Integrating Natural Asset Management into Council Asset Management Systems Investigation Report

Council Roadside Reserves Project

Prepared for

Local Government NSW

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Cardno

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Executive Summary

The Council Roadside Reserves (CRR) project is a three-year project funded by the NSW Environmental Trust and managed by Local Government NSW. The CRR project aims to build the capacity of councils to embed the value of roadside reserves into the Integrated Planning and Reporting (IP&R) systems of councils. The natural assets project is one part of the wider CRR project. The natural assets project is partitioned into three stages:

1. Literature review and detailed investigations;
2. Development of practical advice for integrating natural assets into councils' asset management systems; and
3. Dissemination of Stage 2 outcomes State-wide.

Stage 1 of the natural assets project (this stage) investigated current activities undertaken by councils in managing natural assets in the broader asset management context. This included two main tasks:

1. Literature review; and
2. Stakeholder engagement.

Councils currently have a variety of approaches to managing natural assets. Some approaches are comprehensive, while others are still immature and would benefit from improvement. Councils are looking for direction to refine their existing management systems, as well as guidance on valuing natural assets and securing resources/funding for monitoring, maintenance and renewal.

The main opportunities for improving natural asset integration, include:

- High-level strategic integration of natural assets into their asset management system;
- Natural asset valuation and potential insurance of natural assets;
- Asset management planning – including monitoring and inspection, maintenance and renewals programming;
- Options for integrated asset management information systems suitable for natural asset management;
- Funding allocations; and
- Internal and external reporting requirements.

These opportunities could be applied to three broad natural asset types that could be roadside reserves depending on council and location:

- Trees (street and park trees);
- Open space and green fields; and
- Bushland.

Strategic Asset Management

The first step of successful, integrated natural asset management is the identification of objectives. These have traditionally been either embedded in community plans or strategies, strategic asset management plans or specific natural asset management plans. These documents are high level strategic planning documents developed as part of the IP&R framework. Consolidation of this stage of natural asset management is critical to developing a comprehensive, integrated asset management system. Relevant examples from councils including City of Sydney and The City of Newcastle have been identified and discussed in this review.

Natural Asset Valuation and Insurance

Valuation of natural assets is complex, however, it has been identified as an important element for asset management. For those who currently undertake natural asset valuations, values are derived from the financial costs of asset maintenance and renewal (e.g. trees). The current view is that the valuation of natural assets is difficult, which is limiting them from being undertaken.

The majority of examples of natural asset valuation related to trees. Few examples were found of organisations attempting to value bushland or waterways, except international reports of the use of the System of Environmental Economic Accounting (SEEA) framework. This is a complex framework better suited to a national assessment and not recommended to be of value for local government in NSW.

Basic parameters that were common to tree valuation formula included:

- Species
- Cross sectional area
- Location (street tree, rural)
- Condition (form and vigour)
- Useful life expectancy
- Base tree value

Three valuation formula or methodologies are recommended (Itree, Burnley Method and Council of Landscape Appraisers (CTLA)).

Biodiversity Offsetting calculators provide a potential means of valuing natural assets – however the calculators are focussed on costing delivery of offsets in a competitive offset market rather than managing an asset. The methodology could however be useful in determining the cost of improving a natural assets condition where it is currently degraded and there is a goal to improve rather than maintain the asset.

Asset Management Planning

A specific asset management plan should be developed for natural assets. This should identify priorities and objectives of council which reflect the aspirations of the community as key stakeholders. Guidelines for monitoring, maintaining and renewing natural assets could be prepared as part of the CRR project. The guidelines would help to set the operational standards of natural asset management. As it is apparent that not all LGAs have identical natural asset portfolios, guidelines should address this variation and be developed for each asset portfolio separately with recommendations on integration of the management of all portfolios where applicable.

Integrated Asset Management System Options

Stage 2 of the natural assets project should define a natural asset data hierarchy and data capture and storage standards. If 'Itree' continues to be used as the standard asset system for street trees, other systems should be able to integrate with 'Itree' to provide a holistic asset management system. Stage 2 of the project should investigate data integration and software options.

Funding Allocations

The ability to adequately fund the management of natural assets was identified as one of the main challenges in natural asset management. Stage 2 of the natural asset project is unlikely to have a direct effect on future outcomes of securing resources (funding specifically). However, providing a State-wide consistent approach to natural asset management has potential for natural asset managers within council to provide stronger justifications for funding during budget allocations. Suggestions for councils to enter into the NSW Biodiversity Offset Scheme to secure additional funding should be encouraged. Valuing natural assets and implementing a structured reporting strategy would also support this.

Internal and External Reporting

To ensure future natural asset management continues to be a priority for councils, guidelines could identify internal and external reporting measures requirements. This would create transparency in spending and place councils in a better position to bid for funding for future works.

Recommendations

The investigations and stakeholder interviews that were undertaken have highlighted the State-wide need for natural asset management guidance. No one council either interviewed or in the literature review had a complete natural asset system in place outside of management of street and park trees.

It is for this reason we have not recommended adoption of a specific natural asset management system. Rather we have recommended a series of opportunities for improving natural asset integration.

We have recommended preparing an implementation Guide for Council's wishing to improve management of natural assets. The Guide would provide a step by step approach to integrating natural assets into Council's asset management systems. The guideline would not be a fixed procedure rather it would guide choices depending on the nature of the natural asset portfolio and Council's existing systems.

Table of Contents

Appendices

Tables

Figures

1 Introduction

1.1 Project Context

An estimated 6% of the total area of New South Wales (NSW) lies within linear reserves. Of this area, approximately 2.5 million hectares of roadside vegetation (roadside reserves) are owned and/or managed by local government (i.e. councils). This natural asset not only covers large areas across the State but also possesses a number of environmental, community and heritage values. Councils are required to consider a multitude of complex factors when managing roadside reserves such as, road safety, biodiversity values, cultural values, heritage values, firewood collection, bushfire management, aesthetic and recreational values, routine maintenance activities, legal requirements and development pressures. Management of roadside reserves can be complex due to competing values. Conservation of these areas must aim to balance functionality and values. Councils generally value the built environment in their jurisdiction yet the adjoining natural areas, such as roadside reserves, can be undervalued or overlooked in councils' management systems.

The main environmental legislative requirements for the management of roadside reserves include:

- Bushfire management (NSW *Rural Fire Act 1997*);
- Threatened species (NSW *Biodiversity Conservation Act 2016* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*);
- Weed management (NSW *Biosecurity Act 2015*);
- Protection of public lands (NSW *Local Government Act 1993*); and
- Pollution of land and waterways (NSW *Protection of the Environment Operations Act 1997*).

The Council Roadside Reserves (CRR) project is a three-year project funded by the NSW Environmental Trust and managed by Local Government NSW. The CRR project aims to build the capacity of councils to embed the value of roadside reserves into their Integrated Planning and Reporting (IP&R) systems. The Council Roadside Environmental Management Framework (CREMF) was developed to support councils in streamlining the management of roadside reserves. The CREMF included sections on natural assets. However, due to complexities in natural asset management, an in-depth analysis was not undertaken and is now required to inform this emerging area and influence practice change.

The CRR natural assets project was commissioned in response to this. It is partitioned into three stages:

1. Literature review and detailed investigations;
2. Development of practical advice for integrating natural assets into councils' asset management systems; and
3. Dissemination of Stage 2 outcomes State-wide.

1.2 Project Scope and Objectives

Stage 1 of the natural assets project (the focus of this report) aims to investigate current activities undertaken by councils in managing natural assets in the broader asset management context. The key elements addressed are:

1. What are the key points of difference in managing natural assets and other assets?
2. What are the incentives and disincentives (financial and other) to combining natural and built asset management into one system?
3. Do current asset management systems (including software programs) used by councils, lend themselves to the inclusion of natural assets?

This report details the results of the analyses of existing practices, including a gap analysis and identification of potential opportunities.

2 Methodology

The below methodology was employed to investigate the feasibility of incorporating natural asset management within existing asset management approaches. This included two main tasks:

1. Literature review; and
2. Stakeholder engagement.

2.1 Literature Review

A literature review was undertaken to investigate existing natural asset management activities and any links to broader asset management approaches.

In total 51 separate sources of information were researched. The initial list was derived from known sources of information relating to asset management, asset valuation and environmental management. Further sources were added from accessing the original documents and web pages where references and referrals were made.

The literature review identified examples of natural asset management both within local government and across other sectors, including relevant international experiences where possible.

Key sources under each heading included:

Asset management:

- International Standards Organisation (ISO) 55000 Standards for Asset Management;
- International Infrastructure Management Manual (IIMM);
- Austroads Guide to Asset Management;
- Local Government Asset Management – Better Practice Guide 2015 (Local Government Victoria);
- Technology One (TechOne) (general overview); and
- Authority 7 (Civica) (general overview).

Valuation and Financial Management:

- Austroads – Valuation of Road Infrastructure Assets in Australia and New Zealand;
- International Journal of Science – The Value of the Worlds Ecosystem;
- Tasmanian Government – Framework for Long Term Financial and Asset Management Planning for Tasmanian councils;
- Defence – Asset Management, Purchasing and Capital Investment;
- Institute of Public Works Engineering Australasia (IPWEA) – Natural Asset Capitalisation;
- Bureau of Meteorology (BoM) – Guide to Environmental Accounting in Australia;
- Australian Bureau of Statistics – Australian Environmental Economic Accounts 2017;
- United Nations Environment (UNE) – A comparative analysis of ecosystem service valuation;
- Town of Gibsons – Advancing Municipal Natural Asset Management: The Town of Gibsons experience in financial planning and reporting (Canada);
- Parks Victoria – Valuing Victoria's Parks; and
- University of Melbourne – Urban Tree Valuation – A Current Perspective and Progress Report.
- NSW Government Biodiversity Offset Scheme

Natural Asset Management:

- NSW Roads and Maritime Services (Roads and Maritime) Landscape Guideline;
- AECOM – Green Infrastructure – A Vital Step to Brilliant Australian Cities;
- Roadside Environment Committee:
  - Roadside Vegetation Management Planning;

  - Guidelines for the Development of Roadside Management Plans;
  - Proceedings from the NSW Linear Reserve Environmental Management Forum;
- IPWEA – National Asset Management Strategy (NAMS);
- IPWEA Ask Your Mates;
- IPWEA – Practice Note 10.1;
- Treenet;
- City of Sydney – Tree Management Policy;
- Itree (through Logan City Council, Brisbane City Council, City of Melbourne);
- Purdue University – Forestry & Natural Resources – Tree Appraisal; and
- Council of Tree and Landscape Appraisers (CTLA) – The Guide for Plant Appraisal.

2.2 Stakeholder Engagement

Consultation across council and non-council stakeholders was undertaken to capture and compare existing management strategies for roadside reserves. Stakeholders were asked if they had current strategies, plans of management and any procedures they had implemented for natural asset management within their organisation. This was to further delineate council's requirements and identify any gaps in natural asset management that the CRR project can bridge.

2.2.1 Stakeholder Engagement Plan

Stakeholder engagement was guided by a Stakeholder Engagement Plan (The Plan). The Plan included details on the interview process such as questions, target audience and number of interviews (see **Appendix B**).

Seven councils and two other non-council stakeholders who manage natural and built assets were selected as primary stakeholders for interviews. These included:

- Councils:
  - Blue Mountains City Council;
  - The City of Newcastle;
  - Central Coast Council;
  - Brisbane City Council (Queensland);
  - Queanbeyan-Palerang Regional Council;
  - City of Sydney; and
  - Port Stephens Council;
- Non-Council stakeholders:
  - National Capital Authority (NCA) (ACT); and
  - Department of Transport and Main Roads (Queensland).

2.2.2 Stakeholder Interviews

Interviews were undertaken in accordance with Section 6 of the Plan (see **Appendix A**) and **Table 2-1**.

