator, developing strategies for how the programme should be delivered and driving improvement initiatives. The partners that make up the alliance, along with Anglian Water, are shareholders that generate a return by outperforming historic benchmarks for delivery of outcomes.

All parts of the alliance work collaboratively, taking a best for task approach to the development of integrated teams. The alliance manages the wider supply chain, with a longer-term framework used to develop more effective relationships and secure earlier involvement of the right suppliers. As with the main integrator, framework suppliers generate a return by delivering value against historic baselines, not by delivering work or providing hours.

An example of the alliance acting as integrator was in the development of product-based delivery. The alliance was able to shift from the historic project approach, recognising the opportunity to translate repeatability within the programme into standard products and components and to use a 'product catalogue' as the starting point for delivering the programme. This created significant value when compared to a previous approach that amplified variance and redesign at all levels, including unique project-led solutions and multiple variations of critical components.

This was allied with a digital transformation strategy which has seen the alliance design and build everything virtually, including rehearsing and optimising construction in virtual rehearsal suites before going to site. Not only has this shifted delivery from construction to assembly, it has provided health and safety benefits through off-site construction of products. Digital transformation has also led to more effective engagement with users and operators, with greater involvement in the virtual development of solutions improving operability and operator buy-in. The progress of digital rehearsal demonstrates the value in delivering through integrated teams, where all the influential parts of the wider supply chain are involved in optioneering and solution development.

The alliance has established a strong track record, delivering significant improvements in cost, carbon and time. Anglian Water's future plans commit to further development of aligned and collaborative relationships with its supply-chain partners.

## CASE STUDY

### TEAM 2100 as an integrator

The EA set up the Thames Estuary 2100 (TE2100) which sets out the strategic direction for managing tidal flood risk in the Thames Estuary to the end of the century and beyond, a whole-life approach to managing a complex interdependent system of over 4000 assets, covering 350km of defences including eight major tidal barriers, 290 outfalls, 350 frontage gates and 104 pumping stations. The Thames Estuary Asset Management 2100 programme (TEAM2100) is delivering the first ten years (2015-2025) of capital investment in the tidal flood defences of the Thames Estuary as recommended by the TE2100 Plan.

TEAM2100 is one of the UK government's top 40 national infrastructure projects and is one of the world's largest flood-risk management programmes. Responsibility involves the planning, programming, optimisation and delivery of investigation, design, capital maintenance, refurbishment and replacement works on the existing flood-defence assets along the length of the Thames Estuary. The estuary tidal flood defence system extends from Teddington in West London through to Sheerness and Shoeburyness in Kent and Essex, protecting 1.3 million people and £275 billion worth of property.

The EA made the decision to change its approach to both procurement and delivery models for TEAM2100, with the aim of increasing performance by engendering an innovative approach that would generate significant benefits in delivery and ultimately whole-life asset management solutions. The focus was very much on collaboration, shared values, innovation and integration as well as a longer-term approach in ten-year time lines.

The EA was very clear in its objectives and had a great desire to be an 'Exemplar' particularly in asset management and with the aim of obtaining ISO 55001 Asset Management Accreditation on the programme.

The successful team is formed of Jacobs, its delivery partner Balfour Beatty and a number of specialist suppliers who form an integrated delivery team with the EA to deliver significant efficiencies over the ten-year programme and over the whole life of the asset system. With reference to the Project 13 model then in essence this integrated delivery team fulfils the function of the 'integrator' within the model.

A significant focus was placed on getting the right people in the integrated team in terms of behaviours, with the team working up their key values, drivers and motivators and they spent a great deal of time getting this right. The underpinning values of TEAM2100 are one team, working together, pride in their performance, trust and openness and focus on outcomes and quality.

Another key to the success of TEAM2100 is due to the fact that the team is co-located, enabling them to operate out of co-located offices and this brought great positive benefits. Commercial incentivisation came through alignment with key EA corporate goals as well as the ability to beat the target cost, delivering efficiencies through the lifecycle via both hard and soft innovations.

By all accounts TEAM2100 is taking collaborative working to the next level:

1. It is an exemplar programme for the EA altering the way they work with their supply chain on other programmes to deliver whole-life asset management.
2. Its focus on a holistic asset management approach has been demonstrated by the achievement of ISO55001 certification in March 2017 – a world first for a Flood Risk Asset Management programme. The ISO55001 reviewers highlighted the ‘exemplary collaborative approach’.
3. It has received three successive green ratings from the Infrastructure & Projects Authority project reviews confirming the confidence in the maturity of the programme.
4. Staff feedback is very positive. Jacobs staff apply to join TEAM2100 because of the ways of integrated working that result in fast decisions and minimal re-work or changes in scope.
5. To date it has delivered efficiencies worth £11.8 million.

## CASE STUDY

### Different ways to form an ‘integrator’

Every organisation will be starting the development of an enterprise from different places. This may influence the choice of who can form the initial integrator role. Existing contractual arrangements for design, construction and specialist roles can be amended to work with the integrator and a strategy developed for their renewal or change to better accommodate and work in an enterprise organisation.

