

# WHY WE NEED NATIONAL METADATA STANDARDS AND CONSISTENT OPERATIONAL PERFORMANCE MEASURES

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## ABSTRACT

For the last 5 years central government has been asking local government to improve our ability to undertake the water activities that serve our communities in a more efficient and effective manner. Central to this request is the lack of ability for central government to collate appropriate performance measures and aggregate these into a national framework. This is due to nearly all Councils operating their systems in ways that may best suit their individual needs but are not standardised with any agreed metadata standards, nor any agreed financial and technical performance metrics.

As a consequence of the vacuum of knowledge, central government is assuming a degree of poor performance due to the lack of information to the contrary.

This paper firstly gives an brief update on where the metadata project has got to, secondly where the opportunities might be for the next steps, but thirdly and most importantly, it again presents the case for the need for all New Zealand Councils to proactively get on board with a national approach to a standardised set of performance measures which central government and local government can use going forward.

## KEYWORDS

**Update on Metadata Standards project and the need for standardised performance measures.**

## 1 INTRODUCTION

The National Infrastructure Unit has identified nine long term and systematic challenges to be addressed for infrastructure across New Zealand.

These are:

Summary Of The Nine Long-Term And Systematic Challenges To Be Addressed		
<b>Vision:</b> Lack of a detailed vision of the future of infrastructure to underpin decision making. Changing patterns of demand and impact of technology. Community engagement to set expectations and levels of service.	<b>Economy:</b> Increase understanding of the factors that impact economic growth. Align individual investment decisions with economic goals. Robust investment analysis.	<b>Regional integration and collaboration:</b> Long term planning and provision of infrastructure within and across regions. Integration of land use planning and infrastructure investment esp. transport. Understanding urban form impacts on sustainable economic productivity and social outcomes.

## Summary Of The Nine Long-Term And Systematic Challenges To Be Addressed

<p><b>Data and asset management:</b></p> <p>Limited asset data and lack of data standards</p> <p>No link to decision-making</p> <p>Poor integration between asset management &amp; financial management processes,</p> <p>Weak institutional incentives to manage assets well and poor asset management capabilities.</p>	<p><b>Resilience:</b></p> <p>Understanding of criticality and key pinchpoints/bottlenecks.</p> <p>Shift to interdependencies, levels of service and community preparedness</p> <p>Longer-term view, increased focus on adapting to slower changes over time e.g. climate change.</p>	<p><b>Governance and tools:</b></p> <p>Strong processes and transparency to ensure right investments made.</p> <p>Management and ownership structures</p> <p>Improved tools for decision makers to engage with communities to better understand how to derive benefits from networks and prioritise investment across sectors.</p>
<p><b>Demand Management:</b></p> <p>Managing demand for infrastructure assets in order to best match current and future infrastructure to service requirements and ensure service delivery in the best value-for-money way.</p>	<p><b>Regulations/standards:</b></p> <p>Costs associated from regulatory standards.</p> <p>Tradeoffs clear and well understood.</p> <p>Clarity of roles and responsibilities.</p> <p>Future proofing.</p> <p>Inconsistencies across planning legislation.</p> <p>Balance between one size fits all and flexibility.</p>	<p><b>Funding and procurement:</b></p> <p>A narrow range of funding tools are used, largely reliant on general taxation and rates.</p> <p>Transparent and consolidated pipeline.</p> <p>Lack of collaboration across providers and scale.</p> <p>Late market engagement and lack of procurement coordination.</p>