Table 2-1 Stakeholder interview schedule

Stakeholder	Date of interview	Interviewee and role	Interviewer
Blue Mountains City Council	4 September 2018	Matthew Chambers – Program Leader for Natural Area Management	Kevin Roberts via phone call
The City of Newcastle	14 September	Karenne Jurd – Asset Management Coordinator for the Environment	Kevin Roberts in person

Stakeholder	Date of interview	Interviewee and role	Interviewer
Central Coast Council	14 September 2018	Kim Radford – Facilities Manager Alison Woodward– Asset Systems Rochelle Lawson – Ecologist in the natural asset management team	Kevin Roberts in person
Brisbane City Council	5 September 2018	Tina Manners – Policy Officer in the Biodiversity planning team	Susan Chamberlain in person
Queanbeyan-Palerang Regional Council	27 August 2018	Simon Holloway – Coordinator of Natural Resources Management	Susan Chamberlain via phone call
City of Sydney	23 August 2018	Carl Hanebuth – Asset Strategy Manager and Systems Administrator Karen Sweeney – Tree Management Team, Manager Phil Julian – Tree Management Team	Kevin Roberts in person
Port Stephens Council	4 September 2018	John Maritech – Asset Manager	Kevin Roberts via phone call
National Capital Authority	3 September 2018	Ken Gibson – Manager, National Estate	Susan Chamberlain via email
Department of Transport and Main Roads	6 September 2018	Andrew Golding – Director of Transport Systems and Asset Management	Susan Chamberlain in person

Stakeholder feedback was consolidated and compared following the conclusion of stakeholder engagement interviews. A number of cases were selected from the list of stakeholders, and their systems and approaches are discussed in detail in section 3.2.2. This includes stakeholders who are at various stages of integrating their natural assets, which will help guide the recommendations for Stage 2.

3 Summary

3.1 Literature Review

Findings of the literature review are summarised in the following sections with the full suite of findings in **Appendix A**.

3.1.1 International Asset Management Practice Standards

The International Infrastructure Management Manual (IIMM) and ISO 55000 Standards for Asset Management are high level and do not reference specific asset classes. The principles embodied in these publications can be applied to any asset class or type.

ISO 55000 series defines an asset as 'something that has potential or actual value to an organisation. Value, however, will mean different things to different people and different organisations. Value can be tangible or intangible, financial or non-financial'. According to this definition natural assets, under ISO 55000, can be considered as assets on the basis that they have value.

Both the IIMM and the ISO 55000 series are important and valuable documents for NSW councils. However, the essential elements have been interpreted into more specific guidelines by the Integrated Planning and Reporting Manual for Local Government in NSW.

3.1.2 National Asset Management Practice Standards

Chapter 5 of the Austroads Guide to Asset Management (GAM) relates to roadside vegetation and suggests a 'failure' mode relating to progressive growth and loss of vegetation. Loss of vegetation impacts aesthetics and the environment, including threatened species. The guide suggests that roadside vegetation can be monitored via visual inspection. A common maintenance strategy, identified in the guide, includes:

- Continuous visual monitoring;
- Routine maintenance (e.g. litter collection, removal of dangerous tree limbs);
- Planned maintenance (e.g. mowing, slashing and replanting);
- Proactive maintenance (e.g. fuel load reduction); and
- Safety inspections (e.g. line of sight and clear zones).

The Austroads GAM maintenance strategy is relevant to the management of roadside reserves and can be applied to the degree relevant to the scale and asset management objectives of a specific council. The GAM maintenance strategy could be used to develop an asset management plan for a natural assets class.

The Institute of Public Works Engineering Australasia (IPWEA) through the National Asset Management Strategy (NAMS) is developing a Practice Note for natural assets. To date it has published Practice Notes relating to parks assets (10.1 Parks Management, 10.2 Parks Asset Management, 10.3 Parks Management – Levels of Service, 10.4 Parks Management – Service Delivery), which can be applied in part to natural assets. IPWEA also host an active forum for public works and asset management practitioners to pose questions for others to post responses ('Ask Your Mates'). Management of natural assets has been a regular topic of discussion. Forum users have advocated the use of Itree software for storage of street tree data and quantifying the financial value of annual environmental and aesthetic benefits, such as energy conservation, air quality improvement, CO_2 reduction, storm water control and land property value increases. Practice Note 10.4 is likely to include:

- Introduction and context
- Service delivery planning
- Service reviews
- Service delivery specifications
- Quality management
- Contract management
- Maintenance planning
- Financials

> Asset management plan

This new Practice Note should be reviewed when it is published as it will provide relevant and valuable information for the management of council's road reserves. The outline content indicates it will provide specific detail for natural assets aligning with the general guidance provided in the Integrated Planning and Reporting Manual.

3.1.3 State Government Asset Management Practice

Two state road controlling authorities were researched. Roads and Maritime Services (RMS) in NSW impose landscape design standards for all projects to minimise cost of vegetation maintenance and potential damage to other assets and road users. They also recognise the management of roadside assets but do not list natural assets as roadside assets, except landscaping and grass. Roads and Maritime Services set comprehensive requirements in terms of protecting biodiversity during the development and design of a project. Asset management appears to be focussed on infrastructure assets.

Transport and Main Roads in Queensland (TMR) do not recognise natural assets as 'assets'. They do not hold them within their asset or financial registers. This determination is based on natural assets long lives and lack of depreciation. Natural assets are managed in accordance with relevant legislation, safety and aesthetics but not in a structured asset management system. Justifications for this practice from the interview with TMR are summarised in **Section 3.2**.

3.1.4 Local Government

The practices of six councils were researched in the literature review:

1. City of Sydney (NSW)
2. Logan City Council (QLD)
3. Gold Coast City Council (QLD)
4. Brisbane City Council (QLD)
5. City of Unley (South Australia)
6. City of Melbourne (Victoria)

Brisbane City Council and City of Sydney were subsequently interviewed (**Section 3.2**).

Logan City Council's (LCC) Asset and Services Management Policy does not cover natural assets. Their Total Assets and Services Plan does include Parks assets but does not list road side reserve or natural assets specifically. There is evidence that they do manage their vegetation and bushland areas but not through a formal asset management system.

LCC values trees as green assets and healthy trees that do not meet tree removal criteria will be retained in the first instance. They maintain a tree register to recognise the value of, encourage the protection of and manage trees of significance and/or of concern. The register for trees of concern is maintained detailing trees requiring regular inspections and ongoing maintenance where there is a perception of unacceptable risk such as large trees located in close proximity to private property.

LCC's method of management of their natural assets was not considered to be of specific value to this project to investigate further.

The Gold Coast City Council (GCCC) Asset Management Policy relates to built physical assets (does not includes road reserve trees). Comprehensive Natural Area Management Plans are used and the numbers and types of trees are recorded but there was no evidence of similar for road reserve trees outside of any natural area.

Further investigation of GCCC was not considered of value to this project.

City of Unley use Itree software to value trees in a specific location (the tool can be used for street trees as well). Itree is further discussed in 3.1.5.2

3.1.5 Valuing Natural Assets

Research indicates that there is no one recommended methodology for valuing natural assets and organisations that do value their natural assets take varying approaches.

3.1.5.1 National Capital Authority (NCA)

The NCA has determined that trees meet the definition of an asset and can be valued in accordance with the Australian Accounting Standards Board (AASB) Framework. Their Finance Policy states:

- Initial recognition – costs associated with planting, clearing of and labour and initial nurturing;
- Asset register – trees are a sub-ledger item of the Land Class;
- Measurement after recognition - trees are revalued to fair value;
- Depreciation – trees are not depreciated because they have an 80-100 year life so depreciation is immaterial;
- Impairment – annual assessment to identify dead, dying, diseased or damaged trees; and
- Tree removal – costs are only capitalised if a tree is removed for the planting of new.

The NCA valuation methodology is logical and straightforward. Their process and assumptions should form an input to the LGNSW guidelines for management of natural assets and assessed in more detail in the next phase of the project.

3.1.5.2 Itree

Itree software offers a structured methodology to value trees and is used by Brisbane City Council, City of Melbourne, GCCC and the City of Unley (and many others). This software suite from the United States Department of Agriculture (USDA) Forest Service provides urban and rural forestry analysis and benefits assessment tools. The software quantifies forest structure and the environmental benefits trees provide to people. The City of Unley in South Australia use Itree to value trees in specific locations (the tool can be used for street trees as well). Value is assessed by function and on a financial basis. By function:

1. Air pollution removal;
2. Carbon dioxide storage and sequestration;
3. Rainfall interception.

Itree also estimates structural value (i.e. replacement value). The depreciated replacement cost is based on a CTLA formula (Watson, 2001 and 2002) (see **Section 3.1.5.6**). Replacement value is calculated from tree species, size, condition and location. The calculation aligns with a valuation of a structural asset (i.e. the cost of replacement from a nursery).

The City of Melbourne use the Itree software to calculate the ecological services value of a tree. This is then combined with removal costs, amenity value and reinstatement costs explained in **Figure 3-1**.

A – Removal Costs	Amounting to the fees incurred by Council for physically removing the tree
B – Amenity Value	Calculated in accordance with Council's Amenity Formula.
C – Ecological Services Value	Calculated in accordance with the i-Tree valuation tool
D – Reinstatement Costs	Calculated in accordance with the greening required to replace the loss to the landscape incurred by the removal.

Figure 3-1 City of Melbourne tree valuation system

As discussed above itree software has been adopted by multiple councils and warrants more detailed investigation with a view to recommending its use to NSW councils.

AECOM documented the benefits and costs of street trees in *Green Infrastructure – A Vital Step to Brilliant Australian Cities* (2017) and estimated, via Itree that the 70,000 trees in the City of Melbourne provided approximately $14M in value. Similarly for Brisbane City Council where the contribution of street trees is $1.67M in value. AECOM went on to state that there are four steps to extracting the most benefit from green infrastructure:

1. Reassess its value as vital infrastructure;
2. Show how it is part of a broader plan for the city;

3. Harness community support for regulatory change; and
4. Apply smarter management of trees, parks and other green infrastructure.

The four steps identified by AECOM align with the Integrated Planning and Reporting Manual which advocates the linking of a Councils Community strategy to management of assets. Harnessing community support for green infrastructure starts with recognition, through Community Plans, Asset Management Policy and Objectives and Strategic Asset Management Plans of the value of this asset class.

More detailed assessment of this software, including flexibility, costs and outputs is recommended to determine how it might assist in the asset management planning of roadside reserve assets.

3.1.5.4 Bureau of Meteorology (BoM)

The Australian Government BoM cites the United Nations System of Environmental Economic Accounting (SEEA) Framework. BoM concludes that a non-monetary valuation is required (i.e. not possible to value many aspects of ecosystems by monetary methods). The SEEA Framework is an international standard used to account for individual natural assets (such as land, water, timber and fish), environmental degradation, depletion and expenditure on environmental protection or restoration. It is complex framework better suited to a national assessment of environmental economics. Further investigation of the SEEA Framework is not considered to add value to NSW councils.

3.1.5.5 Standards Australia

Several valuation formulae for urban trees have been collated by Dr G. Moore of the University of Melbourne (2006). However, no methodologies have yet to be adopted by Standards Australia. Three of the formulae are outlined in **Figure 3-2**.

