

Are you feeling confident?

Asset management done well enables operational success. Neglected, it drags a business back and can trigger failure.

Build competence and confidence in seven steps.



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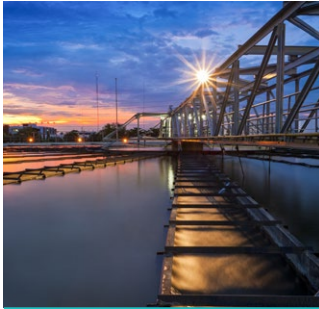
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Practical steps for asset confidence

Confidence can be hard to measure and even harder to generate.

In an asset management context, confidence comes from foresight and control. It results in high-quality, timely decisions that keep you a step ahead of asset deterioration, climate events, or the changing expectations of your customers.

With the right level of visibility, challenges can become opportunities to improve performance, strengthen trust and secure funding. Conversely, a lack of asset confidence is all too easy to measure – in wasted money or missed goals. With poor asset management, bad things seem to constantly happen. Decision-making is reactive rather than proactive. In the worst-case scenario, a business can battle against daily disruption and eventually fail.

With the right level of visibility, challenges can become opportunities to improve performance, strengthen trust and secure funding.

More relevant than ever

It's rarely been so challenging to be an infrastructure owner. There is more pressure on costs, while regulatory requirements are ever more. Customers are more aware of services and who is responsible, and so place more demands. We are also in a period of changing climate. We've seen increasing scrutiny of safety in recent years, with greater checks and balances, and tighter environmental requirements for pollution prevention, energy efficiency and carbon reduction. Resources are increasingly scarce and expensive.

Asset management can help address all these challenges. This publication shares how we help our clients to derive value from their assets with confidence. It's a seven-step approach that guides organisations to a position of asset management maturity – what we call the 'seven pillars of asset management'.

People front and centre

There are recurring themes that I would draw your attention to: the importance of courageous leadership, the opportunities from improved information management, and the importance of always thinking about your customers and stakeholders. Our aim is to show just how many aspects of your business can benefit from joined-up asset management, far beyond just maintenance planning.

I am repeatedly struck by my colleagues' practical approach to projects, often based on experience of working 'client-side', quite possibly in your sector. An asset that's working perfectly is rarely given a thought by staff and customers – and that's the way it should be. But it takes real insight, care and know-how to keep it that way.

If you'd like to discuss the seven pillars and how they can help you, I'd be delighted to hear from you.

Judy Anderson, global leader for asset management

A question of asset management

What is it?

International standard ISO 55001 defines asset management as “the co-ordinated activity of an organisation to realise value from assets.” We see it as a framework for achieving excellent customer service and successful business outcomes by creating, maintaining and operating your portfolio of assets in a sustainable way.

Isn't it just a buzz phrase for stuff we're doing anyway?

Yes and no. Many of the techniques in asset management have been around for a long time and will already be part of your organisation's processes. The new (and exciting) element of asset management is the way it brings together all aspects of your business around common goals, providing the clarity and focus you need to meet the fast-changing demands of customers, stakeholders and regulators effectively and efficiently. That's where asset management impacts the bottom line.

So it's more than a 'nice to have'?

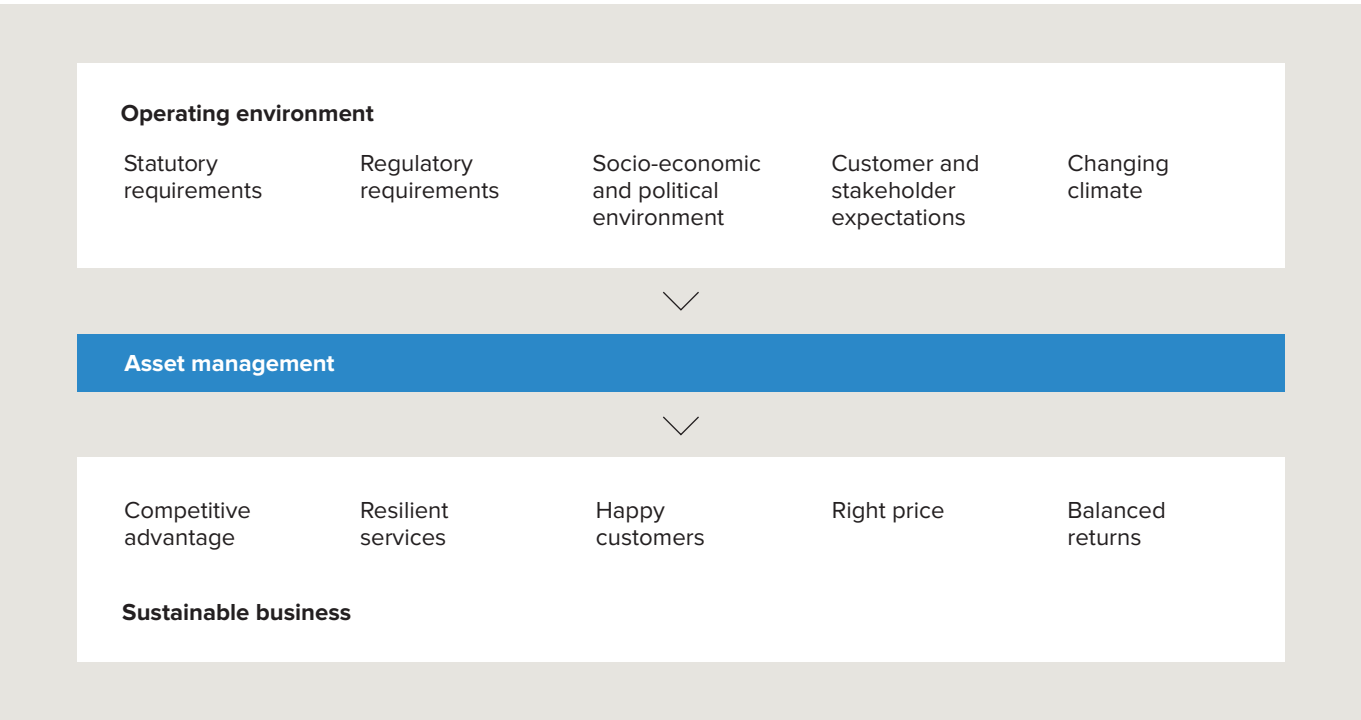
Absolutely. We believe it's the key to balancing the ever-changing operating environment and stakeholder expectations with the needs of the business, the uncertain impacts of ageing assets, the hazards posed by a changing climate and external pressures to reduce costs.

In other words, it helps asset maintenance?

That's just one benefit. It also helps you take strategic and tactical decisions that are aligned with the objectives of your organisation, efficient in whole-life cost terms and balanced within affordability and financeability constraints.

What are the outcomes of asset management done well?

Organisations can realise significant value for their businesses through proactive decision-making, leading to improved and better controlled performance, lower costs, improved customer service and stakeholder trust, and more balanced returns on investment with fewer surprises. Sound good?



Asset management done well enables you to...

1. Make better decisions and achieve better outcomes (it's not just about managing and maintaining assets).
2. Integrate your organisation, people, planning, operations, delivery and supply chain around common objectives.
3. Improve control in managing your costs and performance across the lifecycle of your assets.
4. Achieve better outcomes at lower cost with higher returns on investment without sacrificing your long-term goals.
5. Implement risk-based decision-making which delivers cost savings of 10%-20% compared with traditional asset condition-based methods.
6. Demonstrate compliance with regulatory requirements and defend your actions.
7. Prepare compelling, evidence-based business cases, winning stakeholder support and clear routes to funding.
8. Win trust with your customers and stakeholders through greater control of costs and performance.
9. Better manage your risks to service by improving environmental stewardship, safety and resilience to climate hazards.
10. Influence your stakeholders, and the direction of regulation and statutes governing your business.