The systems integrator role is likely to have the most influence on delivery of value because of its programming function and identification of solutions and delivery routes. Although the role could be delivered by a single lead supplier, working with the owner and other organisations in an integrated way will be critical to the success of an enterprise. Existing contractual arrangements for design, construction and specialist roles can be amended to work with the integrator and a strategy developed for their renewal or change to better accommodate and work in an enterprise organisation. There is also not one ‘right’ model, with the integrator having different scope as can be seen from the table opposite:

Organisation	Contractual arrangements and integrator role
@One Alliance	Integrator appointed, use existing frameworks for design and construction for asset management. Integrator works with main Joint Venture partners to bring in advisors/suppliers through their processes. Operate with enterprise arrangements.
Yorkshire Water	Strategic planner appointed, integrated with owner planning department. Act as a strategic thinker and innovator, challenging and re-engineering solutions that are then delivered either through Alliance contracting or direct by Tier 2/Tier 3 or in-house. The 'Integrator' role identifies delivery routes, establishing risk and value options with supply-chain arrangements set up with owner procurement.
London Underground Bank Station Upgrade	Tier 1 contractor appointed for the design and build of the 5+ year project under NEC Option C. The Tier 1 contractor and owner project staff work in an integrated way in a joint project office with joint management and act as the systems integrator. The Tier 1 contractor manages Tier 2 suppliers in enterprise arrangements with the owner.
Environment Agency TEAM2100	The integrated delivery team of lead supplier and owner acts as integrator. The lead supplier has joint-venture style arrangements for flood-risk asset management work in the Thames Estuary in a ten-year NEC Term Services contract. The JV manages Tier 2 contractors with key suppliers starting to be appointed on long-term contracts.
Connect Plus (M25)	Connect Plus has a 30-year Design, Build, Finance and Operate contract with Highways England for the M25 and connector roads. It is in the second phase of procurement with a framework of four contractors jointly incentivised on common performance metrics for a ten-year contract with break clauses. Tier 2 suppliers are beginning to join these arrangements where they are considered key suppliers. Connect Plus Services, a wholly owned subsidiary of Connect Plus providing project management and other operational services, works with Tier 1 contractors as system integrators.

## Advisor

An organisation that provides expertise to realise the owner's definition of value and professionalism to support the delivery.

There will be many different advisors involved in an enterprise, providing a wide range of expertise such as: environmental, technical, design, planning, commercial and legal.

### The responsibilities of an 'advisor' are to:

- provide high-quality expertise and services which adds value in achievement of the outcomes
- work within integrated collaborative delivery teams
- manage functional specification
- ensure compliance with regulation and legislation
- build the data assets of the owner
- develop networks to access knowledge.

### Important skills:

- » strategic awareness of how their expertise contributes to value
- » embrace innovation from others
- » awareness of technology and appraisal of its ability to add value
- » ability to understand and leverage technology and digital opportunities
- » specialist capability/subject matter expertise
- » experience and insight
- » current legal and regulatory compliance
- » attention to detail.

### Important behaviours:

- » coaching
- » flexible/adaptable
- » problem solvers
- » one team, works for the enterprise.

### Why would each organisation make the transition? What are the benefits to them?

Benefits to the programme	Benefits to the organisation(s) acting as the advisor
Earlier engagement of the fully integrated delivery teams to allow better, more rigorous analysis for the owner.	Longer-term relationships and work flows.
Improved climate for innovation.	Develop world-class levels of expertise in fewer subjects, which is exportable.
Better value for money achieved by paying advisors by value of input rather than time spent.	Greater staff development and satisfaction working towards outcomes not fulfilling a contract/narrow brief.

*'The consultants' current business model is based on selling their services by the hour. This provides few incentives to develop alternative solutions that deliver the required outcomes with less investment in design and construction.'*

From 'Transactions to Enterprises: A new approach to delivering high performing infrastructure', Client Group Report, March 2017

## CASE STUDY

### Turner & Townsend and Heathrow Airport – advisor for Q6 capital investment programme

#### The project

Q6 is the current regulatory control period (2014-19) for Heathrow Airport. Heathrow has organised its programme of capital investment for Q6 – circa £3bn – into four strategic programmes: passenger experience, airport resilience, asset management and baggage.

#### The challenge

Turner & Townsend is the sole commercial and controls advisor for Q6. This role is to ensure that Heathrow as the owner invests in the right projects, with the right controls in place to maximise the benefit of its investment and demonstrate efficient delivery to the Civil Aviation Authority and airlines. To enable key investment decisions, it helps develop solutions and business cases and set baselines for project delivery performance. Once the delivery integrator is engaged, it supports project managers and the suppliers and advisors to deliver maximum efficiency through delivery, provides cost and schedule certainty, and assures robust governance operates.