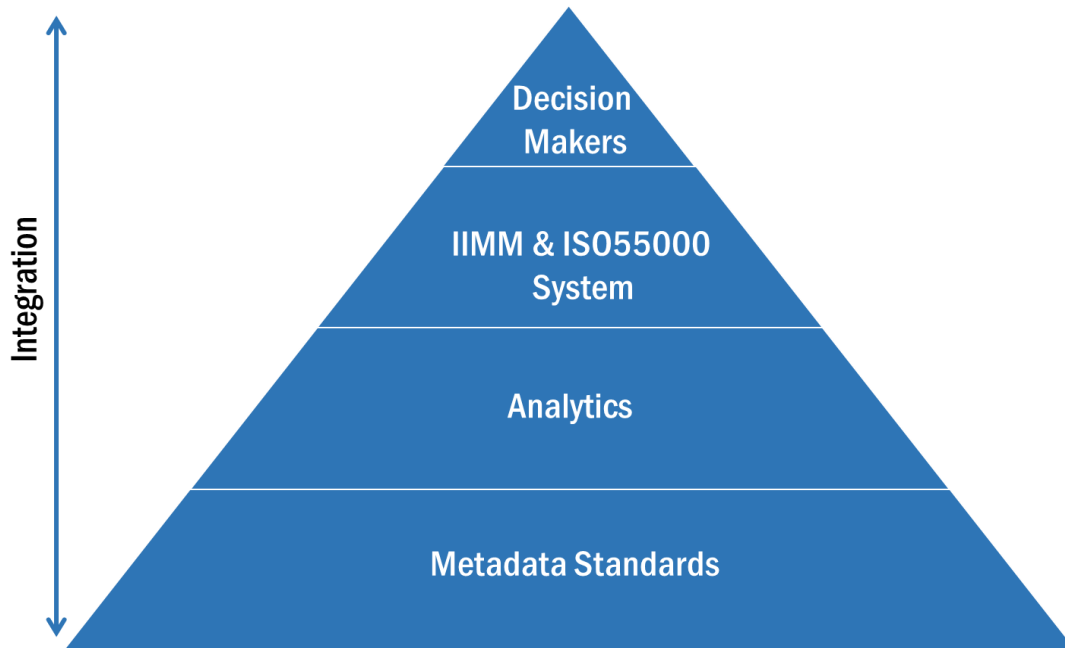
They group these into three key themes being:

1. Increasing understanding of levels of service and future drivers of demand.
2. Strengthening asset management practices and consistent data standards.
3. Optimising decision making.

Therefore there is an urgent need for a New Zealand wide campaign to push to address all of the above challenges with the water sector but in particular the need for a national set of metadata standards.

There also may be some truth to the anecdotal stories which suggest that *“If it is not done by us it will be done to us”*.

Figure 1 illustrates how the 9 challenges above can be integrated. The development of the metadata standards project needs to be linked to a wider campaign to use more mature asset management systems to create better decisions.



*Figure 1*

In addition the water industry also needs to connect the higher level performance measures at corporate local government level to the detailed engineering ‘As Constructed’ schema language. Without the combined campaign of all levels of the industry getting behind the national challenges then momentum will be difficult to maintain and the purported benefits will not be seen to be worth the effort.

In particular we need to have all councils agree on a way forward and not see individual councils still doing things their own way, or ‘customising’ the national approach to suit their own needs.

## **2 UPDATE ON THE MBIE AND LINZ METADATA PROJECT**

### **2.1 BACKGROUND**

Central Government is also funding the metadata project for the Water and Building industries. Land Information New Zealand is the government agency managing this work with Hadyn Read as their project leader. Opus Consultants and Morrison Low Consultants have the primary contract to assist in the development of these standards.

Industry representative groups from both the water and building industries have formed two technical advisory groups which have been instrumental in providing input and guidance as to what these metadata standards should consist of. These groups will be important advocates for the subsequent role out and take up of the use of these standards.

A separate metadata project for the Transport sector has been underway led by Austroads, using Opus Consultants to assist in developing the data systems.

### **2.2 THE STRUCTURE OF THE METADATA STANDARDS**

The metadata standards will firstly provide data consistency. They will enable data to be shared, aggregated and analysed in more detail than is currently possible.

Figure 2 shows the global metadata schemata and how the standards sit in context with the wider asset management framework. Each layer has a role in the development of an integrated, learning asset management environment as described below. Volumes 1 & 2 are being drafted under the Metadata project and are available at [www.linz.govt.nz/draft-standards](http://www.linz.govt.nz/draft-standards)

### ***As-constructed/As-built Asset Metadata Standard (Volume 1)***

This standard describes the data to be captured on the creation of a new asset, at an assetID (component) level. The data at this level has three attributes that define the characteristics of the asset:

- Physical (for example, material or diameter).
- Metadata (for example, date of construction or builder).
- Asset management (for example, condition of the asset). These are summary attributes the full schemas for each attribute are defined within the Asset Management Metadata Standard (Volume 2).

### ***Asset Management Metadata Standard (Volume 2)***

This standard describes the decision elements required for making evidenced-based investment decisions.

