MOTT MACDONALD

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Your Reference
Mott MacDonald
Consultation Response

Infrastructure for a Better Future Consultation Response

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1 Introduction

The New Zealand Infrastructure Commission Te Waihanga has a critical task in co-ordinating the approach to infrastructure within New Zealand and we support the strategic intent of the document. The importance of infrastructure for a thriving New Zealand is a key focus and we support the recognition of the role of infrastructure across all sectors contributing to this.

A key recent focus for Mott MacDonald has been our work with Centre for Digital Built Britain (CDBB) on Flourishing Systems and the reimagining of infrastructure with the human flourishing at its centres. A central part of this work has been in digital innovation and Information Management (IM). While we see infrastructure across the board being essential, we have focused our response here to deal with these two areas as they apply to the increasingly complex challenges of 21st Century infrastructure.

2 Consultation Response

Q2. What are your views on the decision-making principles we've chosen? Are there others that should be included?

While '*Efficient*' references the quadruple bottom line the term does not always reflect other useful measures of value. An outcome focused on wider benefits (for example sustainability, resilience, or regeneration) may support a more value-led approach and care should be had that this does not resort to simple Cost Benefit balancing with an economic bias.

The principles of transparency and evidence-based decision-making support this outcome. To build on these principles and ensure a value-led approach, a Value Index could be developed to measure benefits and compare outcomes between options in a consistent, structured method. The Value Toolkit developed by the Construction Innovation Hub is a useful resource in defining and measuring wider benefits and could be adapted for New Zealand outcomes. This could be used to build from and fully integrate with the NZ Treasury living standards framework to ensure that a holistic view of benefits is delivered by the principles.

Q10. What steps could be taken to improve the collection and availability of data on existing infrastructure assets and improve data transparency in the infrastructure sector?

The use of open data in infrastructure can be broadly split into for two purposes:

1. **User engagement and consultation** - Providing consumers and companies with access to data to enable innovative solutions and increase

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public engagement with the built environment. This data is often provided in real-time through data transfer protocols e.g. APIs (application programming interface). Transport for London is an example of a successful open data policy implementation.

2. **Infrastructure delivery –** Provision of accurate asset information to support planning, delivery, and operations. A primary source of accurate data provides benefits to asset delivery, for example reducing multiple surveys of the same location, reducing risks and variations from unknown utilities. There are multiple approaches to how this data can be captured, stored and managed, for example through local government (Wellington City Council digital twin) or a centralised Data Trust. The advantages and disadvantages of different models needs to be considered at the outset to inform the best outcome in the long term.
    a. The use of a data trust should be further investigated, considering data purpose, quality standards, stewardship, security, liability. The Open Data Institute resources could be used to support this investigation - Data trusts: lessons from three pilots (report) – The ODI

The following recommendations are related to open data to improve infrastructure delivery:

- To realise the benefits of transparent data sharing it is essential that a common language is embedded to enable data interoperability. This may include standards for spatial (GIS) and non-spatial data, including ontological models and metadata standards.
- Digital deliverables should be non-proprietary to ensure solutions are not captured by the largest supply chain members as this may limit participation and uptake.
- Where standards are being developed, for example the Asset Management Data Standard (AMDS), it is recommended to build on existing international standards, leveraging the effort that has been put into developing and refining best practice. While standards may need to be adapted for the specificities of NZ infrastructure, the underlying concepts and principles should hold true at a general level.
- To ensure accurate as-built data is captured, clearly defined data handover requirements should be required as part of contractual requirements. Improving the completion of as-builts using information Management processes (e.g. ISO 19650) will improve quality and confidence in asset information.
- Data needs to be continually maintained and it is recommended that an investigation into different approaches to secure hosting of asset information is completed.

The strategy includes a recommendation to develop a nation-wide digital twin. The potential benefits of a national digital twin are broad, with different outcomes requiring different approaches to development. It is recommended that the purpose and objectives of a national digital twin and overall approach are defined prior to significant investment. This definition phase will help ensure that the outcome delivers on the desired goals.

Other potential considerations also include:

- Who would lead the development of a nation-wide twin? The market, central or local government?
- Would that platform be centralised or a federated ecosystem?
- How do we ensure twins are interoperable between asset owners to unlock wider benefits?
- How do we embed cyber resilience as a design principle?

