

## Beacon Project

# Watercare - partnering for carbon reduction

<b>Project type</b>	Infrastructure construction
<b>Commercial model</b>	Design and construction partner model
<b>Geography</b>	Metro
<b>Value</b>	\$2.4 billion

**Context:** As New Zealand’s largest water and wastewater asset owner, Watercare faces an asset investment programme totalling NZ\$5.9 billion over 10 years to ensure safe and sustainable services continue to be supplied to the growing 1.7 million Auckland population.

**Problem:** In a constrained infrastructure construction supply market that was already delivering significant projects in Auckland, Watercare decided they needed to do something different to achieve their bold new vision for building better infrastructure.

They took a hard look at the issues facing the infrastructure and construction industry in terms of sustainability, risk allocation, profitability, training and investment. They realised that, as asset owners, they had to be the instigators of change. A short-term, project-by-project focus with providers kept at arm’s length had exacerbated these issues. With a clearly defined and funded Asset Management Programme over the next 10 years, Watercare could take a longer-term programme (not project) view to get better outcomes, while also addressing many of the aims of the Construction Sector Accord around productivity, capability and resilience.

### The vision

The recognition of the opportunity to achieve wider value from infrastructure delivery led to the creation of a new vision for Watercare’s infrastructure team termed “40:20:20 Build Better Infrastructure”. The vision outlines three complementary and equally important measures of value:

40% reduction in carbon emissions from construction by 2024

20% reduction in cost of construction by 2024

20% year-on-year improvement in health, safety and wellbeing

### The solution

Combining sustainability, cost and safety together in a vision provides an opportunity for innovation and collaboration. It is recognised that these three areas are important individually, but the real value is unlocked when they are looked at together and over a programme of work where significantly better infrastructure outcomes can be delivered. The scale of this investment,

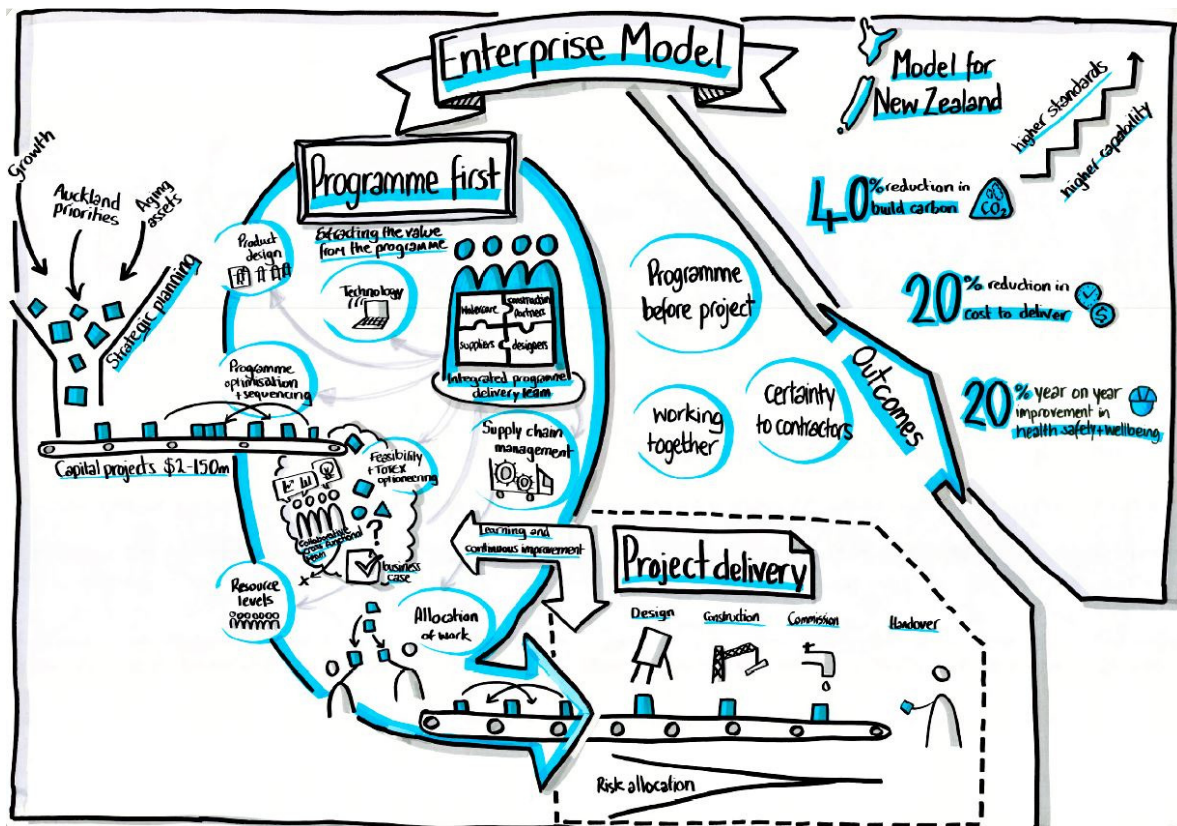
as well as industry influence, has the potential to create market shifts within the infrastructure industry and their supply chains.