The seven pillars of asset management

Asset management done well aligns processes, people, investments, operations and delivery of asset interventions around common objectives.

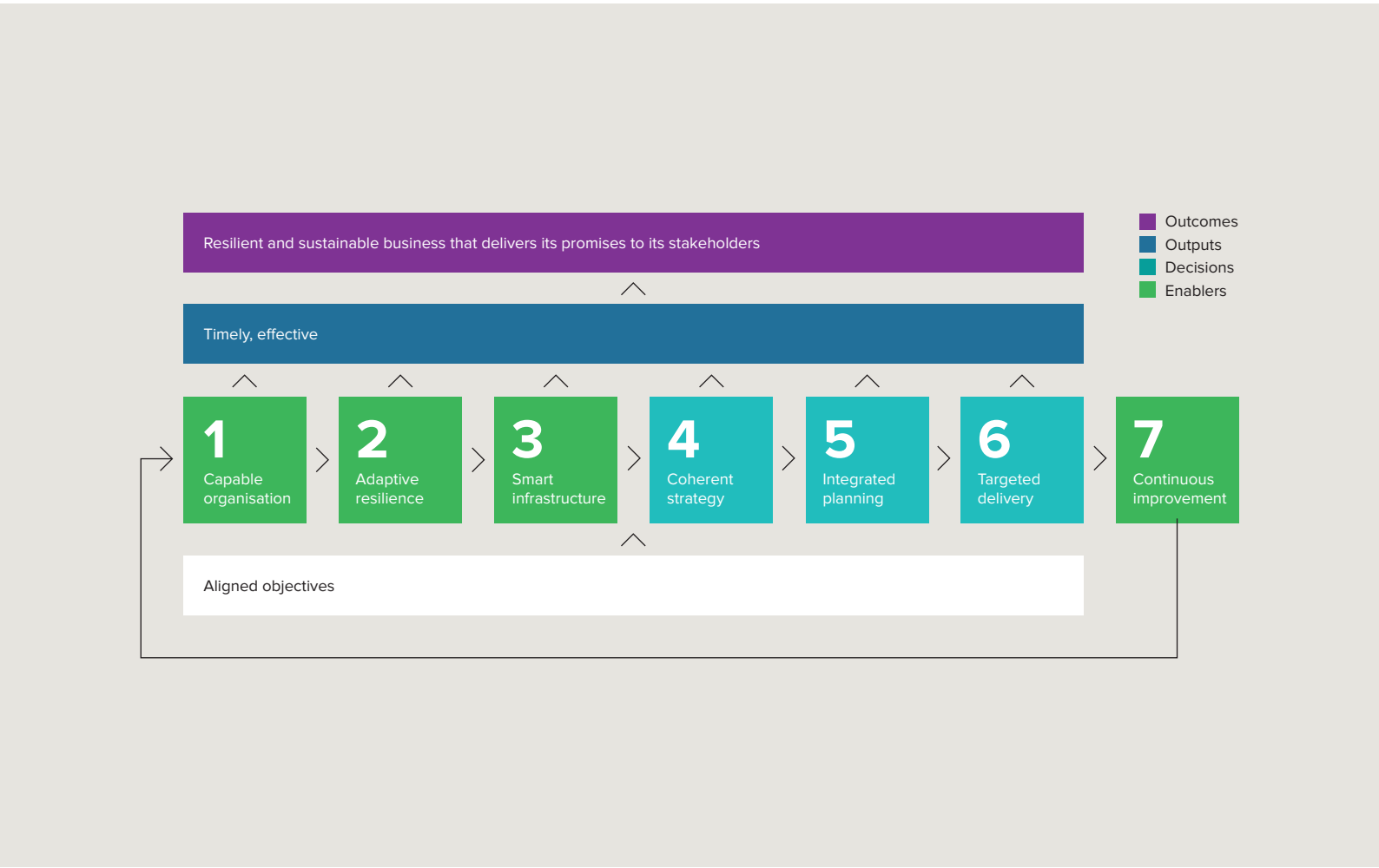
This relies on gaining ‘line of sight’ from boardroom to plant room. In our experience, this is achieved by building asset management principles into organisational design to form a **capable organisation**.

Other key enablers include **adaptive resilience** – those processes to assure your business against natural and man-made hazards – and **smart infrastructure** – crucial digital information about your assets in a form that can support timely and effective decisions, underpinned by an asset management information strategy.

These enablers support development of a **coherent strategy** to set the long-term direction for your organisation and the outcomes you wish to achieve. The strategy provides the framework for forward-looking **integrated planning**: incorporating risk-based decisions to deliver your organisation’s objectives effectively and efficiently.

This supports your **targeted delivery** of capital and operational interventions on an efficient whole-life cost basis so you can proactively manage performance to required levels. Finally, with **continuous improvement**, you can benchmark and regularly review systems to maintain and raise performance of your organisation in delivering its goals.

Our model for asset management is consistent with ISO 55000 and other frameworks for good practice asset management.



Clear line of sight

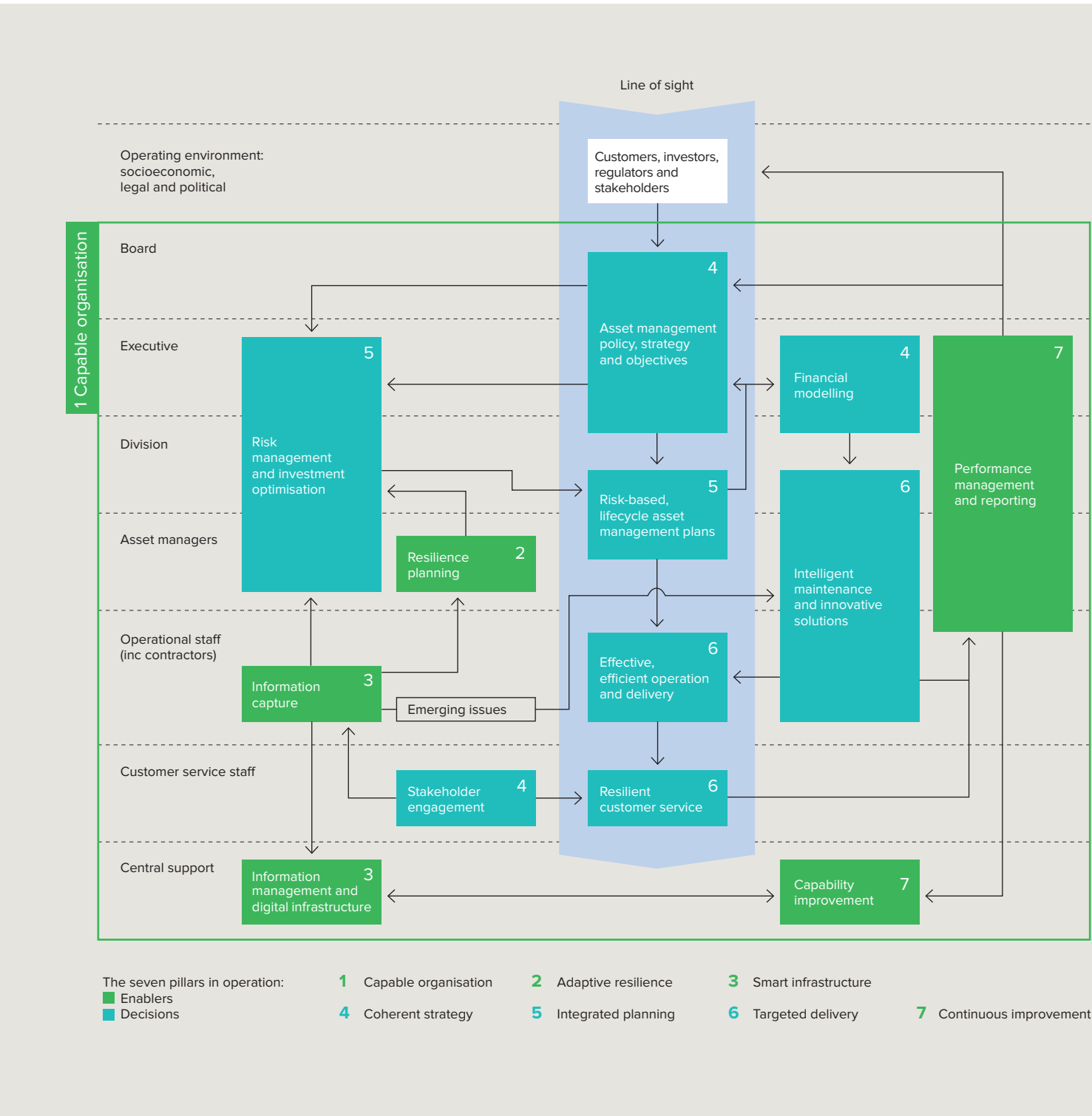
It's essential that, from top to bottom of your organisation, activities are co-ordinated and focused – to address market pressures and deliver the right outcomes for customers.