The elements are defined as:

- Condition: the physical state of the asset, which may or may not affect its ability to deliver the service designed to perform.
- Repairs: maintenance and operations: activities undertaken to ensure the asset continues to deliver its intended design performance.
- Utilisation: the proportion of an asset's available capacity being used
- Demand: the call on an asset's capacity at any given time
- Criticality: the significance of the removal of any individual component or asset on the ability of any part of a network or portfolio to deliver the service it was designed to perform
- Risk: the potential to gain or lose something of value, that is, the probability or threat of quantifiable damage, injury, liability, loss, or any other negative occurrence caused by external or internal vulnerabilities, and that may be avoided through pre-emptive action
- Resilience: the potential disruption of an asset to deliver the service as intended in the design
- Vulnerability
- Design performance: an asset's ability to deliver the service within the functional limits as intended in the design
- Financial performance: an asset's ability to deliver the service within the financial limits as intended in the design
- Service performance: an asset's ability to deliver the service within the levels of service limits as intended in the design.

Each element is required to inform investment decisions in public sector assets – whether for operational investment (for example, prioritising a work programme for condition assessments) or a capital investment programme for renewals (for example, the replacement of water main pipes).

### ***Intervention Methodologies (Volume 3)***

This volume will describe intervention methodologies to determine the current state and performance of assets. For example Volume 3 will describe methodologies for determining the condition of pipelines.

### ***Evidenced-based Investment Decision-making Analytics (Volume 4)***

This volume will include analytical methods to predict the condition and performance of assets, to determine when and where to undertake the interventions described in Volume 3 and to assess the implications of adopting alternative investment strategies with regard to cost, risk and level of service.

## Alignment of Framework Themes with Metadata Standard Schema

Figure 3 shows how the framework themes for the Pipeline Renewals Guidelines align with the Metadata Standards schema.