## The Enterprise Model

In addition to the above targets, it was recognised that a step change in behaviour would be required to deliver the vision – not only within Watercare, but also within the supply chain.

The Enterprise model was developed to enable the 40:20:20 vision and transform the delivery approach of construction projects between NZ\$2m and NZ\$150m, covering NZ\$2.4billion in projects. Watercare have taken best practice from international models such as Project 13 (ICE, 2018), and adapted these to suit the New Zealand environment. The result is the Watercare Enterprise Model.

### Watercare Enterprise Model structure



The Enterprise Model is made up of two core components:

- 1. Programme First** – a business unit that integrates Watercare, two selected Construction Partners and a representative of the Design Consultants partners, working collaboratively as one in-house team. The core deliverable is to extract maximum value from the fully funded 10 year infrastructure programme and deliver the 40:20:20 vision. Creating long term relationships with these delivery partners is key to achieving the long-term goals.
- 2. Programme Delivery** – integrated development of the infrastructure cycle from business cases, designs and construction delivery by the Programme First team. The core component being a focus on programme-wide gains as well as a continual improvement mechanism to create efficiencies within individual projects.

## Action on carbon reduction

Greenhouse gas emissions (carbon emissions) can be a good proxy for resource efficiency. Evidence suggests that a focus on reducing carbon emissions in infrastructure delivery also promotes collaboration across the supply chain, unlocks innovation, and reduces costs.

Watercare work with their supply chain partners to learn from asset management practices in other jurisdictions and implement a structure similar to the Infrastructure Carbon Review (ICR) (Mott MacDonald (Enzer, M., Manidaki M.), 2013) and PAS 2080 (British Standards Institution, 2016) (Green Construction Board, 2016) in order to improve infrastructure value through reduction of whole life carbon and cost across their capital programmes.