Operating environment is a fundamentally important consideration in the development of an asset management strategy, encompassing customer demand, policy and regulation, investment and insurance, cost and affordability, responsibilities to wider stakeholder communities and the environment, and strength of the supply chain.

A clear **line of sight** is needed, cutting across all layers of your organisation to ensure everything between organisational strategy and delivery of customer service is properly aligned and resourced.

Performance management, benchmarking and regular reviews lead to continuous improvement in asset management maturity.

Get it right, from top to bottom of your organisation, and asset management will help you deliver the right service for the right price, build resilience, and respond to increased demand and higher customer expectations. Done right, asset management provides competitive advantage and fuels growth.



Supporting you as your business matures

Different organisations can have different levels of asset management maturity. ISO 55001 defines maturity on a scale of one (least mature) to five (most mature).

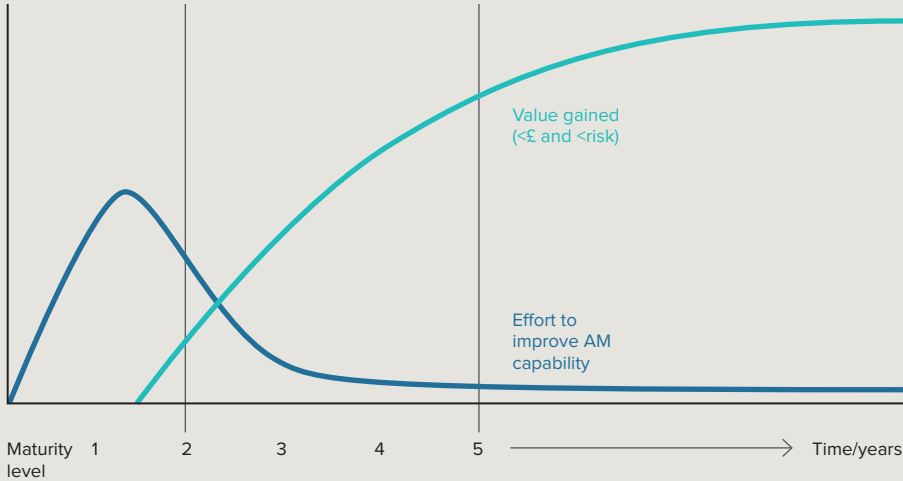
To be considered competent in asset management, a maturity of three is required. Beyond three, organisations optimise and innovate their asset management systems according to their own contexts.

Invest to save

An organisation that is trying to improve its asset management maturity may not begin to see value from its initiatives until its asset management system is established and embedded.

The effort required to establish an asset management system is high at the beginning of the journey and the value gained is limited, but over time the effort required reduces and the value increases in line with maturity.

You will need different support for each stage of your improvement journey. This can range from establishing an assessment management system to full implementation of investment optimisation solutions when maturity is well advanced.



Maturity level 2

The organisation has identified the means of systematically and consistently achieving asset management requirements, and can demonstrate that these are being progressed with credible and resourced plans in place

Maturity level 3

The organisation can demonstrate that it systematically and consistently achieves relevant requirements set out in ISO 55001

Beyond maturity level 5

The organisation can demonstrate that it is systematically and consistently optimising its asset management practice in line with its objectives and operating context

Low maturity

Asset surveys
Asset inventory
Asset referencing
Condition assessment
Strategic planning
Rudimentary investment prioritisation

Competent

Risk management
Deterioration models
Decision-support tools
Asset planning
Cost modelling
Regulation/assurance

Expert

Asset optimisation
Totex planning
Benchmarking
Investment optimisation
Customer analysis
Real-time asset management
Regulation/assurance

At almost any point in your asset management journey, but particularly at the start, it's useful to assess your capability.

Where to start and where to aim?

You can get hold of a best practice framework today if you want to, such as ISO 55000, PAS 55, or the Global Forum on Maintenance & Asset Management's (GFMAM) 39 Subjects of Asset Management. There are other frameworks too, suited to specific sectors and regions.

Like all 'out of the box' solutions, they work best when tailored to each organisation. We've worked extensively with all the principal frameworks and, simply, we know how to use them to best effect. We have also developed assessment tools ourselves, to

meet particular needs and fill gaps, such as the 'Framework for expenditure decision-making', used in the water sector.

Our experts can advise on the right assessment criteria and methodology for your organisation and then support you through the assessment itself, to identify gaps and improvement opportunities. We will use those to develop recommendations for improvement, after which, we can support you with implementation, to achieve effective asset management that supports your business aims.

Assessing maturity using GFMAM's 39 Subjects
This example shows an organisation with a maturity well below level three – competent. Areas scoring one and two would be prioritised for improvement, to ensure that this organisation started its asset management journey on the right track.

Maturity assessment template



Pillar 1: Capable organisation

Clear vision, unobstructed view

One of the core aspects of our capable organisation assessments falls under the title of ‘line of sight’, writes Dr Sarah Watson, principal asset management advisor.

Is the person at the top of the organisation focusing on the same things as the person on the front line? Is everybody trying to achieve a common ambition, with all documents, IT and business processes calibrated to the same goals?

If the push is to improve, say, environmental performance, then we will help ensure that all personal objectives and appraisals are set up accordingly. This might mean the CEO improves processes for reporting environmental performance, while the hands-on doers ensure all the data is collected in the right way. So you have one corporate objective, with everybody contributing and pulling in the same direction.

You might be surprised how rarely that happens. But when asset management is led by the CEO or chairman, with integrated objectives linked to policy, planning, strategy and delivery – then the magic flows throughout the whole company.

When asset management is led by the CEO or chairman, with integrated objectives linked to policy, planning, strategy and delivery – then the magic flows.

Fresh pair of eyes
Often, it's the very act of getting everybody in the same room for a capability assessment that kick starts improvement. Organisations don't work in a conflicting manner on purpose! But for all sorts of reasons, intentions aren't always translated into practice.

Only by swapping notes do disconnects get noticed and sorted. For organisations that have the full asset management lifecycle in their remit – building, operating, maintaining and decommissioning – there are inevitable dependencies and potential synergies. Working from the same blueprint, rather than in siloes, inevitably creates efficiencies.