#### The expertise offered

##### Intelligent data

It has significantly improved the quality of cost, performance and programme data to help Heathrow make more informed decisions. Turner & Townsend is working alongside the client and supply chain to improve data management capabilities, upskilling their teams to achieve Heathrow's ambitious targets around enhancing both value and efficiency.

**Performance improvement**

It established a bespoke performance improvement framework to measure and aid supply-chain performance, drive improvement targets and plan and demonstrate continuous improvement to the regulator. The framework has embedded common goals across different organisations facilitating collaborative ways of working, embodied in shared initiatives on capital efficiency and value improvement – enabling Heathrow to realise its annual 15% efficiency targets.

**Professional collaboration**

It helps to instil a focus on outcomes across the whole Q6 team. Working with the supply chain, it ensures that each project is assessed and developed against the future operational needs of Heathrow, including its opex spend, commercial revenue, passenger experience and airport resilience. It produces key deliverables jointly – such as schedules, estimates and option appraisals – to enable the owner to take the right option forward through development.

**Reward**

Through this approach, everyone succeeds together. Heathrow delivers benefits to passengers, airlines and shareholders. The suppliers and advisors receive rewards through incentive models and Turner & Townsend has an element of its profit linked to overall portfolio performance.

**Reflections**

Fundamental to the success of the Q6 programme has been professional collaboration and alignment of values and behaviours. The shared team mantra is 'Beat the plan, bolster the plan, finish the plan and celebrate success' and these objectives are helping all of the partners to deliver better outcomes for Heathrow customers.

## Supplier

An organisation that supplies materials, components, specialist services, construction or labour to enable the delivery of the programme.

### The responsibilities of a 'supplier' are to:

- own and invest in the development of specialist skills and the means of production
- deploy specialist skills and expertise
- accurately define the performance characteristics of its products
- understand where its products add value
- invest in innovation
- supply accurate performance information
- implement transparent quality processes.

### Important skills:

- » develop and be ahead of the game (innovation)
- » specialist capability
- » effective communication within the supply chain
- » work within integrated delivery teams to deliver outcomes
- » bring together digital and infrastructure systems.

### Important behaviours:

- » long-term outcome/impact focus
- » push the boundaries to deliver high performance
- » problem solving.

### Why would each organisation make the transition? What are the benefits to them?

Benefits to the programme	Benefits to the organisation(s) acting as the supplier
Better return on investment in R&D and effective deployment of innovation.	Opportunity to invest and innovate.
Earlier engagement brings increased opportunities to improve performance and mitigate risk.	Greater influence and impact on the end solution.
Sustainable, reliable and productive supply chain.	Better incentive and understanding on worthwhile R&D, avoiding abortive work.
	Longer-term relationships and work flows therefore less tendering and more certainty of future work.

## CASE STUDY

### Aquam Corp. an SME Technology Supplier

Aquam has been working with Yorkshire Water (the owner) helping to line existing lead pipes right up to the point of entry in customers' homes. This is because of European water quality legislation that requires the reduction of lead content in drinking water.

Ordinarily water companies would only have responsibility to remedy or replace pipes up to the boundary of customers' land, but to ensure the required water quality at the point it enters each building a different approach was required. With the support of Ofwat, Yorkshire Water engaged Aquam to deploy a Drinking Water Inspectorate-approved lining technology to 1,000 council properties and maintain stable customer supply.

Traditionally these pipes would be dug up and replaced – cutting off residents' water supply for long periods of time and causing disruption through construction activities. Pipe replacement would require open-cutting trenches, installing new pipes, removing the existing pipes and reinstating the area, which would inevitably impact local residents through noise and dust pollution, temporary road closures and water stoppages.

Alongside traditional rip-out-replace methods, less disruptive trenchless moling has also been used over the past 20 years. Given the extent of works required, Yorkshire Water required a still more advanced method that could help deliver the same output, namely compliance with the water regulators' water quality and customer service requirements. The utility had to develop an output scope that would also satisfy its customers and shareholders by delivering a better value solution than the current methodology.

In partnership with 3M, Aquam had developed a polyurethane (PU) lining product that could reduce or eliminate the necessity to replace the pipes and instead line them with a flexible polyurethane coating, in situ. The 3M Scotchkote 166I PU liner has been deployed by Yorkshire Water for some years, but was used on customer-side supply pipes for the first time in this application.

Project delivery was supported by specially fitted overland supply vehicles more recently developed by Aquam to provide continuous potable water to customers without interruption, negating the risk of regulatory fines. This involved setting up temporary sterile supply from hydrant to multiple properties so that residents did not lose water, even for a few hours.

There were numerous environmental benefits to relining lead pipes over other techniques. It is estimated that during this 1,000-unit project, 188 fewer lorry loads of spoil were sent to landfill, noise pollution was reduced by 80%, less chemical dosing was required and less new plastic was required as pipes were not replaced. This method was also safer as less plant was required and fewer excavations.