### Carbon baseline

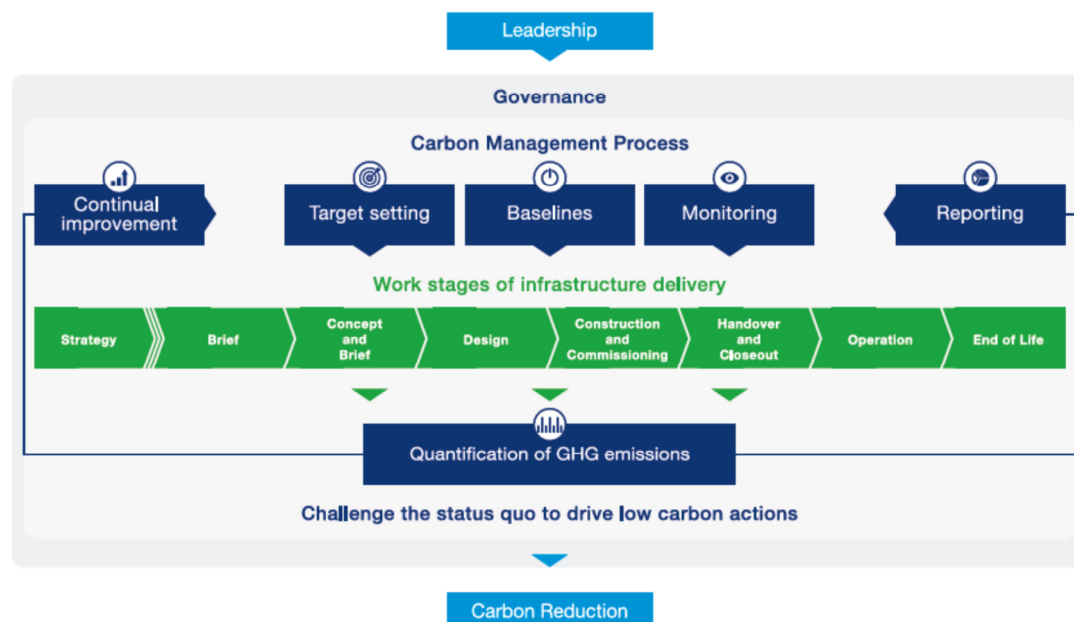
Knowledge of the current carbon impacts of a capital infrastructure programme is required if significant savings are to be unlocked. A detailed understanding of project by project carbon impacts is a start, but Watercare recognised the need for a full baseline of the potential impacts of the pipeline of projects over the next 10 years, in particular highlighting where the real carbon hot spots were. This information has never been available at a programme-wide level to Watercare.

### Carbon management methodology

Globally, multiple asset owners have adopted carbon management methodologies based on the ICR and PAS 2080 to help them deliver low-carbon and low-cost water and wastewater assets, whilst meeting project and programme outcomes. This is achieved through:

- a) Integrating a carbon management process into an infrastructure owner’s asset management system, including robust leadership and governance at all levels of the organisation

### Carbon management process



Source: PAS 2080: Carbon Management in Infrastructure (British Standards Institution, 2016)

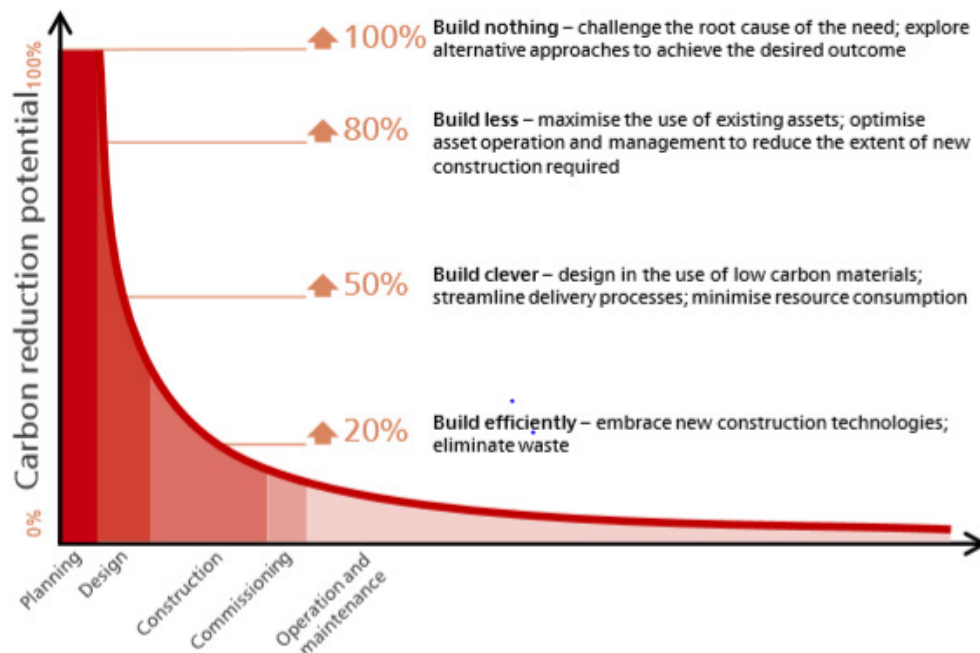
- b) Setting reduction targets, developing a carbon baseline and quantifying carbon using tools to identify hotspots for potential savings.