The 1992Australian/New Zealand Draft Standard Revised	
Value =P(I*L*C+F*Y*S*V)	Value = Tree Value in $AUD
	P = unit value factor
	I = visual impact value (1,5-15)
	L = site suitability value (1,5-15)
	C = cultural significance value (1,5-15)
	F = frequency of occurrence value (1,5-15)
	Y = life expectancy value (1,5-15)
	S = live crown size value (1,5-15)
	V = form and vigour value (1,5-15)
The Revised Burnley Method (2005)	
F = V * B * E * FV * L	F = Final Tree Value in $AUD
	V = Volume of Cone
	B = Base Tree Value $/m³
	E = Useful Life Expectancy (0.5-1.0)
	FV = Form and Vigour (0.00-1.00)
	L = Location Modifier (0.4-1.0)
The Thyer Tree Evaluation Method (2005)	
TV = S * A * Q * P	TV = Tree Value in $AUD
	S = Size Factor
	A = Age Factor
	Q = Physical and Social
	P = Planting Cost in $
Where: Q = H + Eb + L + R + Rt + Sb + F + Ss	H = Health (0-8)
	Eb = Environmental Benefit (0-8)
	L = Life Expectancy (0-8)
	R = Re-establishment Potential of Species (0-8)
	Rt = Rate of Growth (0-8)
	Sb = Social Benefit (0-16)
	F = Form and Features (0-16)
	Ss = Social Significance (0-16)

(Modified after Fitzgerald 2005)

Figure 3-2 Valuation of urban tree formulae by Dr Moore (source: Moore, 2006)

The Revised Burnley Method offers the greater simplicity and has some commonality with the CTLA formula discussed below. More in depth investigation of the Revised Burnley Method, particularly the value of the

various factors is recommended. This method, or a future modification of it presents measurable criteria in valuing trees and should be considered as a possible basis for LGNSW guidelines.

3.1.5.6 Council of Tree and Landscape Appraisers (CTLA)

The CTLA is responsible for the development of *The Guide for Plant Appraisal* (Clark, 2016). The CTLA presented certain factors to be used for valuing trees (**Figure 3-3**).

The formula is: Tree Value = Base Value x Cross-sectional Area x Species Class x Condition Class x Location Class Base Value is the dollar amount assigned to 1 square inch of a tree's trunk cross-sectional area and is typically based on the cost of the largest available replacement plant of the same species.

Cross-sectional Area is a measurement of tree size. It is the cross-sectional area of the tree trunk measured 1 foot above ground level for trees with trunks up to 12 inches in diameter or 4 ½ feet above ground for trees with trunks greater than 12 inches. Cross-sectional area can be calculated from trunk diameter using this formula: diameter^2 x 0.7854.

Species Class is an assigned value based on merit. Criteria used in determining species class include form, growth habit, flowering and fruiting characteristics, structural strength, longevity, insect and disease resistance, and maintenance requirements. Each tree species can be assigned any value from 1 percent to 100 percent, but for simplicity's sake is usually placed in one of five percentage classes (100, 80, 60, 40, 20). When used in the formula, the class values must be expressed as a decimal, i.e. 80 = .80.

Condition Class is an assigned value based on the observed condition of the tree and takes into account such factors as wounds, decay, storm damage, insect or disease damage, and poor form. This value can be any percentage from 1 percent to 100 percent, but for simplicity's sake is usually placed in one of five percentage classes (100, 80, 60-40, 20, 0) and should be expressed as a decimal in the formula. When assigning a value for condition class, keep in mind that very few trees are perfect specimens.

Location Class is based on the functional and aesthetic contribution that the tree makes to a site and the importance of the location in context of the broader community. The location value can be any percentage from 1 percent to 100 percent and should be expressed as a decimal in the formula. Generally speaking, a tree of historical significance or a residential shade tree will have a much higher location value compared to a tree growing in a pasture or under a power line.

Figure 3-3 The CTLA formula for valuing trees (The Guide for Plant Appraisal 9th Edition)

The CTLA formula is a similar approach to that posed by the Revised Burnley Method. Measurement criteria are straightforward and the data is easily collected. Both this CTLA formula and the Revised Burnley Method warrant further investigation. For this initial guide to valuation of trees, the type of data required is key to the deciding the better suited methodology. The data required needs to be relevant, easy to collect and as objective as possible.

3.1.5.7 NSW Biodiversity Offset Scheme

The NSW Government has introduced a Biodiversity Offsetting scheme as a means of managing the impact of development on biodiversity. The offset is designed to compensate for the loss of biodiversity from development. As part of the scheme, a calculator has been developed to measure biodiversity values in terms of credits – credits lost from a development and credits gained from an offset. These credits can then be turned into a value. For offsets this value reflects:

- The cost of works required to improve the value of a degraded natural area (or asset) to one in better condition.
- The market based value of the offset area determined in a competitive offset market.

Biodiversity Offsetting calculators may provide a potential means of valuing natural bushland areas including roadside reserves based on the costs of restoring and or maintaining the natural assets to an agreed condition.

3.2 Stakeholder Engagement

This section outlines the results from the stakeholder engagement interviews. Answers provided by stakeholders are attached in **Appendix C**. A summary of the main findings are outlined in **Section 3.2.1** and **3.2.2.** A select few cases are presented as case studies.

The two amalgamated councils that were interviewed, Central Coast Council and Queanbeyan-Palerang Council, were still consolidating their operations across their organisation. Natural asset management within these councils had not yet reached maturity and establishing a cohesive program was still on the agenda.

3.2.1 Consultation Summary

Natural assets occur across all stakeholder jurisdictions. Some have a large variety of natural assets that are managed across different portfolios, while others are limited by the built environment. Some stakeholders define 'natural assets' as any area that is naturally grown, while others are more liberal and consider all vegetated areas (landscaped or natural) and natural and manmade aquatic assets (e.g. waterways, lakes, wetlands and rain gardens). The various definitions across stakeholder jurisdictions are reflected in the variety of management approaches and levels of prioritisation. Most stakeholders manage a street tree portfolio at the very least, which is usually driven by risk management, as street trees are generally considered a liability to councils. The management of weeds was also another commonality shared across almost all stakeholders and born from legislative requirements.

Those who have comprehensive natural asset management portfolios (e.g. bushlands and open spaces) monitor the extent, type and condition of these areas as a minimum. However, integration of this data into a suitable asset management system was a common problem for stakeholders. Currently, common asset management information systems are created to support built assets rather than natural assets. Thus, most use a combination of systems outside of common asset management information systems as no one system provides full functionality for managing natural assets. Almost all stakeholders prefer a geographic interface to manage their natural assets with the use of other record-keeping programs for tracking financials and programming works. This leads to data being captured and stored in a variety of different formats which not all may be compatible. However, for those councils who manage their natural assets this way, they have been successfully operating using a suite of information systems for some time.

Maintaining a geographic interface for natural assets is important to assist in a council's environmental management, maintenance and capital works. Layering of data in a visual tool allows planning for maintenance and improvement works where the roadside reserve land is affected (for example a road widening). Replacement of a geographic interface with natural asset data held in an asset management information system is not recommended. Linking the geographic interface to the asset management information system, that holds natural asset data (for example, type, species, condition, location) would allow flexible use of the data with confidence the two systems held the same details and data are compatible.

Assets are valued and considered as depreciating assets. Natural assets are difficult to value and can be associated with an ecosystem value in addition to a renewal and maintenance value of which the latter was most commonly employed by stakeholders. Furthermore, although natural assets are considered liabilities to councils, some identified these as appreciating assets by improving their condition through maintenance.

Natural asset management objectives were generally outlined in an overarching community strategic plan. Few stakeholders incorporate natural assets into their strategic asset management plans. Guidance documents for the implementation of these objectives, including renewal and maintenance, were usually unavailable due to the lack of need or lack of resources to develop these documents. As such, those stakeholders successfully managing their natural resources undertake renewal and maintenance based on the experience of internal staff and contractors.

Strategic asset management plans (SAMP) provide a formal platform for the management of council assets. Under an ISO 55001 asset management system the SAMP interprets the Community Plan for relevant asset classes. For any Council that has recognised the importance of roadside reserve natural assets in their Community Plan, inclusion of the natural asset class in their SAMP is key to integrating management of natural assets with other infrastructure assets. SAMPs are higher level documents outlining asset management objectives, policy, governance arrangements and planning processes. Inclusion of natural assets under the SAMP aligns hierarchy of this asset class with other asset classes covered by the SAMP.

Competition for funding and resource shortfalls were usually expressed as one of the main challenges in successfully managing natural assets. The inability for natural assets to compete for budget due to difficulties in valuation and consistency in reporting often resulted in funding cuts and shortfalls and the need for natural asset managers to look for external funding to support their portfolios (e.g. grants).

Natural assets are usually not insured the same way built assets are and those who insure them would only do so from a community risk and council liability perspective. The costs of insurance and difficulties in valuing natural assets usually deter stakeholders from insuring these assets.

Almost all stakeholders are seeking guidance on how to better manage their natural assets irrespective of their current management strategies. The main findings from the stakeholder consultations are outlined in **Table 3-1.**

Table 3-1 Stakeholder feedback summary

Stakeholder	Stakeholder details	Types of natural assets	Management systems	Management and maintenance	Valuations	Insurance	Funding	Successes and challenges
Blue Mountains City Council	▪ 500 staff in council, 30 of which are in the natural area management team. ▪ $17M capex. ▪ $120M opex. ▪ $1.3B in built assets.	▪ 6,500 ha of bushland of which 500 ha are TECs. ▪ 200 reserves. ▪ 300 km of waterways. ▪ 20 ha of open freshwater bodies.	MapInfo® stores data and used to manage natural assets.	▪ Community strategic plan and a natural area asset management plan developed. ▪ Data collected on vegetation extent, type, condition and weed intrusion. ▪ Data collected for landscape features. ▪ Data collected for condition and extent of waterways and aquatic weeds. ▪ Trees and significant trees mapped. ▪ Routine condition assessments are undertaken by dedicated officers or external contractors experienced with Blue Mountains City Council. ▪ No guiding documents to	▪ Valuation of natural assets completed and peer reviewed in 2014 but no plans to repeat. ▪ Value of natural assets determined to be greater than built assets.	▪ Natural assets not insured due to costs.	▪ Funding allocation for each program has remained constant with some special rate variations when available. ▪ Still shortfalls in funding. ▪ Community is a big driver in funding (special rate variations).	▪ Challenges in the management of adjoining private land in alignment with bushland maintenance objectives. ▪ Blue Mountains City Council recognises the importance of maintaining the environment.

Stakeholder	Stakeholder details	Types of natural assets	Management systems	Management and maintenance	Valuations	Insurance	Funding	Successes and challenges
				guide the maintenance of natural assets but rely on the experience of the internal and external team.				
The City of Newcastle	▪ Small asset management team, a panel of ecologists and an arborist.	▪ Coastal assets (e.g. beaches, dunes, seawalls) and estuaries. ▪ Bushland. ▪ Watercourses (although some sections of concrete formed channels are owned by Hunter Water). ▪ Wetlands ▪ Public (street and park) Trees.	OneCouncil/Works and Assets Module (currently holds seawall and renewed watercourses as financial assets), MapInfo® and ESRI, Tree Asset Management Systems (TAMS) and Microsoft® Excel Access database (holds all watercourse and water quality monitoring data/sites)	▪ Overarching Strategic Asset Management Strategy has been developed which incorporates multiple service asset plans including natural assets. ▪ Data collected for all individual street and park trees. ▪ Condition and functionality assessments are based on best practice. ▪ Data captured by external contractors between 5 to 15 years but annually for high risk assets such as trees in high use areas.	▪ Valued based on the costs of previous work (i.e. renewal and maintenance). ▪ Valuations for trees are carried out annually.	▪ Natural assets not insured.	▪ Funding through annual budget process (capital and operational), based on a 10 year forward works program, including grant funding. Competing budgets.	▪ The City of Newcastle works with the community in maintaining their valued natural assets. ▪ Community Strategic Engagement survey (2017) showed respondents ranked investment in environment service area as highest priority and the need to protect it, in all its forms. ▪ Difficult to find suitable integrated systems that accommodate environmental asset parameters/data sets, within current build infrastructure asset

Stakeholder	Stakeholder details	Types of natural assets	Management systems	Management and maintenance	Valuations	Insurance	Funding	Successes and challenges
				▪ Forward works are based on priority renewal work demands from natural assets registers review, including risk. ▪ Maintenance of natural assets is guided by CN Urban Forest Technical Manual (2018) and Citywide Maintenance Procedure (2015).				management systems.
Central Coast Council	▪ Natural assets managed by a team of approximately 20.	▪ Built assets within natural areas and open spaces are managed. ▪ Reserves are managed as BioBanking sites or prospective Stewardship sites.	IPS - but natural assets yet to be integrated following amalgamation.	▪ Natural assets policy, environment strategy, urban sustainability strategy and community strategic plan developed. ▪ Condition mapping of vegetation and threatened species undertaken but not yet integrated into the asset management system.	▪ Valuation of natural assets linked with the BioBanking and Biodiversity Assessment Method (BAM) system. ▪ Valuation of natural assets not linked to condition.	▪ Natural assets are not insured.	▪ Funding from opex, capex, Royal Fire Service (RFS), Section 94 development and restricted funds and the BioBanking and BAM credit market. ▪ Currently not integrated into asset management to be able	▪ Recognises environment is a key driver for community lifestyle. ▪ Not enough resources for the area to manage. ▪ Managing natural assets is complex and is seeking guidance following amalgamation on how to successfully manage and integrate natural asset management.