As the track record of this technique grows stronger it is expected that other water providers will adopt the combined lining technology and overland supply service.

In summary this product development and innovation by Aquam would not have been possible without Yorkshire Water's commitment to:

- systematically engage with SMEs to ascertain the best ideas that address the key issues at hand
- collaborate with a small number of SMEs to provide support and guidance to ensure that the development of the technology stays focused on the key issues
- create focused change agent teams comprising visionary and energetic leaders as the key points of contact for the SME and empower them to make things happen together and quickly
- enable trials and pilot schemes and critically, when the innovation does not work perfectly, immediately collaborate and iron out the issues together.

## CASE STUDY

### Highways Agency Programme-Level Incentive Fund

In 2010, the Highways Agency (now Highways England) awarded the Managed Motorways Framework to four suppliers. This framework consisted of ten schemes, each worth an average of £150m, to be delivered over a period of six years. At the time, this was believed to be the largest use of the NEC3 framework contract.

The Managed Motorways Framework aimed to encourage supplier collaboration in order to focus on efficient delivery of the owners' outcomes. This required considerable commitment and behavioural change from the previous ways of working, based on competitive tender between contractors to gain further work allocations.

The framework sought to enable collaboration in a typically competitive commercial environment which can form a barrier to open and honest teamwork and sharing of best practice. This was facilitated by two features in particular; by allowing the suppliers to propose allocation of work based on the best value each of the parties could offer, and through the introduction of a Programme-Level Incentive Fund (PLIF).

Traditionally any gainshare generated during the course of a contract was typically shared at a project level. The overarching framework introduced a mechanism to also assign a proportion of the gainshare at a programme-level. The PLIF was funded by 20% of any gainshare from the individual projects. On the completion of each scheme, half of the PLIF was distributed equally between the four suppliers and the remaining half to the owner. The effect of this, along with the ability to allocate work, was to pull the organisations together and work collectively to improve and share.

The ability to draw on a vast pool of collective knowledge, expertise and cutting-edge innovation benefited all areas of the programme. The PLIF supported the creation of an environment which facilitated a collaborative approach to the delivery of the overall framework objectives without being held back by concerns over directly competing for future work within the programme. The suppliers involved benefited from a greater visibility of workload and an improvement in planning and forecasting.

## 5 How does the enterprise model impact on our ways of working?

In this Blueprint we focus on the three most significant areas where the enterprise model will change existing ways of working. These are:-

- **governance and alignment**
- **creating the right commercial environment**
- **skills, behaviours and leadership.**

To support organisations that wish to make the transformation to an enterprise way of working, Project 13 has developed a series of tools to assess and guide this journey. These include a maturity matrix to determine how your current system fares and a roadmap detailing access to support and guidance to aid transformation. These products are introduced in section 5d.

### 5a. Governance and alignment

Project 13 is seeking to understand and address weaknesses in the traditional approach to delivering infrastructure, in particular the need to improve productivity and performance. Governance is recognised as the foundation for driving systematic industry reform. Effective governance enables owners and investors to manage the complexity of their infrastructure investments and their relationships with stakeholders and, in particular:

- articulate and deliver true value
- champion long-term socio-economic outcomes over short-term tactical objectives
- engage with stakeholders in a joined-up way which works for the whole programme.

The audience for Project 13's contribution to governance is wide ranging, including all organisations with a role in infrastructure delivery (both public and private), but also organisations and public bodies that set the context within which infrastructure is delivered (for example regulators, government and industry bodies, such as the Infrastructure and Projects Authority). Project 13 recognises that the environment for the public and private sector is somewhat different and thus the response that has been developed must reflect these variances. However, in both the private and public sector the journey to better governance starts with a new vision for value. To enable the transformation from transaction to enterprise a key cornerstone is to question our current understanding of what good performance is in infrastructure planning and delivery. A new approach to governance requires a more advanced appreciation of what good performance is, based on a new vision for value. Within

Project 13 this begins with setting the performance baseline centred on the definition of value agreed between the owner and the investor [see Commercial Handbook for guidance on establishing a performance baseline]. These are likely to be drawn from corporate objectives, government policy objectives, or particular challenges to be addressed. Of critical importance, the owner's and investor's appreciation of value needs to have progressed from reducing initial price or CAPEX cost to a long-term holistic vision for value that benefits a wide range of stakeholders. In line with this goal, excellent governance should produce a new vision for value, considering the following:

*'Value is recognised and appraised on the basis of a broad spectrum of long-term outcomes. Value measurement goes beyond the output per capex £ and extends to outcomes per whole life cost £. Value is enabled through fit-for-purpose procurement, contract and reward models that make possible enterprise, rather than transaction based approaches. The value model of the future is underpinned by highly capable people with a range of skills and a transparent performance management system that drives informed management and decision making.'*

*Both IPA's Transforming Infrastructure Performance programme and DfT's Transport Infrastructure Efficiency Strategy are looking to define measures of good performance and their specific definition of value across government as part of their benchmarking initiatives.*

There is an important interface between the roles of the owner and the investor in the delivery of long-term value. In the public sector, HMT and department boards are critical enablers for how public sector owners can operate. The longevity of funding models, the articulation of policy objectives and the framework within which investment decisions are made for example are all key to how an owner can define and deliver value. In the private sector, ultimate governance controls rest with equity investors, who can both incentivise and constrain the actions of owners, subject to compliance with obligations imposed by regulators.