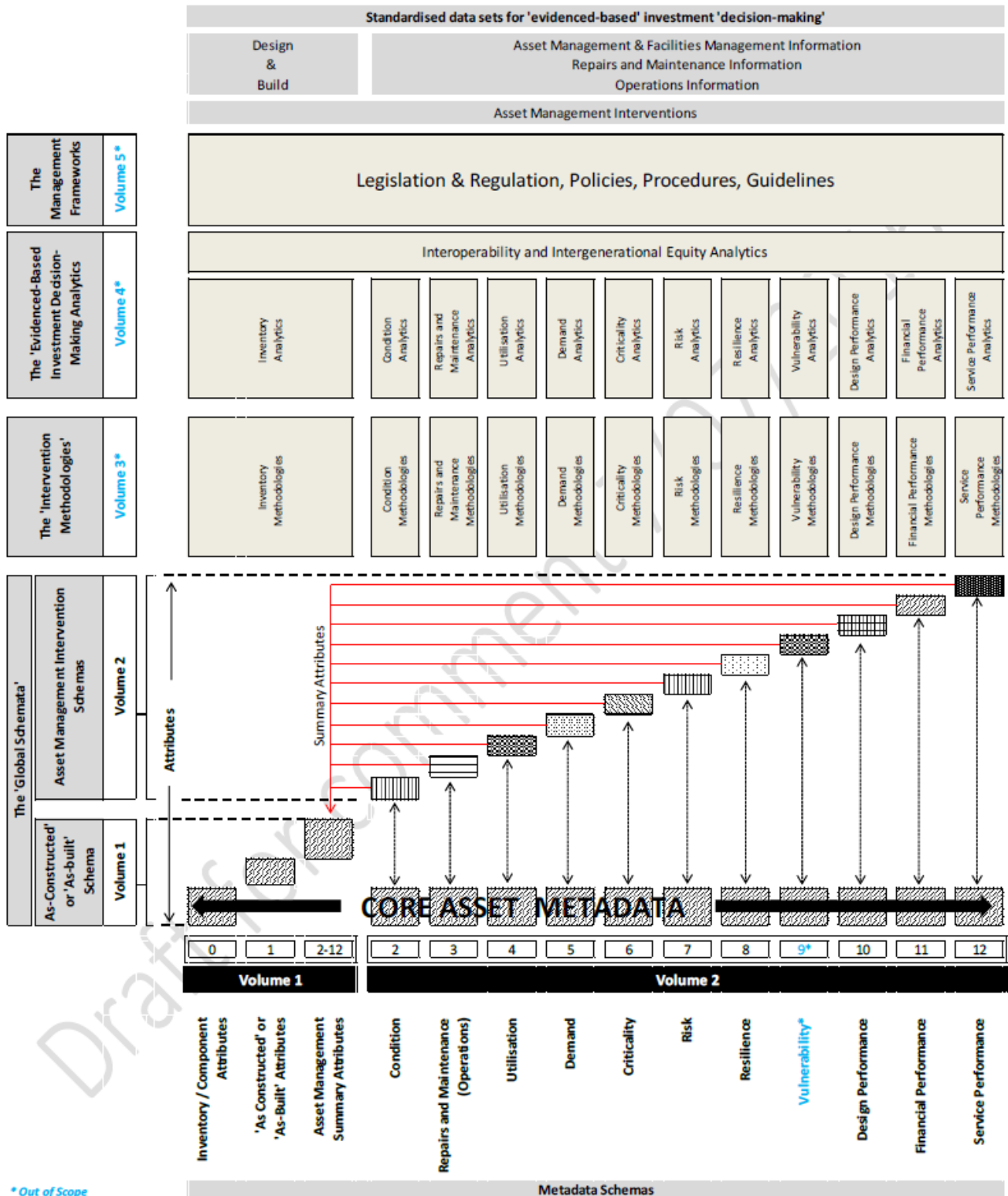
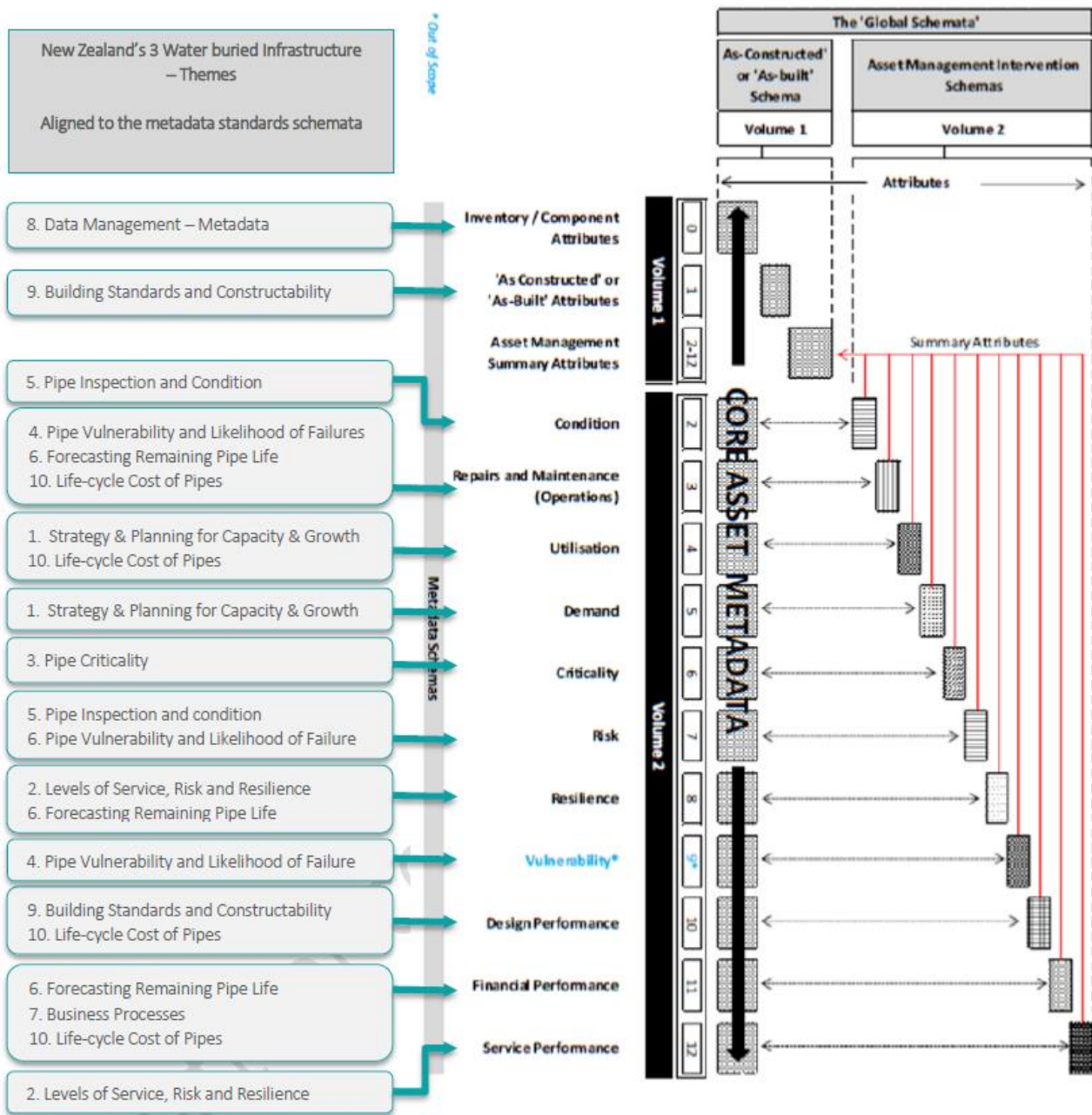