The objectives and approach would inform the immediate next steps and capabilities required for delivery in a co-ordinated and focused manner. For example, if a federated ecosystem approach was taken the development of an information management framework would be a key activity. If instead the approach is to develop a central digital twin the key tasks may be identifying data sources and defining functional requirements.

The above is also relevant to recommendation 11 in the paper '*Preparing for technological change in the Infrastructure Sector*.'

Q12. How can we achieve greater adoption of building information modelling (BIM) by the building industry?

There are pockets of good practice and guidance across New Zealand (e.g. the NZ BIM handbook, Kiwirail Digital Engineering Framework), however there does not appear to be a central guiding strategy driving the adoption of BIM. It is recommended that the development of a National Digital Strategy would help galvanise these initiatives and create a clear narrative to drive behaviour change.

A governance group of asset owners should be established to drive the strategy and provide a forum to share lessons learnt between stakeholders. The Infrastructure Commission are well placed to take a leading role in the development of this strategy and of the governance arrangements that will inform it. This strategy could be applied to significant projects in a similar way as current support by the Commission to Major projects.

The digital strategy contents could include:

- A vision, objectives, and principles
- Benefits for different roles e.g. 'what does it mean for me?'
- Defined approach to drive BIM adoption e.g. government mandate, pilot projects or industry working groups.
    - We note that a government mandate approach could be considered to help drive adoption. A recent report on the value of Information Management stated that for 7 of the 11 case studies reviewed, the UK mandate was one of the main drivers for adoption digital engineering, with all case studies seeing benefits from adoption.
- Example use cases and best practice case studies
- A roadmap and implementation plan with key activities and deliverables
- Capabilities required and identification of key gaps

Uplifting capability

Upskilling across the industry, with clear commitment from asset owners, is a key step in adoption. Developing guidance and documentation while providing support and training is a clear first step in improving capability. The use of pilot projects to roll-out Digital Engineering requirements, processes and standards would also help build momentum. The provision of a dedicated training budget across the supply chain has been proven to support upskilling and dissemination of lessons learn. The recent experiences of Crossrail in this regard are informative. See Crossrail Project: Application of BIM (Building Information Modelling) and Lessons Learned - Crossrail Learning Legacy.

Baselining the current capability of NZ asset owners and the supply chain can help identify knowledge gaps in both BIM and Digital Engineering. There are freely available tools for example the Smart Infrastructure Index developed by Mott Macdonald which can be used to baseline and benchmark against other client organisations.

This recommendation also aligns with recommendation 8 in the paper '*Preparing for technological change in the Infrastructure Sector*.'

Q32. Are there benefits in centralising central government asset management functions? If so, which areas and organisations should this apply to?

A centralised asset management Centre of Excellence (CoE) to support local government in building capability could help improve asset management across

New Zealand. A CoE may help drive the development of policy and standards (ISO 55000) and embed a common language (e.g. AMDS) and/or processes (e.g. standardised asset condition reporting) across asset owners. Training and guidance provided to local councils would be important to ensure data standards and processes are adopted and the benefits are realised.

A centralised Asset Management System may be considered to support local or central asset management functions. It is recommended that the process outlined in ISO 50001 (Management system – requirements) is considered when establishing and implementing any asset management system. The potential benefits and risks of a centralised system is outlined below:

Benefits	Risks
- Support the capture of common asset information across an asset base. - Central source of information will improve the ability to interrogate and report on data.	- Vendor lock-in as asset management systems are costly to license and challenging to migrate between. A central asset management system may result in reduced market competition, increase IT costs and challenges implementing new functionality. - New technology will not address any underlying processes or data quality issues. Prior to any technology procurement there should be clearly defined asset data standards and processes to inform the technology requirements and procurement process.

Q35. What could be done to improve the productivity of the construction sector and reduce the cost of delivering infrastructure?

Information Management (IM) is a term that brings together concepts such as BIM, digital engineering, digital twins and other initiatives into a cohesive whole. It has been proven to increase productivity across the design and delivery of infrastructure. IM is a critical enabler of improvements within the infrastructure sector and should be a viewed in a way that combines all these elements cohesively, rather than as separate initiatives.

In terms of quantification the latest Centre for Digital Built Britain report - The Value of Information Management in the Construction and Infrastructure Sector includes case studies to support these claims. For example, '*for the Environment Agency, their use of IM is expected to secure £6.00 of labour productivity gains for every £1 they have invested in IM*.'

Please don't hesitate to contact the undersigned with any queries on the above.

Kind regards,

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