Project 13 is looking to support both public and private sector investors to enable and support owners to embrace Project 13 principles and ways of working.

## Owner

We have developed two products to help owners embrace Project 13 principles in relation to governance: 1) the Governance Maturity Matrix, and 2) the Project 13 Corporate Code Principles. Both products are applicable to both public- and private-sector owners.

The Governance Maturity Matrix sets out considerations that organisations must focus on in order to achieve our proposed new vision for value. These considerations cover:

- long-term procurement and supplier relationships
- performance measurement
- leadership and decision making.

The Project 13 Corporate Code Principles set out expectations for the boards of infrastructure owners to embed the principles of Project 13 in the operation of the organisation. We have followed the logic of the existing UK statute (FRC Corporate Code & UK Stewardship code) but extended the requirements to reflect the specific circumstances of the infrastructure sector and the obligations we believe should be embraced by infrastructure owners, and intend that the principles are adopted by all organisations, regardless of whether they are within the ambit of the FRC Corporate Code. In it boards are encouraged to have the right relationships, accountability, strategy, oversight, assurance and decision making that drive Project 13 principles and ways of working.

## Investors

Project 13 aims to influence investors in both the public and private sectors to support owners to embrace Project 13 principles.

**Government:** Project 13 wishes to invite a dialogue across government about how they can enable and support owners to embrace Project 13 principles. A guidance note setting out key areas for change has been produced looking at how funding models, policy setting and key investment decisions can shape this.

**Equity investors:** Project 13 has been working closely with a number of equity investors to look at their role in helping shape private-sector owners' responses to Project 13.

**Regulators:** Project 13 proposes to engage with regulators to support the development of regulatory guidance on governance within the industries they regulate, with a view to creating an alignment with Project 13 governance principles.

## Enterprise governance

Once you have established the improved governance systems within the corporate environment there are three key principles for defining the enterprise governance:

Identify which organisations are acting in which roles within the Project 13 definitions, i.e. who is the owner, investor, advisor, supplier and integrator. Each role could be performed by a single organisation or a number of organisations who will jointly perform the role.

Use the Governance Maturity Matrix to determine the constraints and opportunities to be considered in designing a governance structure which interfaces with the external and corporate environment.

Consider how best to 'group' these organisations in a governance structure which means they can fairly and representatively discuss and agree with a single voice for each role. This might be through joint boards such as TfL and DfT formed to deliver Crossrail.

The principles of good governance in the Project Initiation Routemap provide a useful resource to cross-check enterprise governance plans:

It defines accountability for meeting the project's objectives and allocating the risk to those objectives.

It provides for effective decision-making and assigns authority to make decisions and commitments.

It maintains alignment between corporate strategy/objectives and those of the project.

It defines the disclosure of information required to assure stakeholders that the project is set to meet its objectives, or inform corrective action if not.

## 5b Creating the right commercial environment

There are six key commercial principles which need to be in place to create the right environment to develop a high-performing enterprise. If any of these are missing it will undermine the productivity and performance of the enterprise. They are critical to creating the right environment.

1. **Alignment** – where commercial performance measures are aligned to delivery of outcomes to the customer/end user.
2. **Reward** – where reward mechanisms in the enterprise structure are based on value added in exceeding the outcomes, not competed lowest cost for a component.
3. **Risk** – where risks that the infrastructure owner or investor are accountable for are not transferred to the supply chain.
4. **Engagement** – where the enterprise comes together at a much earlier stage in the asset enhancement/creation lifecycle.
5. **Scale** – where the enterprise model yields the greatest benefits when applied across asset systems/portfolios.
6. **Time** – where the relationships between organisations last over a longer time period.

## Developing a commercial strategy

Once agreement has been reached to follow the commercial principles set out in the previous section there are four steps to establishing a successful commercial strategy for an enterprise.

Commercial strategy step	Process	Outcome
<b>1. Establishing a performance baseline</b>	Agree a definition of value considering benefits, performance, capital and whole life costs. Use this to set up fair and consistent performance measurement across the enterprise throughout the lifecycle.	Demonstrate 'value for money' without resorting to lowest price tendering.  Increased alignment of procurement with customer needs.
<b>2. Selecting the right enterprise partners</b>	Selecting partners based on the impact they have on the outcomes using the performance baseline.  Undertaking tendering against the performance baseline and including behaviours in the selection process.	Elevates suppliers who have influence on outcomes (not just volume of spend) to enterprise/ programme board level.  Invite suppliers in to shape scheme development earlier.
<b>3. Linking the risk profile to reward mechanisms</b>	Incentivising all partners to collaborate to mitigate risks through a programme-level incentives.	Encourages collaborative risk mitigation giving increased delivery confidence and better outcomes for programme.  Links opportunity to innovation with rewards for innovating.
<b>4. Contracting to support the enterprise</b>	Select and apply the correct contract to support the delivery of the performance baseline.	Consistent contract conditions across the enterprise.  Contracts drafted to support the commercial strategy not undermine it with additional clauses.