Stakeholder	Stakeholder details	Types of natural assets	Management systems	Management and maintenance	Valuations	Insurance	Funding	Successes and challenges
				▪ Condition assessments are undertaken by contractors as part of other works. ▪ In the process of updating guiding documentation.			to bid for budget.	
Brisbane City Council	▪ Largest local government in Australia	▪ Street Trees. ▪ Native remnant and non-remnant vegetation. ▪ Waterways.	SAP, i-Tree and mapping systems.	▪ Specific Individual Asset Management Plans for all Natural Assets. Natural assets not reflected in citywide strategic asset management plan ▪ Employs the Queensland Herbarium classification and assessment system. ▪ Condition benchmarks (based on the Queensland Herbarium Biocondition Assessment Manual) currently determined	▪ Not currently valued.	▪ Natural assets are not insured.	▪ Funding through the annual budget process and application of grants. ▪ Competing budgets.	▪ Initial questioning of applicability of asset management to natural vegetation asset. Not supported, due to benefits being realised ▪ Implementation of a framework for assessing natural assets has facilitated funding justification.

Stakeholder	Stakeholder details	Types of natural assets	Management systems	Management and maintenance	Valuations	Insurance	Funding	Successes and challenges
				and compared to existing conditions. ▪ Condition data will be collected internally every five years and weed mapping undertaken more frequently. ▪ Natural assets in forwards works plans.				
Queanbeyan-Palerang Regional Council	▪ 460 fulltime equivalent employees (FTEs). ▪ Approx. 10 FTE involved in natural asset management ▪ $112M opex 2018/2019.	▪ Natural vegetation on most of Council's 600 owned/managed properties, including almost half having high environmental value native vegetation ▪ 700ha of bushland across 150 reserves ▪ 1080km of roadside with high environmental value native vegetation ▪	OneCouncil and ArcGIS	▪ No asset management plans which include natural assets but are looking to develop one. ▪ A biodiversity strategy being developed to particularly guide the management of TECs and threatened species. ▪ Data collected internally for natural assets, using a standard methodology for type and condition. Including the	▪ Not currently valued. ▪ Natural assets may be valued under the BAM in the future.	▪ Natural assets not insured with the exception of public liability.	▪ Funding for weed control and urban tree management available due to legal obligations while funding for other works arise mostly from grants.	▪ Challenge to secure funding. ▪ Shortfall of resources. ▪ Lack of valuation contributes to poor justification for funding. ▪ With the exception of weeds, natural assets are seen to largely look after themselves. ▪ Require better guidelines and consistency.

Stakeholder	Stakeholder details	Types of natural assets	Management systems	Management and maintenance	Valuations	Insurance	Funding	Successes and challenges
				use of a drone. ▪ Extent of some urban tree assets are mapped but condition data have only been collected for the first time recently in four to five year cycles. ▪ Works are based more on need rather than forward planning with the exception of weeds and trees. ▪ No guiding maintenance document or standards have been developed but recognises the need.				
City of Sydney	▪ Team of over 150 manage and maintain natural assets. ▪ Budget of over $25M allocated to natural asset management.	▪ Trees. ▪ Landscaped parks, nature strips, rain gardens and bushland.	Confirm	▪ Natural asset management objectives are mainly canopy targets for trees. ▪ A strategic asset management plan has been developed for parks, open spaces and	▪ Trees are valued every three to four years based on the costs to remove and replace. ▪ Value of trees not considered to depreciate.	▪ Limited insurance for some natural assets.	▪ Funding aligns with strategic vision for an ongoing program. ▪ Competing budgets.	▪ Valuation of natural assets are complicated. ▪ Resourcing issues. ▪ Costs associated with startup and ongoing maintenance of

Stakeholder	Stakeholder details	Types of natural assets	Management systems	Management and maintenance	Valuations	Insurance	Funding	Successes and challenges
				trees individually while other natural assets are incorporated into respective portfolio plans. ▪ Data collected by contractors electronically and brought into Confirm. ▪ Condition, type, location and status of trees are recorded annually. ▪ Condition assessment feeds into forwards works planning. ▪ Guidance for maintenance and performance measures determined with contractors.	▪ Valuations are reported through the IP&R system.			management systems. ▪ Successes in managing natural assets within the LGA could be shared with other councils.
Port Stephens Council	▪ Approximately 500 employees. ▪ $110M opex. ▪ $20-30M capex.	▪ Natural roadside reserves. ▪ Naturally grown parks (including Crown Lands). ▪ Foreshores.	Civica, GIS and Microsoft® Excel.	▪ Currently no clear objectives or triggers for actions. ▪ Foreshores managed under the	▪ Not currently valued with the exception of the use of the Delphi Method for trees.	▪ Natural assets not insured.	▪ No funding unless triggered by need for works. ▪ Capex funds foreshore	▪ Port Stephens Council recognises the importance of natural assets to lifestyle and tourism but management

Stakeholder	Stakeholder details	Types of natural assets	Management systems	Management and maintenance	Valuations	Insurance	Funding	Successes and challenges
		▪ Asset management zones (AMZs). ▪ Trees.		State Environmental Planning Policy (Coastal Management) 2018. ▪ Community strategic plan and environmental management strategy has been developed and include natural asset management. ▪ Data collected for natural assets but have not yet been incorporated into council's asset management information systems. ▪ Data collected for trees. ▪ Spatial data collected internally for other natural assets. ▪ Condition assessments and maintenance triggered by need for works			works if available. ▪ Competing budgets.	mostly along foreshores. ▪ Valuing natural assets is difficult and can be seen as a liability. ▪ Endless financial requirement to manage natural assets. ▪ Need standards and guidelines for natural asset management.

Stakeholder	Stakeholder details	Types of natural assets	Management systems	Management and maintenance	Valuations	Insurance	Funding	Successes and challenges
				and local knowledge. ▪ No guiding documentation for natural asset maintenance.				
National Capital Authority	▪ 65 FTE.	▪ Open spaces. ▪ Open water bodies. ▪ Trees. ▪ Conservation areas.	TechOne and ArcGIS.	▪ Specific objectives and strategic asset management plans for natural asset management have been developed. ▪ Data collected for specific attributes reflected in geographic interface and condition reports. ▪ Contractors undertake annual data collection across the range of assets. ▪ Natural assets included in forward planning. ▪ Guiding service levels and performance measures are	▪ Natural assets are valued under the Australian Accounting Standards Board annually by an external service provider.	▪ Natural assets are insured and differ from insuranc e of other assets.	▪ Funding from budget bidding. ▪ Competing budgets.	▪ Limiting budget and resources. ▪ External service delivery coordination can be difficult. ▪ Difficulties in managing risk profiles of natural assets in comparison to built assets. ▪ Integration has allowed for a consistent reporting process.

Stakeholder	Stakeholder details	Types of natural assets	Management systems	Management and maintenance	Valuations	Insurance	Funding	Successes and challenges
				still in development.				
Department of Transport and Main Roads	▪ Queensland Transport and Roads Investment Program (QTRIP) is a $3.2B program. ▪ Department of Transport and Main Roads (TMR) has a $70B asset base.	▪ Natural assets not recognized by TMR as an 'asset' that is financially valued but do have roadside reserves.	N/A.	▪ No clear objectives or strategic management specific to natural asset management. ▪ Each region has a tactical asset management plan which incorporates environmental components. ▪ Vegetation data collected and mapped but not incorporated in asset register. ▪ Non-native species are monitored. ▪ No condition assessment undertaken.	▪ Not currently valued as part of portfolio. ▪ Viewed as a liability with no depreciation.	▪ Natural assets not insured as they do not fit the standard asset category.	▪ Not really considered and funding is usually less. ▪ Competing budgets. ▪ TMR would share costs with local authority for community valued areas.	▪ N/A

3.2.2 Case Studies

3.2.2.1 Blue Mountains City Council

The Blue Mountains local government area (LGA) encompasses large areas of natural assets in addition to a range of built assets.

The majority of the LGA is natural area, managed by NSW National Parks (Blue Mountains NP), crown land or managed by council. Of the 143,000ha within the LGA, approximately 4.5% is managed by council as natural area. These assets are viewed as appreciating assets, in contrast to built assets. Blue Mountains Council had their natural assets valued externally in a desktop study in 2014. Although these areas only constitute a small portion of the total area of jurisdiction, their economic value was suggested to be higher than Blue Mountains Council's built assets (up to $2.2B).

Similar to many other stakeholders' asset management systems, the community strategic plan outlines clear objectives for the management of natural assets. A standalone natural asset management plan specifies procedures and tools to meet these objectives. Not all councils employ this document format and Blue Mountains City Council is likely to have commissioned this in response to their extensive range of natural assets. This plan no only dictates the management of natural assets, but also outlines the challenges and consequences if these challenges go unaddressed. This management plan covers all natural assets mentioned above but excludes guidance for the management of street trees.

The management of street trees are divided across various portfolios (e.g. built assets) and are not currently guided by an existing management document. Complementary management documentation, including a weed management strategy, have also been developed.

Civica had previously been used by Blue Mountains Council as the preferred asset management system, but has not met Council's requirements in the functionality of its base systems package or its additional plugins. As a result, Blue Mountains Council are currently in the process of procuring another asset management system. Natural asset management is currently captured in a spatially-enabled service (MapInfo®). The geographic interface of MapInfo® and its ease of use for works programming was valued by Blue Mountains Council. A geographic interface also enables data capture of extent, type, condition and other features to be readily integrated. Bushland conditions are currently determined from a visual assessment by an inspection officer and then categorised into three broad categories; 'degraded', 'recovering' and 'pristine'. Visual inspections of landscape features (e.g. erosion) and weeds are also undertaken. These condition assessments vary in frequency from annually to three-yearly by dedicated Blue Mountains Council officers.

Management of natural assets, including data collection, works planning and reporting, all currently lie within the respective natural area management teams (e.g. for bushland and for waterways) and are carried out internally. Maintenance works packages are delivered by external contractors who have completed internal training and have a long-standing relationship with Blue Mountains Council.

Funding allocations for natural asset management programs have remained constant with the exception of some special rate variations where available. This demonstrates shortfalls in funding for natural asset management exists throughout the LGA. Variations to funding are largely driven by the community. Furthermore, there are currently no external financial reporting requirements for these programs to elucidate any funding shortfalls.

Other challenges in managing natural assets in the LGA include conflicting land management practices, particularly with respect to weed management, and compatibility of asset management systems to the requirements of natural asset management.