- c) Applying the ICR Carbon reduction hierarchy (see diagram over page) throughout all project delivery stages. For example, “build nothing” has the greatest opportunity to reduce carbon and costs during the earlier delivery stages
- d) Involving the supply chain at the right stages of the delivery process, to maximise carbon and cost reductions by enabling existing approaches and technical solutions to be challenged and creating a culture of innovation
- e) Monitoring performance, throughout the project life, against the baselines and targets set, to provide feedback and enable continual improvement.

**Integration of carbon into the procurement model**

To achieve carbon savings, the carbon reduction hierarchy (below) is now being applied to the programme. In the first instance, the root cause of the requirement for the infrastructure is challenged – ie can we build nothing? Further carbon savings can however be leveraged through a holistic engagement of the supply chain. Creating a focus on carbon through the procurement model provides opportunity for unlocking low carbon opportunities and new solutions which will benefit Watercare and the wider industry.

**Carbon Reduction Hierarchy**



Source: Mott MacDonald (adapted from the ICR (Mott MacDonald (Enzer, M., Manidaki M.), 2013)

Supply chain partnerships are critical in unlocking low carbon success, and asset owners can drive innovation by providing clarity and rewarding successes. Analysis has identified a number of carbon hotspots, elements that are common across horizontal and vertical infrastructure projects. They include:

1. Concrete
2. Concrete lined steel pipe
3. Fuel consumption in construction and excavation
4. Aggregates

## Methods of monitoring and continual improvement

Establishing a methodology for continual improvement and monitoring was required to capture and share learnings in this emergent field. A key component is having a strong link with the construction partners on projects. Within the Enterprise Model, the two primary delivery partners are embedded within the early planning of projects which provides initial insights into constructability, as well as a direct feedback loop for initiatives that have been successful, or not, on the construction site.

A focus on both 'designed' as well as 'delivered' carbon savings initiates strong monitoring requirements and tracking of project progress against projected carbon is key. For example, feedback from construction partners can provide insights from the construction phase to identify where savings were or could have been made based on measured value. This can both enable transfer of knowledge to improve best practice and refine project baseline developments.

Watercare is at the beginning of its low carbon infrastructure journey and has strongly embraced the 40:20:20 vision as a way to get better value from infrastructure delivery. Key aspects of the PAS 2080 framework have been vital to the establishment phase, providing a solid base to achieve low carbon solutions in the future.

Achieving a reduction in the environmental impact of their asset enhancement and maintenance programme required Watercare to develop a strong vision for their business with a clear link to outcomes and incentives for their partners to support the change.

## Construction Sector Accord

This project aligns with the Construction Sector Accord vision "A high performing construction sector for a better New Zealand", and has been selected as a Beacon Project to share good practice and lessons learned across the construction sector.

### Accord outcomes:

- Sustainable buildings and infrastructure created with minimal environmental impact
- Better whole-of-life value for taxpayers
- A collaborative industry

Achieving these ambitious goals requires Watercare to provide certainty to their partner organisations to allow them to invest in innovative practices and technology. That certainty, as well as the team culture created by the Enterprise Model, has allowed lessons to be shared and built on from project to project.

This demonstrates a clear link to the following Accord outcomes:

- Fair risk allocation
- Consistent, reliable and timely project delivery for partners
- Greater pipeline certainty and confidence to invest for the future
- Capacity and flexibility to meet customer needs.

Visit [www.constructionaccord.nz](http://www.constructionaccord.nz) for more information on the Construction Sector Accord and Beacon Projects.