The Project 13 Commercial Handbook sets out in more detail guidance on how to move through these steps.

## 5c Skills, behaviours and leadership

Alongside the commercial principles it is essential that the capability is attracted, developed and retained within an enterprise to provide the underpinning leadership, behaviours and skills for success.

There are two aspects to ensuring the right skills, behaviours and leadership attributes required to support an enterprise.

### 1. Creating the right environment for the desired behaviours

There is a simple model that enables enterprises to consider and plan their approach to behavioural change. Figure A provides a framework for considering and designing behavioural interventions. It is an adaptation of a Defra model and considers four general areas where interventions or levers will be effective to engage, exemplify, encourage and enable.

These can be considered at organisational, team and individual level. The model advocates a broad-based and balanced approach to behavioural change, with the general categorisation helping to identify both the opportunities for creating enablers of change as well as considering the barriers to change which may exist in any particular organisation.

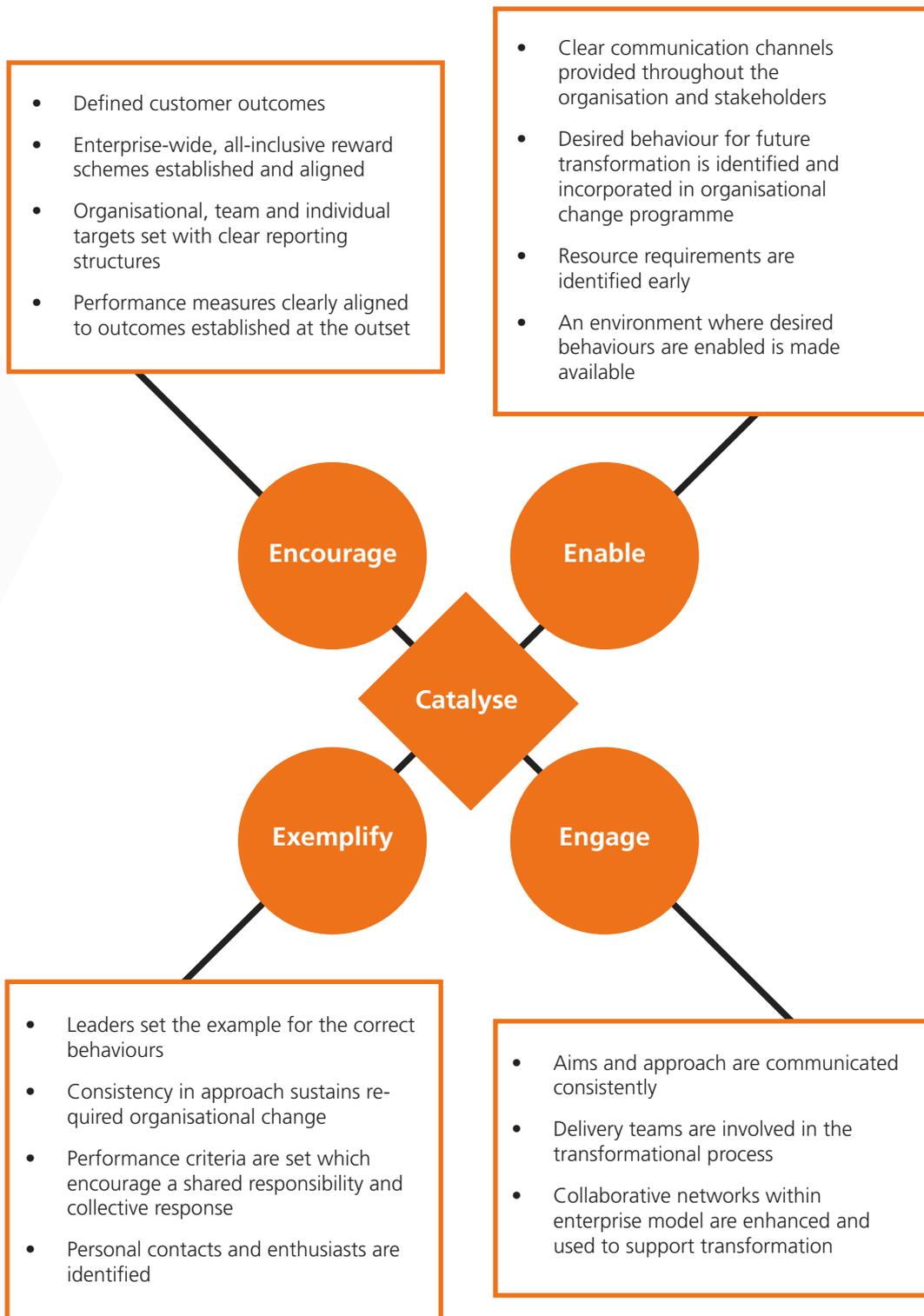


Figure A

## 2. Skills and behaviours of organisations in an enterprise

In forming an enterprise, behaviours must be aligned throughout the organisation and constituent teams. The required shift in behaviours must be recognised by all parts of the integrated organisation as being a clear change from a traditional transactional approach.