Figure 2. Global Asset Metadata Schemata



**Figure 3.** Alignment of Framework Themes with Metadata Standard Schema

### 2.3 PROGRAMMES OF DELIVERY

At time of writing, Volumes 1 and 2 are out for consultation and submissions.

The intention is for these Volumes to be revised and finalised by the end of August 2016.

The follow-on work as to the preparation of future Volumes and the take up of usage of the first set of Schemas then needs to be from local government and water industries.



### 3 OPPORTUNITIES FOR THE NEXT STEPS

There are numerous examples of excellent water asset management systems around New Zealand. The Auditor-General reports summarise and identify examples of good asset management systems being used within many Local Authorities.

These include Wellington Water and Watercare, large CCO water businesses that continue to develop robust asset management systems. As the potential for more water CCOs becomes reality, each of these will also develop mature asset management systems and excellent data sets from which to base their analysis on.

The vertical integration of Metadata standards with good asset management systems provides an opportunity to capture these systems as part of the full volumes within the metadata project.

Opportunity also exists in that good quality and quantity of data, with new analytics allows more ‘what if’ scenario questioning of dataset to gain more in-depth knowledge of future planning. This approach allows the asset owner to model various future outcomes and remain flexible as these change.

There is however a danger that individual asset owners will have developed their own data standards or customise the metadata standards to their own needs. The opportunity to aggregate this data, and develop consistent analytics producing transparency as to relative performance would then be lost.

Industry involvement is therefore crucial to maximising the benefits being assumed in the preparation of the metadata standards business cases.