3.2.2.1.1 Key Learnings

As roadside reserve vegetation management is similar to the management of bushland reserves (i.e. natural assets), integrated management is considered a practical approach. Including roadside reserves in large natural assets portfolios ensures that these areas are not overlooked. Differences between natural asset management and the management of built assets have generally been recognised by councils and Blue Mountains City Council addresses this by developing a standalone natural asset management plan. A standalone document allows councils to identify specific areas of focus as well as define challenges and solutions for consideration.

Like many other councils, Blue Mountains City Council value a geographic interface for managing their natural assets. This facilitates works programming and data integration and should be a key attribute when procuring a suitable AMIS.

Although Blue Mountains City Council currently rely on the knowledge and experience of internal staff and contractors to carry out condition assessments, there are risks associated with changes in staff and contractors and information loss. These risks can be alleviated by developing guidance documents and standard operating procedures (SOPs).

Internal and external reporting requirements have been suggested to be a solution to securing funding for natural asset management. There are currently no set requirements. Under currently circumstances, Blue Mountains City Council received additional funding from special rate variations, largely due to community appreciation of natural assets within the LGA. Community engagement and education can result in funding shortfalls can be bridged through special rate variations. This approach would also help councils in managing adjoining land, particular with respect to weed management.

3.2.2.2 Port Stephens Council

The majority of natural assets within the Port Stephens Council LGA lie along its foreshores. However, natural assets including natural roadside reserves, naturally grown parks, asset management zones (AMZs) and trees also occur. High level objectives to protect and enhance the natural environment are outlined in the community strategic plan however, specific works are guided by the *State Environmental Planning Policy (Coastal Management) 2018* (Coastal Management SEPP) and the environmental management strategy.

Port Stephens Council currently use a combination of Civica, Microsoft® Excel spreadsheets and geographic information systems (GIS) to facilitate asset management, with natural assets not yet incorporated into Civica but rather stored in GIS. In lieu of a suitable management system for natural assets, data collected for natural assets are not successfully informing management in the same way other hard infrastructure is managed. Port Stephens Council are still establishing/searching for a suitable industry wide methodology so natural assets can be part of the typical asset management process. As a result, condition assessments and other works, including weed eradication, are triggered by need for maintenance (outlined in the environmental management strategy) rather than routine. Foreshore and tree management are two portfolios which receive routine, internal management resources. The former focus is likely to be a consequence of the location of the LGA with respect to the coastline. Tree management helps alleviate risks to the community and council from an asset management perspective thus, the condition and status of trees within the LGA are logged and likely to inform forwards works planning. While natural assets are not currently valued, a large number of volunteers maintain natural assets within the LGA in liaison with Port Stephens Council.

The management of natural assets compete for internal funding with other works from a capped budget within a treasury model. External funding (e.g. grants) are only likely to be allocated based on requirements and mostly driven by threatened species. With no formalised natural asset management strategy, there is also limited operational documentation guiding this area of management with those available primarily focused on higher value features such as Coastal Wetlands.

Port Stephens Council recognises the value natural assets provide to community lifestyle and tourism within the LGA and work with NSW National Parks and Wildlife Service (NPWS) on various fronts. However, Port Stephens Council finds it difficult to ascertain a formal natural asset management system due to liabilities associated with natural assets, the lack of suitable guiding documentation and the allocation of funding.

3.2.2.2.1 Key Learnings

Natural asset management are driven by the type of natural assets present in the LGA and community values. This is evident in Port Stephens Council's focus on foreshores management due to extent of foreshore areas within the LGA and the value these areas provide the community (e.g. recreational and tourism).

3.2.2.3 Brisbane City Council (Queensland)

Brisbane City Council is the largest Local Government in Australia. It has a diverse range of assets with a high community focus. As a Local Government, it has moved beyond roads, rates and rubbish.

Brisbane City Council defines its natural assets (natural habitat) cover as remnant and non-remnant (native) vegetation within the habitat areas and ecological corridors across Brisbane that occurs on Council land. This vegetation includes the 81 different vegetation types, covering wetlands, saltmarshes, mangroves, eucalypt woodlands through to rainforest communities. Remnant vegetation is the more mature vegetation, whilst non-remnant is the immature/regrowth vegetation. The natural vegetation assets must be mapped as vegetation communities in accordance with the Queensland Herbarium methodology.

The Strategic Asset Management Plan is city wide and does not specifically reference natural assets. Asset Management Plans for natural assets are being developed. Brisbane City Council targets 40% reinstatement

of natural habitat across the city with 75% to be in a healthy condition. Brisbane City Council has formally recognised natural assets through the development of an Asset Management Framework.

Natural vegetation asset data is to be stored, like other assets and managed in a SAP system, which allows for tracking of works undertaken on the assets. Used by operational staff to record activities and in turn the costs associated with specific assets can be reported.

Brisbane City Council has adopted the Queensland Herbarium Bio-condition classification system. Data for this condition rating includes:

- Large trees;
- Canopy height and cover;
- Recruitment of dominant canopy species;
- Native tree species richness;
- Shrub cover;
- Coarse woody species richness;
- Non-native plant cover;
- Native perennial grass cover;
- Organic litter; and
- Presence of weeds.

The assessment methodology requires a condition benchmark to be established, which reflects the pre-clearing standard for each natural vegetation asset. When each asset is assessed it is compared to the benchmark and assigned one of 4 condition levels. The first condition level being ‘Healthy’ with the fourth condition level being ‘Very Degraded’. Each asset is assigned a desired condition (or desired level of service), which can be any of the 4 condition levels. This provides a basis for any community discussions. Future condition audits can then be compared to desired condition. Condition data has been collected and a five year cycle is to be started. The cost and approximate timeframes for restoring a vegetation asset from one condition level has been calculated, which allows for budget development for asset restoration or maintenance.

At this stage Brisbane City Council do not financially value their natural assets. Their prime focus is the development of the Asset Management Framework, benchmarking and determining condition and using this data to secure funding to achieve community driven outcomes and the natural habitat reinstatement target.

Natural asset management funding is gained through the Brisbane City Council annual budget process as well as grants funding and working with external groups such as Catchment Groups. Investment is being made into new assets to meet the 40% reinstatement target.

Data collection and asset management is undertaken through either council staff, outsourced to industry and actioned through Community Groups such as ‘Habitat Brisbane’ and ‘Creek Catchment Conservation’.

The outstanding benefit of the Asset Management Framework and using the Queensland Herbarium condition assessment methodology has been the ability to justify funding and to communicate with the community. Completion of the Asset Management Plans will require determination of customer levels of service and further evidence of what is required.

One of Brisbane City Council’s greatest challenges is the three different customers – residents, neighbours to bushland areas and visitors to Brisbane. However, they see that the Asset Management Framework allows evidence based decision making that can be documented and visualised. The setting of targets and goals has been key in enabling a gap analysis to be undertaken, which is then used to identify actions. The condition profiles are key for discussions as they are outcome focussed.

3.2.2.3.1 Key Learnings

Management of natural assets is similar to that of other assets. Data is collected for natural assets, including condition. Condition benchmarks for vegetation communities have been developed using the Queensland Herbarium guidelines. This provides rigour to Council’s standards and assists with gaining agreement on expectations. It has involved a step by step process. Firstly collecting data, then benchmarking condition and then measuring against their benchmarks. The Queensland Herbarium condition assessment guideline and BCC’s approach to managing their natural assets could be of value to other councils.

3.2.2.4 City of Sydney

The natural assets in the City of Sydney LGA encompass largely street trees, with landscaped parks, nature strips, rain gardens and bushland. There is very little remnant vegetation within the LGA, with natural asset management objectives following a set of environmental and canopy targets. Strategic management plans have been developed for parks, open spaces and trees, with details integrated into various portfolio plans (e.g. roadside verges in civil plans and rain gardens in stormwater plans). Management objectives for parks, open spaces and trees are detailed in the community strategic plan and the operational plan.

City of Sydney use Confirm and incorporate street trees, parks and open spaces into this asset management system. Some customisation of Confirm was required to ensure suitability, but City of Sydney are now able to successfully use Confirm as an asset register to capture the approval process, work history, condition assessments, maintenance and contractor works. External contractors complete routine condition assessments by capturing data digitally and reporting into Confirm. Data (condition, location, status and type) collected for trees is comprehensive and condition assessments are clearly defined and repeatable. Contractor works adhere to service level standards/agreements established between contractors and City of Sydney. City of Sydney also have plans for increasing canopy cover throughout the LGA (50% by 2030) which forms part of their forward work plans.

Trees are valued every three to four years and are based on the costs to remove and replace with consideration of the size and character of the tree. The value of trees are reported through the integrated planning and reporting system. City of Sydney also possess limited insurance for natural assets and includes trees and parks. Funding for the maintenance, renewal and expansion of trees occurs as an ongoing program which aligns with the City of Sydney strategic vision.

City of Sydney understand the value trees bring to the LGA as well as the risks these assets pose to the community and council. Valuation of this asset is recognised as difficult, with council employing a method to value trees which integrates into their asset management system. This comprehensive management system for their natural assets has led the City of Sydney to be an example for other councils in managing this asset.

3.2.2.4.1 Key Learnings

Variations in natural asset portfolios between LGAs were evident in this case study. Natural assets within the City of Sydney LGA were limited to trees and open spaces unlike other councils. This has allowed the City of Sydney Council to provide a structured and integrated asset management system to maintain and renew these assets.

3.2.2.5 National Capital Authority (NCA) (ACT)

The NCA manages a range of key Commonwealth assets in Canberra, which provide a variety of services to its stakeholders, residents and visitors. The asset base managed by the NCA is diverse. The asset classes are shown in **Table 3-2**.

Table 3-2 The NCA's asset classes

Asset Classes	Services Provided
Buildings	Buildings and facilities owned or leased by the NCA, for various NCA services, such as visitor centres, tourist attractions, kiosks for private functions, space for other Government Departments/Agencies, and commercial enterprises.
Dam and Lake	Scrivener Dam and Lake Burley Griffin for recreation and commercial activities, irrigation and enhancement of the character of the National Capital
Open Spaces	Open spaces, parks, trees, gardens and playgrounds to enhance the character of the National Capital and provide for recreation, sporting, cultural and private events. Within these areas memorials, fountains, artworks and architectural features provide for remembrance
Transport	Infrastructure such as local roads, bridges, lighting, signage, car parking and paths, for the purpose of enabling movement throughout the Precincts within the Nation's Capital. Stormwater drainage is provided to protect human life, protect property, ensure the transport network is operational during periods of rainfall, while minimising environmental impacts, and utilising stormwater harvesting

NCAs' natural assets include:

- 879 Open space and landscape areas;
- 7,628 Rose bushes; and

> 17,635 Trees.

Natural assets account for over 2% of the NCA asset valuation (**Figure 3-4**) as at 30 June 2018.