This proactive approach is always more productive than calling for intervention from a burning platform. There's the temptation to let things run, hoping that the performance disaster or sanction for bad investment doesn't come. But managing assets actively rather than reactively puts you on a sound footing and brings much greater benefits.

Above standard assessment
I am one of the biggest fans of ISO 55000. Apart from anything else, it was one of the first standards to formally recognise that people are an organisational asset, and not just the concrete, steel, bridges, tunnels, cables, tanks and pipes they operate.

But the questions it asks and the approaches it recommends are, unsurprisingly, quite generic and lack some of the nuance required for specific organisational contexts. At Mott MacDonald, all our assessors have past lives in utility, transport and other infrastructure companies, so we understand the pinch points on the ground, and we can translate the black-and-white of the ISO into practical guidance.

Our IAM-endorsed accreditation is important to our team. Every new member is obliged to qualify. We understand how to add rich texture to the drier elements of the ISO, asking questions that open up real opportunity for our clients. Identifying line of sight is a good example. In that way, we see ourselves as ISO-plus.



Pillar 1: Capable organisation

Understanding organisational capability is the first step in improving it.

Our team of IAM-accredited ‘Endorsed Assessors’ can support you in developing better awareness of strengths and weaknesses. We can then work with you to create an improvement plan, build asset management capacity and deliver business change. All with the aim of enabling effective risk management and efficient decision-making across your business.

Key benefits

You will gain more effective decision-making leading to:

- Improved performance
- Increased stakeholder confidence
- Increased total expenditure efficiency
- Increased resilience

Methodology

1. Create organisational objectives
2. Assess your baseline and undertake a gap analysis against good practice
3. Develop an improvement plan and integrate into ‘5 steps for change’
4. Reassess and monitor with KPIs
5. Establish continuous improvement

Planning for next century

Asset management projects usually aim to extend lifetimes or achieve indefinite maintenance of a facility. Decommissioning a nuclear site asks a different question. How to dismantle your assets and manage the hazardous materials within them, over many decades, without jeopardising or short-changing the public?

Working in partnership with the Nuclear Decommissioning Authority (NDA) since 2009, we have conducted maturity assessments and supported improvement initiatives at four site licence companies (SLCs), namely Sellafield, Dounreay Site Restoration, Magnox and the Low Level Waste Repository in Cumbria.

Our role is to support NDA strategy by driving improvements in asset management capability across the SLCs, with particular focus on the management of risks and opportunities for cost savings. We have been doing this through repeated asset management maturity reviews against the PAS 55 and ISO 55000 frameworks. We have also been working with the SLCs on specific improvement initiatives such as objective mapping to achieve line of sight; risk assessment to

prioritise investment decisions; developing robust asset management plans; improving the capture of cost information; and integrating decisions across the sites and investment categories. We have also supported the NDA in sharing best practice.

As a result of our work, the SLCs have been able to demonstrate improved capability through their increasing PAS 55/ISO 55000 maturity scores. They are achieving more systematic, data-informed management of their assets, sharpened clarity through critical asset dashboards, better underpinned and justified plans, and increased understanding of cost and opportunities for savings.

Project

Nuclear decommissioning programme

Location

Sites around the UK

Client

Nuclear Decommissioning Authority

Expertise

Maturity assessment



Pillar 2: Adaptive resilience

“The first step is recognising the need to adapt”

It's less a matter of if a climate event will hit than when and how hard. Organisations that invest in resilience will survive better, recover faster and outcompete those that don't, says Ian Allison, global head of climate resilience.

Across all sectors, the provision of reliable, high quality service to customers depends on a complex network of physical assets and third party suppliers, each with its own life support network, also known as 'asset systems'. The creation and operation of asset systems takes place within an intricate environment involving social, economic, financial, policy and regulatory dimensions.

Cascade effects

Many assets feed into one another and rely on each other's strength. Any vulnerability along the chain puts all the connected assets at risk. When things go wrong, the effect is cumulative. As asset systems become overstressed they start to fail more frequently.

Degradation or loss of service provision can result in breach of contractual and regulatory obligations, leading to more onerous terms, tighter scrutiny and potentially shifts in policy. Loss of revenue and profitability can result in low investor confidence and harder borrowing terms exactly when additional finance is required. All this is in addition to the service disruption itself and the direct impact on customers.

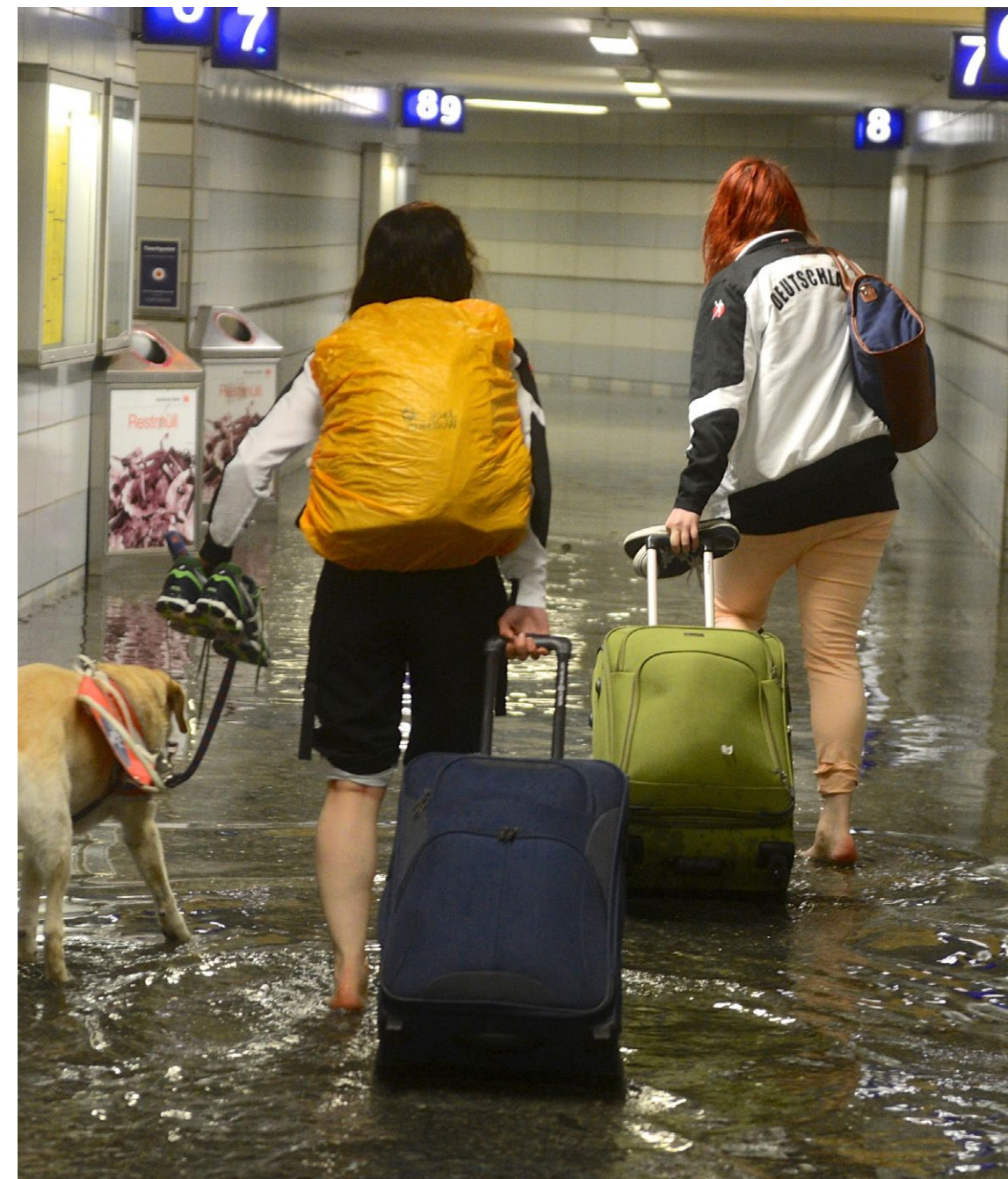
When climate events hit an insufficiently resilient asset system they can exert a shock load that triggers a collapse of the system's functionality. Events can damage physical infrastructure, wipe out stock, disable supply chains and trigger cascade failures through interconnected asset systems.