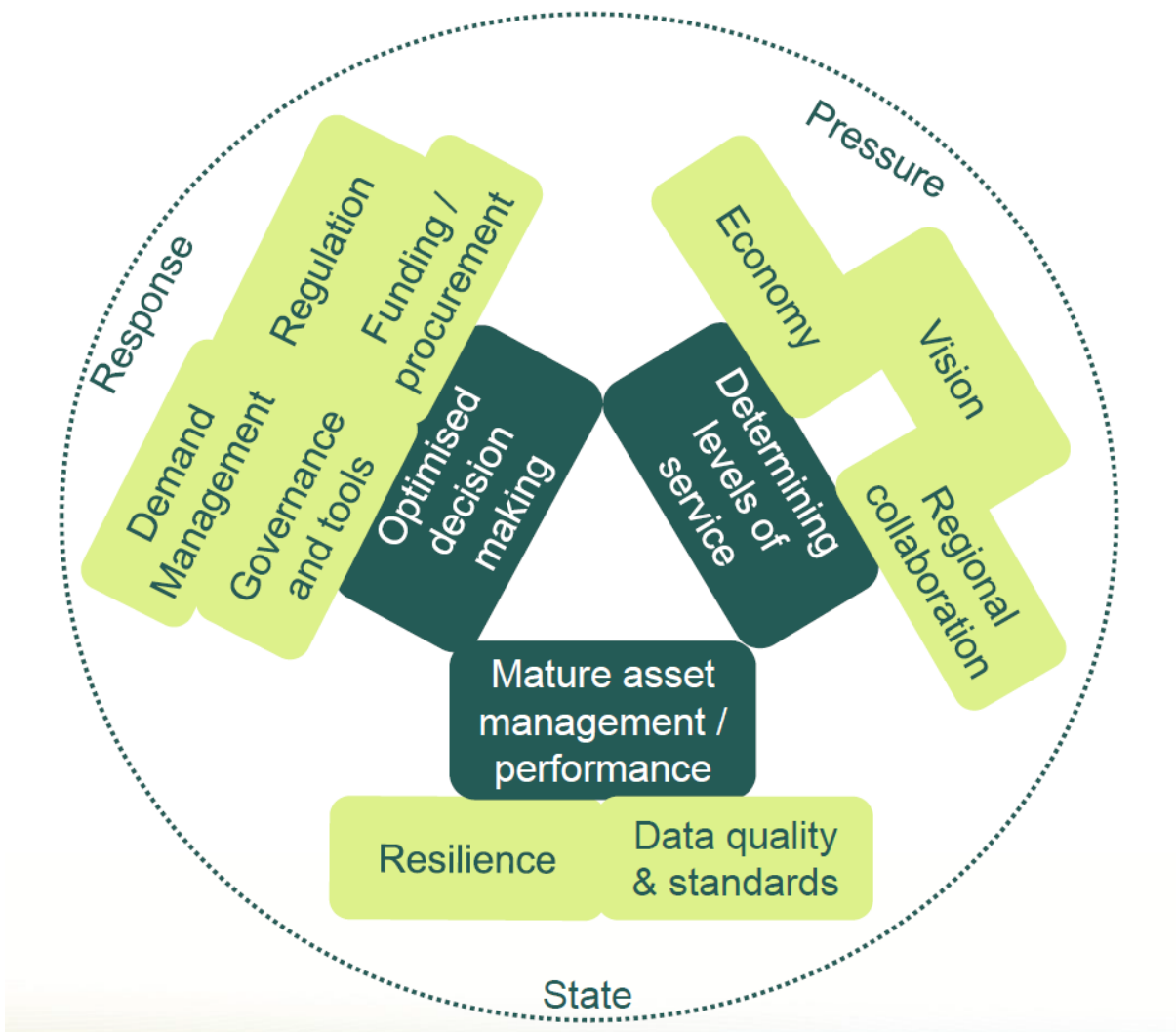


Figure 4

## 4 WHY WE NEED A NATIONAL APPROACH

As we know the water, wastewater and stormwater networks play a major role in sustainable functioning of our communities. The total replacement value in 2014 was estimated at NZD\$45.2B.

The Auditor General's view (OAG 2014) as stated includes the following.

*“The evidence base for good decision making and learning is not consistently available. However it needs to be. Local Authorities need to build their capability to use their information and systems to get the best performance from their asset networks. They need to understand how assets perform throughout their lives to know the points at which and whether to maintain, renew, or replace individual asset parts”.*

Many asset owners would correctly argue that they already do this.

Many can rightly point towards their optimal use of limited funding streams, also managing their already mature assets to an agreed level of service which is sustainably affordable by their local communities.

However, as the Auditor General points out, some water asset owners are not able to provide the evidence for how they do this.

But the far more important issue is one which results from there being no ability to provide evidence of this good (or not so good) asset management maturing at a national aggregated level.

In the vacuum created by this lack of evidence, Central Government is assuming a generally poor level of performance, even when LGNZ Water sector report goes part way to providing evidence that there is generally a good level of water asset management practice taking place.

For there to be more confidence, and to ensure that there is no vacuum of evidence, the national metadata standards, and the full set of volumes (1 through to 4), need to be understood and used by all New Zealand Local Authorities.

This also sits well with the recently launched LGNZ Local Government Excellence Programme. This programme set out to communicate to a wider set of stakeholders the relative performance of each Council and by doing so proactively address the perception of poor performance from ratepayers and businesses.

An opportunity exists for SOLGM, IPWEA and LGNZ to establish the linkages and buy-in of the metadata standards with the higher level decision making and higher level performance measures as illustrated in the diagram in Figure 1.

The question is will this happen voluntarily or will this need to be mandated by some form of regulation?

IPWEA and SOLGM working with WNZ will need to work closely together to ensure the benefits are understood, and the importance of NZ wide level thinking is created.

In essence this paper is but one small step towards supporting these outcomes.