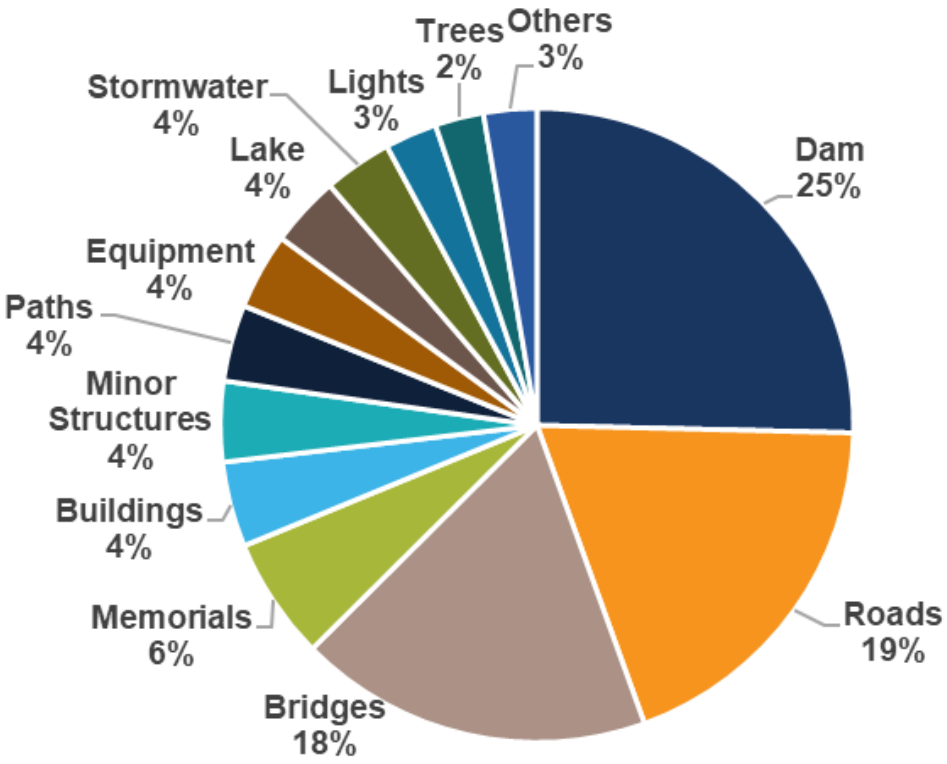

Figure 3-4 The NCA's assets as at 30 June 2018

The NCA Asset Management Objectives and the Strategic Asset Management Plan both cover the management of natural assets. The NCA are currently developing an Asset Management Plan for Open Spaces, which includes land, activity points, irrigation, open spaces, landscape areas, public artwork, roses, trees and waste collection points.

NCA's asset management information system is Technology One, with ArcGIS used for mapping purposes. Data fields include asset class, asset category, location, sub location, coordinates, type, age, use, useful life, species/ type, condition, risk rating and key features.

In general, condition data is captured annually, this includes recording the current state of an asset, applying a risk rating is applied and outlining proposed treatments. From this, condition data forward works plans are developed, for example tree removal and replacement.

Annual financial valuation of natural assets is undertaken in accordance with the Australian Accounting Standards Board – Standard 116 (AASB116) Property, Plant and Equipment, together with the Australian Standards Board – Standard 13 (AASB13) Fair Value Measurement, as well as a valuation for insurance purposes of the non-current assets under the demise of the NCA.

Funding for management of natural assets is through budget bids from Departmental and Administered Works Budgets. These funding bids compete with similar bids for other assets.

NCA outsource data collection, annual financial valuations and the maintenance of the assets.

The benefits of managing and valuing their natural assets relate to amenity, aesthetics, environment and the creation of a sense of place. It provides consistent reporting, consistent application of risk management and judgement, benchmarking and ultimately the effective and efficient management of assets across the NCA land.

A number of challenges have faced NCA in establishing their natural assets management. These include:

> Competing for funding;

> Budget constraints;

- Budget limits on related activities (e.g. water for irrigation);
- Weather effects;
- Events utilising and adjacent to the assets;
- Service provider delivery standards; and
- Management of risk profiles (e.g. natural asset risks are perceived as lower risks than those related to infrastructure assets, pot holes on a road, or bridge failure);

3.2.2.5.2 Key Learnings

NCA are fully integrating their trees, gardens and roses into their new Asset Management System and Asset Management Information System. Their SAMP and AMP would be useful as templates for other councils although they are based on standard guidelines from ISO and IPWEA.

4 Overall Findings

4.1 Managing Natural Assets

The lifecycle of an infrastructure asset is:

1. Planning
2. Creation or acquisition
3. Operation and maintenance
4. Disposal

The lifecycle of a natural asset in roadside reserves is similar for some asset types within the natural assets class e.g. street trees where planting is planned, trees are planted, managed and then disposed when they die, become unsafe or removed to make way for a new project or strategy. However, bushland or open spaces may not go through planning, creation or disposal cycles mentioned above.

The common lifecycle phase, for all assets, is operation and maintenance. Key differences identified in managing these phases are

Natural assets	**Other assets**
Varying condition rating methodologies adopted	Common condition rating methodologies adopted e.g. IPWEA
No standardised financial valuation methodology	Standard valuation methodology available and used
Value can be defined on a financial basis and an ecological basis	Value is defined on a financial basis
Value appreciates as the asset matures and depreciates late in the asset life	Value depreciates over asset life
Form a part of a wider ecological system	Play little or no role in a wider system (than that they were provided for)
Not often covered by council strategic asset management plan	Covered by council strategic asset management plan
Few asset management plans	Asset management plans
Data stored on a geographical platform	Data stored in an asset management information system

The principle steps of managing other built assets can be applied to natural assets:

- Understand the condition, functionality, useful life and risks of the asset;
- Analyse data to identify maintenance requirements, including replacements and renewals; and
- Program works to meet maintenance requirements.

Councils that have begun developing asset management frameworks, or asset management plans for natural assets report increased ability to compete for maintenance funding, greater knowledge of how their assets are aging and increased ability to meet community expectations.

City of Sydney, National Capital Authority and Brisbane City Council are examples of councils that have adopted the principal asset management steps.

The Integrated Panning and Reporting Manual, IPWEA International Infrastructure Management Manual and supporting Practice Notes all offer good guidance to the management of assets, including development of strategic asset management plans and asset management plans.

4.2 Asset Management Systems

ISO 55001 defines an asset management system that combines people, process and technology. It suggests a specific hierarchy of documentation to guide the management of assets. It is not specific to any particular asset class (refer **Figure 4-1**).

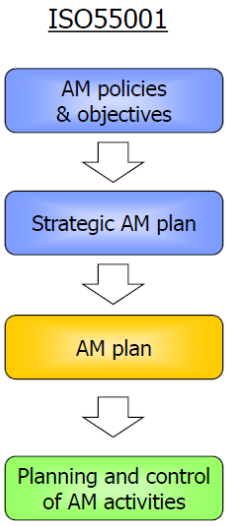

Figure 4-1 Asset management system as defined by ISO 5500X

In an ISO defined asset management system no distinction is made between asset classes and natural assets can be included in all hierarchy levels. Specifically natural assets would be referenced in the asset management policy and objectives, covered by the strategic asset management plan and have specific asset management plans and planning and control activities.

There is no identified disincentive to include natural assets in an asset management system. The degree of effort required to achieve this will depend on the existing available natural asset data, the need to collect more or different data and the development of long term maintenance and financial plans based on the data. The cost associated with this may be significant and may require funding in itself but the long term benefits include:

- Consistent reporting;
- Consistent application of risk management and judgement;
- Informed decision making;
- Justified funding requests;
- Benchmarking; and
- Effective and efficient management of assets.

The IPWEA Practice Note 10.4: Parks Management Service Delivery have recently been published. This document provide practical and specific advice and guidance on the management of public parks, open space and natural areas for the purposes of public recreation, conservation, amenity or landscape enhancement.

The International Standards Organisation (ISO) 55000 Standards for Asset Management, International Infrastructure Management Manual (IIMM), Austroads Guide to Asset Management and the IPWEA Practice Note 10.4 all provide practical guidance for councils to establish an asset management system.

4.3 Asset Management Information Systems (AMIS)

The literature review and stakeholder interviews identified a number of AMIS are used by councils, including:

- Confirm;
- OneCouncil;
- Civica;
- Technology One; and
- SAP.

Also used and highly valued by councils for natural asset data: ArcGIS, MapInfo and *Itree.*

No clear finding has been made in relation to one system that appears better than another for the integration of natural assets. Stakeholders did express concerns that their specific AMIS could not easily hold natural asset data and their preference for a system with a geographic interface. More detailed investigation into the flexibility of common AMIS is recommended to explore this concern, given core data (asset and functionality, class and type, location, description, condition, age, remaining life) is common across all assets. The option to custom existing systems, currently used for City of Sydney Council, could also be explored.

Stakeholders interviewed did express the importance of the AMIS linking to geographical information, or for information to be displayed in a geographic format. This allowed natural asset data to be used by planning officers, capital project officers, environmental managers as well as the asset managers.

4.4 Strategic Asset Management

The first step of successful, integrated natural asset management is the identification of objectives. These have traditionally been either embedded in community plans or strategies, strategic asset management plans or specific natural asset management plans. These documents are high level strategic planning documents developed as part of the IP&R framework. Consolidation of this stage of natural asset management is critical to developing a comprehensive, integrated asset management system.

The subsequent development of a strategic asset management plan, including the asset management policy and the asset management objectives, should include and cover a natural assets asset class. For councils that have existing strategic asset management plans (SAMPs), including an asset management policy and asset management objectives, an update to the SAMP will be required. This will involve translating the strategic direction provided in the community plan or strategy for natural assets into asset management objectives, widening the scope of the policy to include natural assets and ensuring the planning process described in the SAMP is reflective or applicable to natural assets. The SAMP then provides a direct line of sight between assets and strategic direction. The value in taking this step is the recognition natural assets will be provided at a strategic level. Funding requests for natural assets can be justified through transparent links to community expectations.

City of Sydney and The City of Newcastle have SAMPs that include objectives for natural assets. NCA is in the final stages of completing their SAMP. It covers open spaces (trees, gardens, land) and Lake Burley Griffin as well as other assets such as roads and buildings. These SAMPs would be useful examples of good practice and a useful framework for councils when developing or updating SAMPs to incorporate natural assets..

ISO 55001 provides a good guide to the structuring of a SAMP and IIMM is a good practical guide to the detail within the SAMP structure.

It is recommended that Council's consolidate or develop objectives for natural asset management into the Strategic Asset Management Plan.

4.5 Natural Asset Valuation and Insurance

Valuation of natural assets is complex, however, it has been identified as an important element for asset management. For those who currently undertake natural asset valuations, values are derived from the financial costs of asset maintenance and renewal (e.g. trees). The current view is that the valuation of natural assets is difficult, which is limiting them from being undertaken.

Distinguishing between the financial responsibilities for maintenance and renewal of these assets and the ecosystem value should be made in the first instance. The former is a practical formula currently employed by many councils. Ecosystem values of natural assets are usually far greater than the maintenance and renewal values and relativities to financial management would be difficult to integrate.

The majority of examples of natural asset valuation related to trees. Few examples were found of organisations attempting to value bushland or waterways, except international reports of the use of the System of Environmental Economic Accounting (SEEA) framework. This is a complex framework better suited to a national assessment and not recommended to be of value for LGNSW.

Basic parameters that were common to tree valuation formula included:

- Species
- Cross sectional area
- Location (street tree, rural)
- Condition (form and vigour)

- Useful life expectancy
- Base tree value

Three valuation formula or methodologies are recommended for more detailed assessment. There are currently no specific formula or methodologies developed to value other natural assets. Thus, the recommended valuation systems were all designed for the management of trees.

Itree

Free software developed by the United States Forest Service, but containing data to allow Australian councils to use the software. The model is shown in **Figure 4-2**.

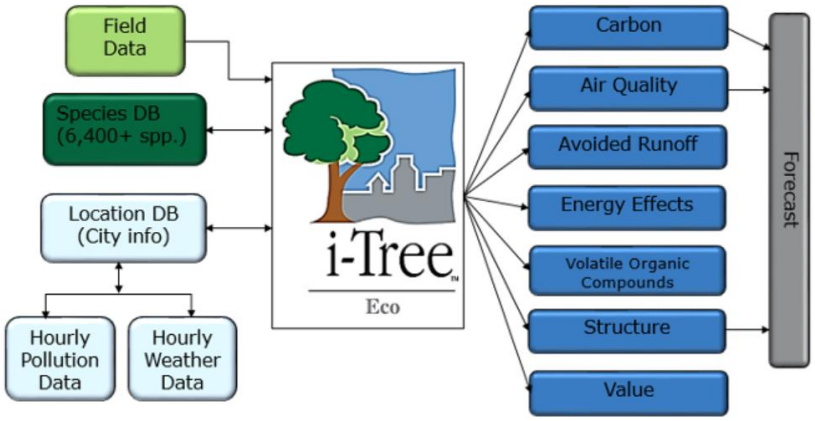

Figure 4-2 Itree model

Itree uses data collected in the field, combined with inbuilt data relating to specific tree species and location knowledge to derive multiple outputs, including a value. City of Melbourne and Brisbane City Council are user of Itree for their street trees. It has also been discussed on the IPWEA Ask Your Mates Forum as a valid option for valuing trees.