Eyes tight open

The stark truth is that most asset systems are currently underprepared for the impacts of climate change. The cost of inaction could be devastating. Assets may not

recover if consumer confidence is shaken by loss of service. Perhaps the first, and most important step, is recognising the need to adapt. Climate systems operate to regular patterns. Business leaders need to recognise this link and plan for extreme climate events just as they plan for the impacts of currency rate fluctuations, political elections, regulatory periods or economic cycles.

There are benefits to a more proactive approach. Fully resilient businesses not only deal with climate events; they rebound from events to gain a better position than their poorly adapted, less resilient competitors. Achieving continuity of operation and service provision gives organisations the opportunity to grow market share and profitability, or attract greater funding from regulators, so providing a clear 'resilience dividend'.



Pillar 2: Adaptive resilience

Protecting against failure starts with identifying vulnerabilities and creating plans for adaptation and resilience.

Taking action will help you to prepare for predictable climatic, as well as other natural and man-made shocks.

Key benefits

- Quantifying the vulnerability of an infrastructure system, using an all-hazards approach, improves understanding of:
- Resistance – how well will your assets and asset systems stand up under stress
 - Reliability – what level of service is at risk
 - Redundancy – how much ‘spare’ capacity is there to maintain operational continuity should part of the system fail
 - Response and recovery – how quickly will your operations buckle when subject to a shock, and how fast will they rebound in the aftermath

Methodology

- With an approach tailored to your needs, we’ll help you identify which hazards should be considered a real cause for concern, quantify the scale of the hazard, and spot the weak links in the asset system that supports your operations. Key questions include:
1. What does resilience look like for your organisation?
 2. What level and duration of service disruption is acceptable – and what’s survivable?
 3. What changes to your asset base are needed to sustain your operations?
 4. What changes to your organisation and supply chain are needed?

In short, we’ll help you understand the risks posed to your organisation and your stakeholders, and to justify investment or change necessary to protect them.

Our tools visualise the assessment and convey the results to all levels in your organisation. They include resilience matrices and GIS mapping, as well as dashboards that report at asset and system level.

No more sandbags

Power supplies in the UK face a significant threat from flooding because many electricity substations are located in floodplains. Following the damaging rains of 2007, the National Grid instigated a flood resilience programme to ensure that its substations are protected and remain operational during extreme flood events. We were commissioned to assess the flood risk for over 100 electricity substations, which together provide power to up to 500,000 people. Where risks were judged to be intolerable, our engineers were tasked with designing effective flood resilience measures.

Using detailed hydrological and hydraulic modelling, we assessed the risk to substations from heavy rainfall, river and tidal flooding, and other sources including flooding

from sewers and drains and reservoir failure. Our solutions aimed to protect each substation through whole-site protection, such as flood walls and/or earth bunds; localised protection, such as building barriers around equipment; raising or moving critical equipment; improvement of site drainage systems; installation of pumps; and drainage diversions.

Many National Grid substations are now protected against extreme flooding, including 1:1000 year flood events. The remainder will be made resilient by the end of the programme in 2022. The programme will help to safeguard power supplies to critical assets in all infrastructure sectors – such as water, transportation, communication, and health services – maintaining the provision of essential services to the public and preventing disruption to the economy.

Project

National Grid flood resilience programme

Location

UK nationwide

Client

National Grid

Expertise

Flood risk modelling and design of improved defences



1:1000
years flood protection

Pillar 3: Smart infrastructure

No destinations without clear origins

The idea of operating in a live environment, with full visibility of how end users are interacting with assets has obvious appeal, writes BIM consultancy lead Andy Moulds.

But picturing the destination is the easy bit. It's gaining a full understanding of the journey that's tricky.

Do any of these complications sound familiar?

1. Data exists in different formats, across different locations in a disorganised way.
2. Whole chunks of data are missing, either owned by others and inaccessible, lost, or never created or captured in the first place.
3. Data differs markedly in terms of age and quality, existing in different formats.
4. Your organisation has a wide range of systems to host or manage data.

Can't share, won't share

These challenges are not peculiar to sectors or industries. Often, they emerge as organisations mature, whether through mergers and acquisitions, as individual projects and assets are procured, or as priorities change. Teams within the organisation focus on different priorities, oblivious to data they could share or gain from colleagues.

The good news is that it is never too late to change. You can start by ensuring that the right conversations and transactions take place, and that data is handled in the right type, format and location, and in a common language.

Leadership can demonstrate the advantages of sharing and co-creating data, while illustrating the spheres of data influence up and downstream.

If leaders set clear targets, empower those lower down the hierarchy and reward their enthusiasm, they'll get much better-quality data, and consequently better decision-making. They'll also be much more likely to stimulate and benefit from innovations if the data strategy embraces all in the organisation, root and branch.

Broader horizons

Just as you need to understand your starting point to plot a clear path to your desired destination, it's important to address the right questions on the way. For example, which decisions have you most struggled with in the recent past? Which decisions do you make based on assumptions, rather than evidence? Which problems are costing you the most money and time to overcome?

At present, there is a disconnect between contractors and clients in the management of information. Data generated to increase efficiencies in design and construction has the potential to make operation more efficient. Data models should be established at project inception with operation in mind. Clients need to specify it in the contract and put the systems in place to receive and benefit from it.

The promise of data is that, handled right, it helps to diagnose just how a business is performing. That nirvana is attainable. With a co-ordinated and considered approach, based on your current data maturity, and setting out realistic steps in the right sequence, you really could turbo boost your business.



Pillar 3: Smart infrastructure

Sound information, captured, processed and presented to decision-makers at the right time, is essential to good asset management, enabling better decisions, faster and cheaper.

We can help you develop and implement an information strategy coupled with the latest technology to underpin and accelerate your asset management decision-making.

Key benefits

Defined data needs and governance with supporting processes and systems can deliver:

- Data of the right quality and completeness to make timely decisions
- Alignment of data, systems and processes around organisational goals
- Insight to manage emerging risks and control costs

Methodology

We begin the process of making data work effectively for our clients at project inception with BIM consultancy: it involves embedding the information management technologies, processes and protocols that are right for your organisation and strategic objectives. BIM consultancy segues into smart infrastructure consultancy, focused on making data work for you, for maximum benefit. Our work is supported by:

1. Proven middleware applications H2knOwhow and Field Book combine information sources and analytical tools to provide operational insight
2. Asset inventory and work-management software tools
3. Extensive programming skills used to create bespoke digital solutions for clients in all major infrastructure sectors, as well as long experience of working with major off-the-shelf systems
4. Strategic partnerships with major enterprise asset management providers



A\$500,000
Annual cost savings

Project

Sludge treatment and aeration improvement programme

Location

Various wastewater treatment sites across south Australia

Client

Confidential

Expertise

Operational review and optimisation

Timing makes a power of difference

If data from sensors is coupled with the right analytics, it's possible to spot anomalies and inefficiencies that aid prevention of service failure and enable performance to be optimised. This creates value by giving greater real-time control over costs, and provides insight that informs better collaboration and decision-making between designers and operators.