As the behaviours required to deliver these outcomes for the enterprise are developed and agreed, the direct alignment between outcomes, goals and behaviours must be maintained and has to be visible to everyone involved in the enterprise.

Behaviours should be considered as specific to that enterprise and the outcomes to be delivered. There is no single set of behaviours that define an enterprise, although some such as collaborative behaviours are likely to feature given the emphasis on delivering through integrated teams. For example, in some enterprises where there is a direct relationship with customers and a commitment to improved service, a behaviour around customer service would likely feature. In an enterprise which needs to find radically different solutions and new ways of working innovation could be a desirable behaviour.

Using the information and case studies available in the previous section it is possible to consider which are the right skills and behaviours and if these are available in the organisations and the individuals within them.

## **5d. Supporting the transition – how do we define what is simple collaboration and what is a high performing enterprise?**

Based on the analysis and research of the five work streams the following Maturity Matrix sets out the different attributes of a system with simple collaborative relationships and one which is a high-performing enterprise. This Maturity Matrix can be used to identify the current status of a system and where there may be opportunities to work more effectively as a high-performing enterprise. It is available in an interactive format on the Project 13 website.

# Maturity Matrix

## SIMPLE COLLABORATION

**GOVERNANCE**

- Defining outcomes and value
- Performance benchmarking
- Enterprise organisational structure & capabilities

Value appraisal goes beyond initial capex cost and incorporates outcomes in addition to outputs assessment.

Procurement models target attainment of value (outputs and outcomes) and appropriate adaption of contract standard forms and equitable risk sharing.

Appraisal is based on risk, value and outcome benefits with limited benchmarking.

Clear organisational division of responsibility for approval of investment, acquisition strategies and managing assets.

**ORGANISATION**

- Commercial approach
- Behaviour

Collaborative supply chain strategy in place.

Cost reimbursable contracts with financial incentives.

Successful combining of skills brought together from each organisations to meet the specific challenges.

**INTEGRATION**

- Processes & systems
- Delivery

Internal procedures and systems exist and partially applied.

Application of R&D and innovation is incentivised in the commercial relationships aligned to outcomes.

**DIGITAL TRANSFORMATION**

- Customer insight
- Digital leadership
- Asset integration
- Value of information

Data provides some insight on value for the customers and other stakeholders.

Commitment to digital transformation with owner's digital strategy sponsored by senior leader.

Physical assets are specified, with digital 'tagged on' separately in separate or siloed systems.

Value of information recognised but not linked to business outcomes.

**CAPABLE OWNER**

- Asset system knowledge
- Capability and skills

In regular communication with and aware of the requirements of the customer and operation.

Repeat contracts and collaboration with the supply chain at project level.

Increasingly open to skills from other industries.

## INTEGRATED FUNCTIONS AND RELATIONSHIPS

Value appraisal goes beyond initial whole life cost and incorporates outcomes in addition to outputs assessment.

Procurement models target attainment of value (whole life cost and outcomes) and appropriate adaption of contract standard forms and commercial risk sharing.

Performance standards and value definitions are agreed upon across all organisations and beginning to be benchmarked over long-term relationships (10 years +).

Appropriate experience of delivering infrastructure programmes embraces whole life value in acquisition strategies and has robust processes to ensure supply chain representation.

Key suppliers procured through frameworks based on mutual understanding of delivery against demand.

Incentivised contracts with sustainable performance targets which reflect the joint and mutual outcomes of the integrated organisation.

Long-term collaborative partnerships to jointly develop skills required for the specific challenges.

Single integrated project organisation. Core team co-located with common systems.

Complementary R&D programmes exist across partnering organisations, aligned to delivery of overall outcomes.

Customer-led culture developing to understand customer needs, both expressed and implied.

Strong digital leadership across owner and partners, empowered to drive change. Coherent digital strategies in place.

Leading investments delivered as integrated physical-digital systems.

Business models recognise value, cost and obligation of information throughout asset life.

Ongoing effective engagement with operations and customers throughout the lifecycle.

Contracts can be flexibly applied by the owner to seek constructive resolution and encourage innovation and collaboration at programme level.

Senior leaders across the owner organisation committed to a new way of working. Diversity actively sought and colleagues have experience across multiple functions and sectors.