Burnley Method

The Burnley valuation formula uses basic parameters to derive a final tree value (F). It has been developed specifically for the valuation of trees.

F = V*B*E*FV*L

Where:

V = tree cone volume

B = base tree value

E = useful life expectancy

FV = form and vigour (condition)

L = location

V, FV and L are measured in the field. E can be assessed from any existing data related to tree species and planting date, or approximated from field data. The base tree value is assessed from the cost of replacing the tree (at whatever size a replacement tree can be sourced).

Council of Landscape Appraisers (CTLA) formula

CTLA have developed a tree valuation formula similar to the Burnley method. Tree value is derived from:

Base Value*Cross Sectional Area*Species*Condition*Location

Parameters are collected in the field, except the base value which is derived from the cost of replacing the tree by the largest available.

Both Burnley and CTLA formula are considered suitable for use by councils due to the practicality of the data required.

Further investigation into all three and their suitability to council's asset portfolio is recommended for the valuation of natural assets. It is also considered that the Biodiversity Offsets calculator developed by the NSW Government may also assist in providing input of standard management costs to either maintain or improve natural asset condition depending on agreed outcomes for the area of land. These are all promising formulas for valuing natural assets but selection would depend on councils' natural asset portfolio and management framework.

Insurance of natural assets depends on the successful valuation of natural assets. Interviewed stakeholders generally insured natural assets to cover public liability, not for the replacement of assets should they be destroyed or damaged through weather related events, fire or vandalism. A council's decision to insure their natural assets would depend on the value of those assets and will vary from council to council.

Public liability insurance is recommended to protect council from damages caused by natural assets to third parties. Councils should be encouraged to insure their natural assets where they have undertaken an assessment of the economics but it is recommended that effort and focus be placed on implementing a robust asset management and valuation regime of natural assets in the first instance.

While insurance is a key consideration for councils, the decision to insure or not should be based on relevant and accurate knowledge. Building up data sets and developing natural asset management plans are recommended to provide that knowledge before making any significant changes to existing insurance arrangements.

4.6 Asset Management Planning

4.6.1 Asset Management Plan

Asset Management Plans (AMPs) are written for each specific asset class or asset type. They provide greater detail as to the assets themselves. An AMP would typically cover the following topics:

- Asset/s description;
- Condition;
- Performance measures and levels of service;
- Demand (that would cause increase or decrease in the number of assets);
- Risk – to performance, condition, to third parties;
- Value (could be covered in the SAMP);
- Lifecycle planning;
- Forecast cost of maintenance, operations and renewals;
- Budget allocations for maintenance, operations and renewals; and
- Funding gaps and solutions.

Integration of natural assets into any other AMP is not recommended. AMPs are designed to be specific to an asset class/type and allow detailed documentation of information relevant to that asset class/type only. Higher level processes that might be common to all assets, including natural assets, can be documented in the SAMP however, the development of specific natural asset management plans is recommended.

The asset management plan should identify priorities and objectives of council that reflect the aspirations of the community as key stakeholders. Similar to community strategic plans, community engagement is important to the development of this document. However, consultation with other asset management teams (e.g. built assets) would also benefit in providing an integrated vision and ensure objectives align across various asset portfolios. A clear set of actions should arise from this process and identification of responsibilities (internal or external) should be delineated.

Comprehensive guidance on the development of an AMP is provided by IPWEA and they run numerous training sessions to further assist in understanding and compiling AMPs. The steps taken to develop a natural assets AMP are the same as for other assets. The first step being to collect data if it does not already reside in an asset register e.g. asset type, location, condition.

Blue Mountains Council and National Capital Authority have developed AMPs for natural assets. Their examples would form a good basis for a template Natural Assets AMP to guide other councils. The development of an adaptive AMP template would occur during the next stage of the project.

4.6.2 Monitoring, Maintenance and Renewal Guidelines

Guidelines for monitoring, maintaining and renewing natural assets should form part of the natural assets project. This would dictate the operational standards of natural asset management. As it is apparent that not all LGAs have identical natural asset portfolios, guidance documents should address this variation and be developed for each asset portfolio separately with recommendations on integration of the management of all portfolios where applicable.

Weed management would be integrated into the open space and green fields and bushland portfolios as this is recognised as an important attribute to natural asset condition.

Monitoring, maintenance and renewal processes currently vary from council to council and are highly dependent on the extent of natural assets and resources within the LGA (see **Section 4.8**). Guidance for these processes are usually poorly documented and rely on the knowledge and experience of internal staff and contractors. Stage 2 of the natural assets project should develop a set of adaptive guiding documents which would introduce consistency in these processes by recommending minimum monitoring attributes and condition benchmarks in alignment with recognised standards (e.g. native vegetation condition benchmarks for plant community types (PCTs) developed by NSW Office of Environment and Heritage (OEH)). Trigger conditions would then be defined from benchmarks upon which maintenance and renewal would occur. This would facilitate resource allocation and reporting (see **Section 4.8** and **4.9**) to complete the management cycle. Flexibility should be built into these guiding documents for councils to adapt their own set of documents based on their asset portfolio and requirements.

4.7 Integrated Asset Management System Options

Part of integrating natural asset management with other asset management portfolios relies on a suitable universal data storage (register), planning and financial system. Currently natural asset management systems span a range of programs of which most include a geographic interface (GIS) as common asset management systems have limited capabilities in allowing councils to integrate data, planning and financial requirements. Itree is currently used by many councils to manage trees and appears to be suitable for this portfolio.

Stage 2 of the natural assets project should define a data hierarchy and data capture and storage standards. If Itree continues to be used for street trees, other systems should be able to integrate with Itree to provide a holistic management system.

A clear recommendation for integrating natural assets into a specified AMIS has not been drawn. Councils using existing systems, such as Technology One, Civica, Confirm and OneCouncil are unlikely to be in a position to change AMIS to another AMIS to accommodate natural assets. Insertion of natural asset data into an established AMIS holding other infrastructure data is considered an ultimate goal but should be implemented after considering the effort and value in doing this for each individual council scenario. For larger councils with complex assets integration into an existing system is likely to be cost effective. For councils with less complex assets it may be as effective to store natural asset data in a separate system to their infrastructure data. The cost, disruption and resource effort to do this could be excessive. In principle natural asset data sets are the same or very similar to other assets. The recommended starting point is to define a natural assets data hierarchy and structure that will facilitate integration of that data into existing AMIS.

For any councils who do not yet have an AMIS there are examples, such as National Capital Authority's Technology One who have successfully integrated natural assets with other assets into the one AMIS. However, prior to any investment in an AMIS each council must understand their needs and budget constraints. For some councils data stored on spreadsheets may be totally appropriate given the nature of their assets, operating budgets and community priorities. Recommending specific AMIS is a potential risk to LGNSW as it impacts commercial organisations offering AMIS to councils and LGNSW have no control over the ongoing support of such off the shelf tools.

Further consideration of the best way to provide guidance to councils in relation to AMIS is recommended. Putting in place robust asset planning processes including capture of key data is seen as a higher priority than trying to integrate an AMIS.

Key to the ability of an existing system to accommodate natural asset data is defining the type and structure of the data. This includes a data hierarchy. Such hierarchy could be described as follows:

Table 4-1 Natural asset data hierarchy

Asset Class	Asset Type	Asset sub type
Natural asset	Street tree	
	Bushland	
	Open space	
	Waterway	River
		Stream

For each level of data the type of data to be collected is determined. For example – location, species, condition, height, girth, density.

The data required to manage natural assets is essentially similar to that needed for the management of other assets.

4.8 Funding Allocations

This was identified as one of the main challenges in natural asset management. However, Stage 2 of the natural assets project is unlikely to have a direct effect on future outcomes of securing resources (funding specifically) but rather provide a State-wide consistent approach to natural asset management which has potential for council to provide strong justifications during budget allocations. Suggestions for councils to enter into the NSW Biodiversity Offset Scheme to secure additional funding where possible should also be encouraged. Valuing natural assets (see **Section 4.5**) and implementing a structured reporting strategy (see **Section 4.9**) would also facilitate this.

Developing SAMPs for natural assets will assist in bridging the gap between the valuation and reporting of other infrastructure assets. Collecting and analysing key data for natural assets (e.g. condition data) will facilitate a robust understanding of maintenance need for this asset class which can be converted to a budget forecast. Valuing natural assets will highlight the importance of them to council and assist in justifying adequate funding allocations. Thus, recommendations to improve funding and resource allocations are tied to other aspects of asset management recommended in this section.

4.9 Internal and External Reporting

The lack of internal and external reporting is one of the limitations to securing funding/resources for natural asset management. Financial reporting would create transparency in spending and when coupled with condition reporting, benefits of council's spending can be demonstrated. Reporting can also create transparency for the community which has been identified, in some cases, as one of the key drivers for funding allocations (e.g. special rate variations).

There are currently limited to no reporting obligations for council's natural asset management teams. Stage 2 of the natural assets project should set internal and external reporting requirements for councils to follow. This would help councils to determine the effectiveness of natural asset management within their jurisdiction, provide direction for future targeted management and provide justifications to secure funding and other resources.

5 Recommendations

The investigations and stakeholder interviews that were undertaken have highlighted the State-wide need for natural asset management guidance. There is a clear desire to improve management of natural assets and to incorporate them into Council asset management systems to provide greater funding certainty, better targeting to achieve strategic natural asset goals and to better report on achievements and benefits of success.

No one council either interviewed or in the literature review had a complete natural asset system in place outside of management of street and park trees. Each Council has a different set of natural assets within their boundaries – some only have trees and landscaped areas, others extensive areas of bushland. Roadside reserves may fall into three broad asset types:

- Trees (street and park trees);
- Open space and green fields; and
- Bushland.

Councils also use a range of different asset management systems and it is important that natural assets can link with the preferred Council system. It is for this reason we have not recommended adoption of a specific natural asset management system. Rather we have recommended a series of opportunities for improving natural asset integration:

Recommendation 1:

Clearly define the natural assets within the Council area and if required classify them into natural asset management portfolios.

Recommendation 2:

Include natural assets within the Council's Strategic Asset Management Plan

a. Develop clear objectives for each natural asset type.

b. These objectives should be developed in consultation with the broader community.

c. Integrate the objectives including high level actions for each natural asset into Council's strategic asset management plan.

Recommendation 3:

Develop asset management plans for each asset type or portfolio.

Recommendation 4:

Choose an asset valuation formula suitable for the individual Council and its asset types

a. For trees suggest using one of the three formulae identified in this report.

b. For bushland considers options that value asset improvement/enhancement (for example credit calculators under the Biodiversity Assessment framework.

Recommendation 5:

Adopt asset management information system for natural assets.

a. Follow data hierarchy, capture and storage standards.

b. Can be integrated with other asset management systems if feasible but can operate independently if this is not feasible.

c. System allows for spatial referencing through GIS or other mapping system.

d. Identify performance outcomes that can be readily measured and reported on.

Recommendation 6:

Secure funding for ongoing management of natural assets

a. Recommendations 1-5 provide a basis and justification for securing natural asset funding in competition with other funding requirements.

b. Investigate alternative sources of funding such as grants or entering into the NSW Biodiversity offset scheme.

c. Provide clear report on funding outcomes to assist in securing future funding.

Recommendation 7:

Prepare an implementation Guide for Council's wishing to improve management of natural assets.