This has happened at a number of activated sludge treatment works in Australia, which are using real-time data and analytics to gauge the best time to clean aeration tanks and de-clog diffusers. Previously, these operations were undertaken at set intervals. However, with improved insight provided by data, our client has been able to intervene whenever loss of performance becomes an issue, time cleaning operations for when they will cause minimal disruption, and tune operation of the aerators to the actual load, which varies with the rate of wastewater through-flow.

Given that aeration consumes 40%-60% of our client's overall power costs, there were clear incentives to invest in technology. We developed a cost-benefit calculator for automated decision-making in real time. The calculator highlighted inefficient operation and evidenced payback for replacement of diffusers and control improvements.

We helped to identify opportunities to improve aeration efficiency and achieve power cost savings of A\$500,000 per year. Savings, not to be sniffed at.

Pillar 4: Coherent strategy

Give them what they really want

Andrew Heather, principal consultant for asset management, explains how clever thinking, backed by good evidence, can find the sweet spot of service and cost.

The perfect strategy for a utility (for example) will identify the balance point between service and cost. But it's often easier to do on paper than in reality. Imagine a set of scales with 'level of service' on one side and 'utility charges' on the other. Where is the equilibrium for customers? Will they pay more for better service? Or will they cope with occasional disruptions, as long as the bills stay low?

The truth is that customers expect the best of both worlds. They don't want to pay more for what they perceive as 'standard service'. We are all used to seeing improvements in service for less money in other areas of life. That's where organisations need to find clever ways to solve the top pain points as customers see them, and prioritise spending to make a difference where customers notice most. This could mean finding ways to repair assets faster, or providing answers first time to avoid repeat calls. On the flip side, you can 'find' money by deferring or avoiding expenditure on assets that won't measurably raise customer satisfaction.

This means adopting an asset-centred structure to leadership, where director of asset management is more than a job title, but an accountable role for ensuring that the organisation manages assets to deliver better service. By having oversight of the whole asset management function, the director of asset management can ensure that the organisational strategy is coherent and integrates information and decisions around common goals.

Pulling together

The benefits of this approach make practical sense. You can encourage different teams, such as planners and operators, to work more closely and have good conversations. Planners will then know and account for operational realities in their models and expenditure forecasts.

Find clever ways to solve the top pain points, and prioritise spending to make a difference where customers notice most.

A coherent strategy also provides a clear reference point to test any decisions against. Without that cornerstone, you can be sure that teams will focus on delivering their own perception of what is most needed, guided by the most vocal and influential people in the organisation.

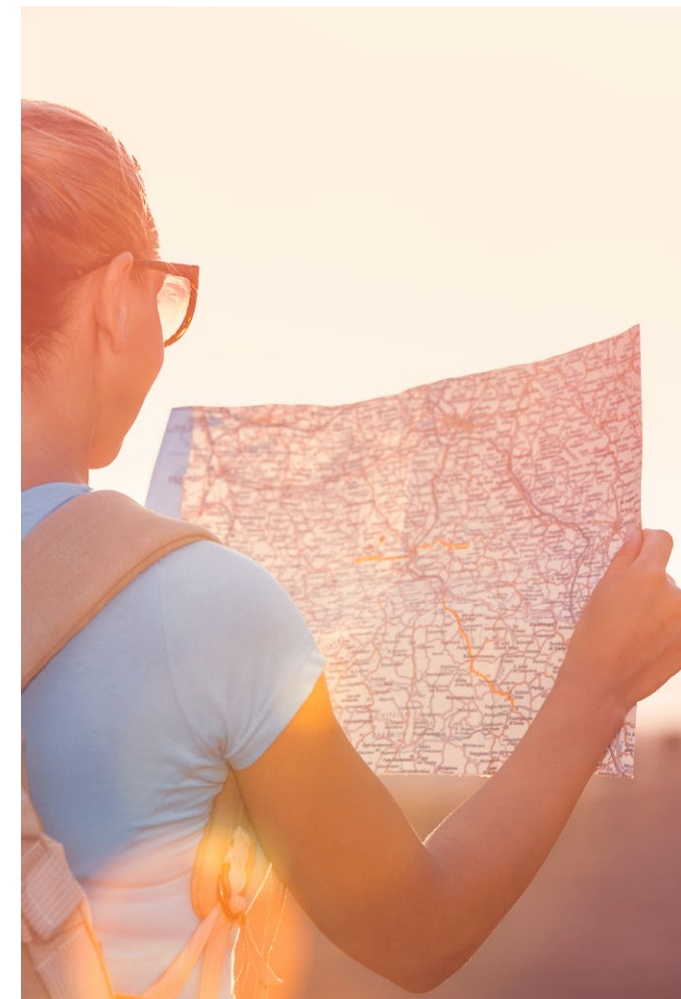
Information management is vital for providing evidence for the strategy. Often, this means employing clever thinking around the data and information you already have available to you. Harnessed properly, big data allows you to quantify the impact of changes to your asset base or the way you operate them, and forecast where and when the benefits to your customers will come if you spend money on those changes. Regulators are always more likely to be swayed by well-articulated, evidence-based business cases. Your company board is more likely to greenlight expenditure.

Coherent strategy, clear direction

Put simply, a coherent strategy gives you clear direction. Without that, you can't focus your expenditure. Delivering the service then costs a lot more than it needs to, so you make less profit than you could for the same income. You waste money.

Without good evidence, it's hard to make informed decisions, so you need regular reviews. But with good evidence, you can put together a strong case for how a given level of expenditure will benefit your strategic aims.

The result? Satisfied customers, sympathetic regulators and happy shareholders. Sweet indeed.



Pillar 4: Coherent strategy

Strategies are coherent when they demonstrate a golden thread from the top to bottom of an organisation across all asset portfolios and categories of expenditure.

Develop an effective long-term strategy that is built around your objectives; founded in tangible evidence; supported by internal and external stakeholders; easily monitored and tracked; and implemented at all levels.

The process of developing a coherent strategy typically starts with SWOT and PESTLE and gap analyses, using standards and benchmarking where applicable. Stakeholder engagement, strategic studies, scenario planning and options appraisal follow, along with visioning, blueprinting and benefits mapping. The strategy is presented with the aid of tools to make a compelling business case.

Key benefits

A coherent strategy:

- Provides a clear mission and purpose for all stakeholders
- Creates a framework for decisions, priorities, outcomes and objectives company-wide
- Prepares organisations for challenging circumstances or changing futures such as regulatory reform, climate change, funding constraints and competition
- Advances sustainability and promotes role satisfaction and increased levels of engagement
- Sharpens differentiation and competitive edge

Methodology

How do we do it? Every strategy and every organisation deserves (and gets) a bespoke approach but typically we help you to:

1. Develop a clear understanding of baseline activity, costs, performance, capability and capacity based on sound evidence
2. Forecast activity, costs and performance for future scenarios
3. Implement a robust, evidence-based optioneering approach
4. Identify opportunities and threats and build a compelling business case
5. Create prioritised implementation plans and monitoring frameworks



Thirsty work

Thames Water in the south east of England provides water and sewerage services for over a quarter of the UK’s population. As with many utilities worldwide, Thames Water faces a considerable present and future challenge to secure water supplies for its customers.

Not only will Greater London’s population grow from 8M to 11M by 2050, but climate change will likely bring drier summers and wetter winters, providing less resource when it’s needed most and greater chance of flooding. If left unchecked, current forecasts predict a potential resource deficit of over 400MI/d in London by 2040, equivalent to the water needed by around 2M people, and 800MI/d by 2100. Thames Water required a long-term strategy, supported by the many interested stakeholders, to manage demand and, where appropriate, develop major new resources to secure supplies for London and the Thames Valley into the future.