## HIGH PERFORMING ENTERPRISE

Value appraisal is fully embedded at outcomes per whole life £ level. A sophisticated range of outcomes are included.

Procurement models are jointly created within a single enterprise and commercial structures are strongly linked to realisation of outcomes.

System-wide strategy and solutions delivered through long-term enterprises and ecosystems. Applying and measuring performance through benchmarking across enterprises.

Long-term outcomes success through embedded partnerships and collaborations.

Supplier inter-relationships are mature enough to deliver combined innovative solutions which achieve whole life outcomes.

Single enterprise focused on and rewarded for delivering customer outcomes. Enterprise rewards depend on performance measured against joint, shared outcomes.

Environment created to proactively develop and retain talent.

Integrated teams, systems and tools support the creation of an environment which encourages the aligned behaviours necessary to deliver the outcomes.

Single joint R&D programme for the enterprise aligned to outcomes, jointly prioritised and delivered, sharing investment and rewards based on improved performance.

Deep understanding of customer and other stakeholder needs and wants at the centre of all investment decisions.

Joined-up leadership across the enterprise drives fully integrated strategy for digital transformation.

All investments maximise lifetime value from integrated physical-digital systems.

Information assets – the 'digital twin' – considered as important or even independent from corresponding physical assets.

Customer outcomes translated into clear requirements and targets, agreed and cascaded through the whole enterprise. Integrated, proactive and collaborative approach with operations, who are embedded in the programme team and define requirements.

Trust and relationship based contracts between the capable owner and ecosystem are driven by well-defined value.

Employer of choice and a breeding ground for industry.

## **Appendix A**

### Leadership and support

#### **Project 13 Executive Group**

Miles Ashley, Wessex Advisory Ltd  
Nick Baveystock, Institution of Civil Engineers  
Mark Enzer, Mott MacDonald  
Dale Evans, Infrastructure Client Group Chair & Anglian Water Services  
Emma-Jane Houghton, KPMG  
James Merrett, Mace  
Simon Murray, Acumen7 Network  
Mark Reynolds, Mace  
Richard Threlfall, KPMG  
Phil Wilbraham, Heathrow Airport  
Hannah Vickers, Institution of Civil Engineers

#### **Project 13 Operations Group**

Dr Franziska Drews, KPMG  
Ben Goodwin, Institution of Civil Engineers  
Zain Kanji, Mace  
Tim Leech, Heathrow  
Neilan Perumal, Anglian Water  
Jamie Radford, Mott MacDonald

#### **Project 13 Future Leaders Panel**

Heather Cox, Rolls Royce  
Zoe Henderson, UCL  
Lucy Howard, Turner & Townsend  
Aaron Matthew, Transport for London  
Doug Mills, Bam Nuttall Ltd  
Miranda Sharp, Ordnance Survey  
Tom Wooster, Rider Levett Bucknall

#### **Institution of Civil Engineers President's Future Leaders**

Will Lavelle, Atkins  
Charlotte Murphy, Arup

## Appendix B

### Reference material

#### **Constructing the team (Latham)**

<http://constructingexcellence.org.uk/wp-content/uploads/2014/10/Constructing-the-team-The-Latham-Report.pdf>

#### **ICG – Alliancing Code of Practice**

<https://www.ice.org.uk/knowledge-and-resources/best-practice/alliancing-code-of-practice-grid-infrastructure>

#### **In Plain Sight – reducing the risk of infrastructure failure**

<https://www.ice.org.uk/news-and-insight/policy/in-plain-sight-reducing-the-risk-of-infrastructure>

#### **Independent review of building regulations and fire safety – Interim Report**

<https://www.gov.uk/government/publications/independent-review-of-building-regulations-and-fire-safety-interim-report>

#### **Infrastructure Cost Review**

<https://www.gov.uk/government/publications/infrastructure-cost-review-measuring-and-improving-delivery>

#### **Infrastructure UK**

#### **Modernise or Die (Farmer report)**

<http://www.constructionleadershipcouncil.co.uk/wp-content/uploads/2016/10/Farmer-Review.pdf>

#### **National Audit Office**

#### **Framework to review programmes**

<https://www.nao.org.uk/report/framework-to-review-programmes/>

#### **Project Initiation Routemap – Governance Module**

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/361175/Governance\\_Module\\_30\\_Sept.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/361175/Governance_Module_30_Sept.pdf)

#### **Rethinking Construction (Egan)**

[http://constructingexcellence.org.uk/wp-content/uploads/2014/10/rethinking\\_construction\\_report.pdf](http://constructingexcellence.org.uk/wp-content/uploads/2014/10/rethinking_construction_report.pdf)

#### **Transport Infrastructure Efficiency Strategy**

<https://www.gov.uk/government/publications/transport-infrastructure-efficiency-strategy>

#### **Transforming Infrastructure Performance**

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/664920/transforming\\_infrastructure\\_performance\\_web.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/664920/transforming_infrastructure_performance_web.pdf)