We supported Thames Water in developing its water resource management plan for London with a 2100 planning horizon. We engaged collaboratively with stakeholders from the outset through regular technical groups and forums, to identify options, develop the methodology for options assessment and discuss the outcomes of the options screening process. At each stage, we requested and incorporated, or responded to, stakeholder feedback.

Our water resource planning experts investigated a wide range of options to strengthen the long-term resilience of Thames Water’s supplies, including:

- augmenting raw water resources with wastewater reuse
- reservoir development
- raw water transfers from other catchments such as the River Severn
- desalination
- groundwater development

We developed a three stage process to identify specific options for each resource type and to test the feasibility of each one, followed by a fine screening assessment where resource options of all types were compared. In all, more than 150 specific options were assessed. This enabled us to focus in on a ‘constrained list’ of around 40 options. Some of these could individually provide between 50MI/d and 300MI/d of additional water resource.

Integrating new and existing resources and assets efficiently, and at an affordable cost, were key considerations. To help, we developed an ‘elemental’ system to assist with the visualisation of how old and new would interact. This modular approach created elements for:

- treated water or augmented raw water supplies
- raw water conveyance
- raw water system reinforcement
- additional water treatment capacity
- treated water network reinforcement, including reinforcements to the London ring main

For each element we prepared conceptual designs, cost estimates and risk assessments that fed into Thames Water’s programme appraisal to identify the best value programme over the long term. The outcome from the water resources plan is a coherent action plan. It integrates options to manage demand, control leakage, develop new resources and reinforce the system. The strategy is underpinned with robust evidence and has been developed in close consultation with stakeholders throughout.

Pillar 5: Integrated planning

Viewing risk through the customer's lens

Paul Dix, principal asset management advisor, explains how the foreground has shifted during his career.

One of the biggest shifts in risk management over the last generation is from a physical to a customer context. The need to understand how an asset performs and when to replace it remains important, but now it must always be linked with customer impact and risk to service.

What if...

Before, owners used to think: we have all these assets, how do we keep them running as efficiently as possible? Today, they need to think: if our assets fail, what could be the impact on customers, the cost in legal damages, fines for missing guaranteed service standards, reputational loss and regulatory penalties for missed performance targets.

In the water sector, for example, there is no hiding the human impact of pollution, loss of supply or discolouration for something as essential as drinking and washing. Yet, it is no less important across highways or power, health or education. By having a clear view of assets through the customer lens, owners can take informed decisions to either let an asset operate until it fails, or replace it proactively because it will cut customers off, dent the organisation's reputation or even put health at risk.

With the right tools and methodology, asset managers can balance risk, value and customer service with the cost of delivery.



Fingers crossed?

With the right tools and methodology, asset managers can balance risk, value and customer service with the cost of delivery. Importantly, regulators are increasingly demanding a risk-based approach to asset management, in line with good practice and standards like ISO 55000. If owners understand the risk of delivering against a service measure – those metrics that regulators will be monitoring performance against – they will be able understand risk in terms of regulatory performance as well.

Gathering and analysing data is critical for meeting this data hungry shift in emphasis. Traditionally, infrastructure companies haven't placed importance on keeping data up to date and meaningful, or measuring failures so they are not repeated. The industry has come a long way since the 'fingers crossed and hope for the best' days, but there is still more to be done to collect information, model performance expectation in particular stages of lifecycles, and validate assumptions with hard data. The result is a more aligned maintenance programme, as well as accurate long-term investment for capital replacement with greater confidence of 'no surprises'.

Owners can target investment to the most hazardous areas in terms of impact to service and regulatory compliance. And the result of viewing risk through the customer lens? In a word: visibility.

Traditionally, infrastructure companies haven't placed importance on keeping data up to date and meaningful, or measuring failures so they are not repeated.

Pillar 5: Integrated planning

Integrated planning is about gaining robust, justifiable asset management plans that combine lifecycle capital and operational expenditure, and balance risks to outcomes, cost and performance.

The plan is oriented around business objectives instead of being asset-led or siloed, as is all too common.

- Key benefits**
- It's all about seeing the big picture and focusing effort where it will count the most. Our integrated planning service delivers:
- Visibility of risks to objectives giving control over performance and costs
 - Predictability of expenditure and performance over the lifecycle of the assets
 - Significant cost savings compared with reactive planning methods
 - Well-justified and efficient plans that secure funding to address needs
 - Plans that proactively address emerging risks as well as known issues
 - Plans that reduce the likelihood of stakeholder challenge

- Methodology**
- We'll help you to:
1. Determine outcomes, objectives and measures of success (MoS)
 2. Develop and implement risk management principles and build a register of risks, needs and mitigation options to achieve the MoS
 3. Assess historic costs and performance and lessons for the future
 4. Forecast future performance, costs and risks to objectives
 5. Understand trade-offs and balance capital and operational investment
 6. Document succinct, compelling business cases in integrated plans

Ground-breaking research, literally

The earthworks supporting and skirting the British rail network provide a lasting monument to the ingenuity and muscle power that fuelled Victorian ambition. Today, Network Rail has responsibility for nearly 200,000 embankments and cuttings, which can pose a significant geotechnical risk, particularly during periods of extreme weather.

“Failures are a regular occurrence,” explained Chris Power, principal engineering geologist with Mott MacDonald. “The vast majority of these earthworks were constructed over 150 years ago, before the development of modern engineering practice.”

His team has played an instrumental role in developing an integrated set of policies, procedures, standards and tools to allow Network Rail to plan for the maintenance and renewal of their earthworks now, and into the future. “This body of work has stood up to regulatory scrutiny, and it allows the performance of the assets to be measured, relative to the investment made into their condition,” he added.

- To date, the work has included:
- Development and implementation of statistically derived hazard identification algorithms, validated against our detailed engineering knowledge
 - Ground-breaking research and development into global stability assessment and resilience measurement
 - Determination of evidence-based degradation profiles for embankments and cuttings
 - Development of strategic, and tactical decision support tools (including a whole life cost model)
 - Authoring and implementing asset management policies, and key Network Rail standards to support the policies
 - Assurance of bottom-up engineering work banks, to assess their alignment to the overarching policies

Our work has allowed Network Rail to more precisely focus their investment in the earthwork assets to reduce both the likelihood and consequence of earthworks failures, and ultimately derailments.

Project

Earthworks condition assessment and remediation

Location

UK

Client

Network Rail

Expertise

Geotechnical assessment, engineering, standards development and policy guidance



Pillar 6: Targeted delivery

Have courage. Show leadership. Innovate!

Where are the loud voices needed to unleash innovation and curb the infrastructure sector's carbon emissions? Sustainability leader Maria Manidaki believes your time is now.

Transport, water, communications and the waste sectors need to act, and fast, to ensure that carbon reduction targets are not missed. The infrastructure sector requires those that are more advanced to step forward, to lead and enable others in the value chain. There are numerous companies that have produced or have the potential to produce game-changing solutions. But without the requisite culture, systems, muscle and influence they cannot pass 'go'.

Carbon emissions are a proxy measure of resource use and therefore cost. There is an unambiguous commercial case for cutting carbon: it saves money.

Asset owners are best placed to provide the leadership that's so badly needed. They need to support collaboration, listen to ideas from the traditionally marginalised bottom tiers of the supply chain, manage the risks associated with new thinking, and keep demanding better.

We should be building fewer assets and finding clever ways to make the most of existing ones, to save both costs and carbon. Where we can't avoid new build we must do it smarter, with an eye on total life expenditure – 'totex' – not just capex.

A low-carbon solution has three parts: technology and engineering; leadership and behaviours; and then having the right tools to get it done. They need to come together. There's no point quantifying carbon and identifying the hot spots unless you can work out how to reduce them, and then have the culture in place to deliver the result.

Some sectors have started to create systems that place cost and carbon reduction next to each other. That's when progress really happens. Leading companies have shown that pursuing carbon reduction both requires and stimulates innovation. When those innovations are realised, commercialised and implemented, substantial savings follow. Capital cost savings of 40% allied with a 60% carbon reduction? Sounds good, doesn't it? It's been done at a programme scale by one water utility: each firm's gains will be different, but every firm will have some.

With major reductions to chase, and a legal obligation driving them on, clients, contractors, designers, suppliers and users have never had a better reason to innovate. When a leader stands up and has the courage of conviction to put asset management at the heart of carbon reduction, good things follow. Every time.



Pillar 6: Targeted delivery

All aspects of delivery including effective and efficient operations, intelligent maintenance, innovative solutions and resilient customer service need to be aligned with organisational goals through the application of risk-based decision-making.

We can help you align delivery with the objectives and processes used to build your strategy and integrated asset management plans.

Key benefits

It all starts with joining processes for risk management up with delivery so that interventions are correctly targeted.

- Proactive intervention to remove or manage risks delivers better performance at lower cost
- Targeting risks to service protects customers from experiencing service loss and saves money
- Innovation and better ways of working deliver long-term cost savings
- Focus on lifecycle rather than capital costs helps you maximise value for you and your customers
- Understanding risk levels and tolerances in real time delivers better control of cost, identifies emerging risks and supports the case for funding

Methodology

It all starts with making sure risks are visible to decision-makers:

1. Having identified risks, empower your staff and suppliers to reduce them and identify opportunities to do things better than before
2. Pursue whole-life value by focusing on totex to gain efficiencies and deliver shareholder returns
3. Challenge convention and incentivise innovation; specify outcomes you want to achieve, not outputs

Project

Protection of Silver Jubilee Bridge

Location

Runcorn/Widnes, UK

Client

Halton Borough Council

Expertise

Structural assessment and cathodic protection system design

Live long and prosper

Crossing the River Mersey, the Silver Jubilee Bridge is used by 80,000 vehicles a day. Major disruption and cost were threatened when it was found that salt from winter de-icing had permeated the bridge’s concrete deck, triggering severe corrosion of its steel reinforcement. Corrosion had to be halted and fast.

Replacing the entire deck was logistically and economically a non-starter, and requiring 1000m³ of concrete with a carbon footprint of 300t it was environmentally unappealing too.

Instead, we proposed cathodic protection (CP), which involved passing a low voltage electrical current from an inert anode to the reinforcing steel to stop corrosion.

CP was to be installed on the underside of the deck. Traditional methods involve applying either a mesh anode coated in sprayed concrete, or drilling holes into which discrete anodes are installed. But difficult access and the construction of the bridge itself made both unworkable.

We resolved the dilemma with a first-of-its-kind solution. We sat anodes in a foam-filled glass reinforced polymer tray or ‘cassette’. These were bolted to the underside of the deck. Electrical connectivity was provided by surrounding the anodes with gel that sucks moisture from the air: the wet, swollen gel provides contact with the deck and enables current to flow.

After 12 months of operation, physical inspection of the deck supported data from remote monitoring, showing that corrosion had been fully halted.

The system has a 25-year design life but there’s no reason why it should not continue to provide protection indefinitely.



Pillar 7: Continuous improvement

The benefits of hindsight

Benchmarked cost data helps clients make better decisions and put stronger business plans to regulators, says projects director Matt Cunningham.

How did your team gather momentum in this area?

We've been gathering and benchmarking cost data for 10 years. We've gone from developing the first generation of costing tools to powerful databases and modelling dashboards that send granular data back through the client organisation.

Where are you mostly involved?

A key area is helping clients in regulated industries to put together their business plans. They need to identify risks, solutions to mitigate those risks, and the costs of putting those solutions into practice.

How?

We develop costing tools and models to deal with different types of assets, from whole sites to items of mechanical kit. Our clients can use them for price reviews. But beyond that, as part of their ongoing business operations, clients can use our tools and models for decision-making, to improve processes, and for training. Once tools and models have been created, they can be updated and assured – there's no need to build new ones for each regulatory period.

Where does your costing expertise come from?

Whether we're talking the water, rail or power sectors, for example, we have longstanding relationships with major companies, so we know the price differences and can account for them. We invite them to collaborate, sharing a sample of cost data, so we can learn from them, and they can learn from each other. This provides valuable insights on where they can increase efficiency to meet the regulator's benchmarks.

And if clients want more detail?

We can help them see where they sit relative to an average or good performing position and the percentage gap they are away from where they need to be. So they know if they should take money off before putting in their business plans.

So you're like a price comparison site?

Maybe closer to a supermarket that says to its customers: this is money you got back because other supermarkets were charging less. If a client needs to replace a bit of kit, they can use data to decide the best way of doing it at the best price. Before it was based on what they thought things used to cost them, not what it should cost them.

It's all about the data then?

Yes, it comes back to how well you can crunch it. Ideally, we would automate the whole process with barcoded, standardised solutions. Making all that information work more effectively than it does at the moment... that's the challenge we're working on, and where the real opportunity lies.

Something to feel good about

Whether we're talking buildings or infrastructure, the industry is doing broadly the same things it has always done in the same way, yet wishing it could achieve different results. Once conventional efficiencies measures have been exhausted, the only way to outperform business as usual is to do things differently. So we need more innovation enabled by better data and technology. There's a hugely exciting opportunity for those with the courage and foresight to invest in new ways.



Pillar 7: Continuous improvement

Organisations may be driven to improve by their customers, regulators or the markets they operate in.

They may also challenge themselves to improve by comparing themselves with competitors. Whatever the reasons, we specialise in helping organisations to improve... and improve some more. We do it by designing monitoring frameworks, benchmarking costs, optimising processes and training staff.

Key benefits

Organisations that challenge themselves to improve achieve:

- Steadily advancing asset management maturity
- Benefits for customers through improved services and lower charges
- Benefits for shareholders and increased investor confidence
- Competitive advantage
- Increasing influence with their stakeholders and legislators

Methodology

With the right know-how you can continuously improve your asset management by:

1. Gaining a clear monitoring framework with which to measure success
2. Seeking independent challenge of your asset management systems
3. Assuring your processes and independently challenging your plans
4. Adopting lean principles and optimising your processes
5. Mapping competencies to roles and providing training to fill gaps
6. Benchmarking your performance and costs against suitable comparators
7. Driving the R&D agenda and challenging your supply chain to innovate



From back road to fast lane

Project

Institutional capacity building in the transport and roads sector

Location

Kenya

Client

Ministry of Transport, Infrastructure, Housing & Urban Development (with support from the European Union)

Expertise

Technical assistance for development and implementation of management strategy, policy and institutional reforms

With over 160,000km of roads to manage and maintain, Kenya’s roads authorities needed guidance to prioritise investment, standardise methods, achieve consistency and drive efficiency. We guided and supported our client to develop and implement a road infrastructure asset management system, and produced an options paper for setting up a core road management system complete with recommendations, budgets and time scales for implementation. This included a network database and systems for pavement management, routine maintenance management and business management. We also developed and delivered:

- A draft level of service system linked to the road hierarchy
- A programme and documentation for delivering asset management using performance-based contracts and public private partnerships (PPP)
- Metrics to assess the roads authorities’ readiness and capability in asset management and PPP
- Training in asset management including risk management

Work is ongoing, but the future for Kenya’s roads sector is more certain now the foundations of an effective and efficient approach to road asset management and maintenance have been established.

Opening opportunities with connected thinking.

For more information search 'Mott MacDonald, asset management'
mottmac.com