The Guide would provide a step by step approach to integrating natural assets into Council's asset management systems consistent with this report's recommendations eg setting goals, classifying natural assets, valuing and monitoring asset condition, developing asset specific management plans and information systems. The guideline would not be a fixed procedure rather it would guide choices depending on the nature of the natural asset portfolio and Council's existing systems.

Note that the recently published IPWEA Practice Note 10.4: Parks Management Service Delivery provides practical and specific advice and guidance on the management of public parks, open space and natural areas for the purposes of public recreation, conservation, amenity or landscape enhancement. This note will assist in preparing the implementation guide.

The following diagram illustrates a potential structure for the Guide based on the findings and recommendations.


Identification of natural assets
• Determine types of natural assets.
• Categorise natural assets into asset management portfolios.
Define natural asset management objectives
• Define objectives for each natural asset type/portfolio.
• Hold stakeholder/community engagement sessions to help determine objectives.
Develop/update strategic asset management plan/s (SAMP)
• Translating strategic direction from the defined objectives into action.
• Actions should be applicable to asset type/portfolio.
Determine asset valuation formula
• Adoption of one of three existing formulae, adaptation of an existing formula or investigation into a new formula for asset valuation.
Asset management planning
• Specific to each asset type/portfolio.
Employ an integrated asset management system
• Follow data hierarchy, data capture and storage standards.
• Employ or adapt existing asset management information systems (AMIS) to suit natural asset portfolios.
• Potential to store asset data in a separate system to built assets if not feasible to integrate.
Secure funding
• Undertake the above steps to provide strong justifications for funding allocations.
• Investigate external funding options including grants and/or entering into the NSW Biodiversity Offset Scheme.
• Introducing internal/external reporting requirements to assist in securing future funding.

6 References

AECOM, 2017, *Green Infrastructure – A Vital Step to Brilliant Australia Cities*

Clark, J., 2016, *The Guide for Plant Appraisal*

Moore, G., 2006, *Urban Tree Valuation – A Current Perspective and Progress Report*, The 7th National Tree Symposium

Watson, G., 2001, *A study of CTLA formula values*, Journal of Arboriculture, volume 27, pp. 289-297

Watson, G., 2002, *Comparing formula methods of tree appraisal*, Journal of Arboriculture, volume 28, pp. 11-18

APPENDIX

A

LITERATURE REVIEW

Local Government New South Wales
Asset Management of Road Reserve Assets
Literature Review Register July 2018

Document No.	Name	Author/ Owner	Publication Date	Document Reference	Comments and links	Summary	Usefulness of Document to LGNSW Natural Assets Project
1	Integrated Planning and Reporting Manual for Local Government in NSW	NSW Government The Division of Local Government, Department of Premier and Cabinet	Mar-13	ISBN 978-1-922001-16-0	Chapter 3.4 - Asset Management Planning (Natural assets not required to be managed per p.79) Chapter 6.4 - Asset Reporting Chapter 6.5 - Reporting on the State of the Environment	Manual provides information on how Councils can apply the legislative requirements. At this stage, councils are only required to specifically consider their physical assets. However, some councils currently choose to plan for the long term management of 'soft assets' (intangibles) such as intellectual property and natural assets. The key components or tools in a council's asset management system should include: • Asset registers • Asset condition assessments • Asset maintenance and management systems • Strategic planning capabilities • Predictive modelling • Deterioration modelling • Risk analysis • Lifecycle costing. Councils may choose to have a single plan that encompasses all the assets under its control, or it may have a series of plans for each asset class or asset group (eg roads, buildings)	Good outline of asset management planning in general but based on PAS 55 which was superseded in 2014 by ISO 55001. Useful to use as a detailed interpretation of PAS 55 for the implementation of an asset management system. Check changes from PAS 55 to ISO 55001 recommended before using.
2	Integrated Planning and Reporting Guideline for Local Government in NSW	NSW Government The Division of Local Government, Department of Premier and Cabinet	Mar-13	ISBN 978-1-922001-15-3	Page 13 - Asset Management Planning essential elements	Councils must comply with these Essential Elements when planning and reporting to comply with the Local Government Act Asset Management Planning forms part of the Resourcing Strategy in the IPR framework. - The Asset Management Plan must encompass all the assets under a council's control - The Asset Management Plan must identify asset service standards - The Asset Management Plan must contain long term projections, of asset maintenance, rehabilitation and replacement costs - Council's must report on the condition of their assets in their annual financial statements	To be used in conjunction with the Integrated Planning and Reporting Manual Makes clear that Councils must manage 'all assets' . Gives direction and context to management of natural assets but no direct further use for project.
3	International Infrastructure Management Manual	IPWEA	2015	ISBN No: 0-473-10685-X		No specific reference to natural assets - high level	Aligns with ISO 55001. Comprehensive guide for the development of an asset management system but not specific to natural assets. Concepts useful for project but as a reference only.
4	RTA Landscape guideline	RTA	Apr-08		Chapter 3 - Design guidelines Table 7 - Vegetation type guide (provides maintenance implications for different vegetation types)	Minimum landscape design standards for all projects undertaken on road corridors. Key issues with poorly designed and managed vegetated road corridors: expensive to maintain, can damage other assets or infrastructure, can result in injuries. General design guidelines	Not specifically of use to this project. More aligned to landscape design and project work.
5	Green Infrastructure - A Vital Step to Brilliant Australia Cities	AECOM	2017		Page 6 - benefits and costs of street trees	Research mostly deals with street trees. A 10% increase in leaf canopy of street trees could increase property values by average of $50k. Interviews with Blacktown City Council, RMS, TfNSW, Stockland, and an energy company. Four steps to get the most benefit from green infrastructure: 1. Reassess its value as vital infrastructure 2. Show how it is part of a broader plan for the city 3. Harness community support for regulatory change 4. Apply smarter management of trees, parks and other green infrastructure Use of i-Tree to calculate some of the benefits trees provide (e.g. City of Melbourne: 70,000 trees provide $14 million in value. Brisbane CC estimates street trees contribute $1.67million in value)	Interesting to read but of no direct value to progress the natural assets project.
6	ISO 5500 Standards for Asset Management	ISO	2014	ISO 55000 - Asset management - overview; principles and terminology ISO 55001 - Asset management - Management systems - Requirements ISO 55001 - Asset management - Guidelines for application of ISO 55001		ISO 55000 series defines an asset as - 'something that has potential or actual value to an organization. Value, however, will mean different things to different people and different organizations. Value can be tangible or intangible, financial or non-financial'. It does not discuss specific asset types or categories. According to the definition natural assets can be classified as assets on the basis that they have value - (possibly non tangible and non financial)	Directly relevant to the natural assets project as it provides guidance for the establishment of an asset management system. Not specific to natural assets but relates to the management of any/ all assets. The IP&R Manual is based on PAS 55 which is the predecessor to ISO 55001. Very few if any councils will seek certification under ISO 55001 but it is a sound guide to align to. Useful for councils to be familiar with.
7	Guide to Asset Management - Technical Information Part 14: Other Assets	Austroads	Sydney 2018	AGAM14-18	Chapter 5 - relates to roadside vegetation	'failure mode' relates to progressive growth or loss of vegetation Loss of vegetation impacts rebate to aesthetic impacts, environmental impacts such as threats to endangered species and impacts related to increased fire risk due to high fuel load Roadside vegetation can be monitored by visual inspection (from vehicle), supplemented by walk overs Common maintenance strategy: continuous visual monitoring routine maintenance eg litter collection and removal of storm damaged vegetation, dangerous limbs etc Programmed maintenance eg: replanting, mowing and slashing proactive maintenance such as fuel reduction inspections for line of sight and trimming etc in the clear zone	Directly relevant to councils and a sound guide to management of natural assets in road reserves.

Document No.	Name	Author/ Owner	Publication Date	Document Reference	Comments and links	Summary	Usefulness of Document to LGNSW Natural Assets Project
8	Valuation of Road Infrastructure Assets in Australia and New Zealand	Austroads	Sydney 2000	AP-144/00	Chapter 6 - Table 3	No state road authority valued natural assets (at the time of the publication)	Relevant to all councils valuing assets but no specifics to natural assets. Councils could apply the principles to natural assets.
9	Council Roadside Reserves Environmental Management Framework	Local Government in NSW/ NSW Environment Trust	Sydney 2018		Table 2 - roadside reserve values Section 2.5 Natural assets - Steps towards developing a natural asset register Page 14 - Example: Rockdale City Council Asset Management Strategy 2013 includes management of natural assets (https://www.rockdale.nsw.gov.au/pages/pdf/CityPlan2013AssetManagementPlan.pdf) Page 14 - Example: Blue Mountains City Council includes natural assets in their Resourcing Strategy (Summary Dashboards: https://www.bmcc.nsw.gov.au/sites/default/files/document/files/2013-03-12_Enclsoure%20to%20Item%205-5.pdf) Table 4 - summary of roles and responsibilities for roadside environmental management Table 5 - Legislation and relevance to roadside veg management Table 6 - desktop analysis of values in roadside environments Table 7 - prioritisation criteria for road reserves (followed by examples of three councils prioritisation methods) Section 5.3 rapid assessment method for use in field Page 35 - Steps towards integrating roadside environmental management into the IP&R system Appendix D - self assessment checklist	Report prepared to enable the value of natural assets in roadside reserves to be embedded into councils planning, reporting and asset management systems. To improve integration of roadside environmental management into other council activities including road planning, construction and maintenance. Tools and case studies are presented in this report consistent with the Integrated Planning and Reporting framework, with a focus on councils' core activities of strategic planning, impact assessments and approvals, and on-ground works. Steps towards developing a natural asset register: 1. Determine class of natural asset 2. Assess value of natural asset 3. Document attributes in register 4. Set targets for overall management goal for asset 5. Identify financial cost required to restore/enhance asset and maintain asset in target condition state 6. Prepare management options with reference to existing policies and plans Steps towards integrating roadside environmental management into the IP&R system 1. identify links between roadside management objectives, community strategic plan and delivery program 2. identify links to other strategic plans 3. identify staff responsibilities 4. explore costs/benefits to council for greater collaboration and work alignment	Excellent document outlining the steps for the management of natural assets. Should be consulted by all councils determining how they will manage natural assets.
10		National Grid (UK)				National Grid - are using a new and innovative approach to the management of their environmental assets. This assigns indicative financial values to the public and private benefits provided by the natural environment.	Of no direct use to councils. Interesting to be aware of but more complex than needed by councils.
11	Roadside Vegetation Management Planning	Roadside Environment Committee	no date		Four documents: Managing Roadsides: 1 Assessment, 2 Planning, 3 Implementation, 4 Monitoring and Evaluation	1 Assessment: includes roadside assessment sheet to determine high, medium and low conservation value roadsides. Over half of local councils in NSW have conducted roadside environmental assessments 2 Planning: developing roadside vegetation management plans. About two thirds of local councils in NSW have developed RVMPs or similar plans covering roadsides 3 Implementation: maintenance options, signage and markers, training, community education, regulation, stakeholder engagement, funding, projects. Examples of RVMP implementation projects can be found at: www.lgnsw.org.au/policy/roadside-vegetation-implementation-project/resources-and-case-studies. 4 Monitoring and Evaluation	Focusses on vegetation management rather than asset management specifically. Broad guidance all councils should be using.
12	Guidelines for the development of Roadside Management Plans	Roadside Environment Committee	no date			Three aspects to best practice management: assessment, planning and training. Funds should be allocated in the following order: 1. to ensure that areas of high conservation value vegetation and special management areas are able to continue as self-maintaining 2. to improve medium conservation value areas towards high quality, self-sustaining areas 3. to ensure low conservation value areas are maintained so as to ensure safety for road users, avoid weed spread, assure fire control and not become eyesores.	Broad guidance councils should be using
13	Proceedings for the NSW Linear Reserve Environmental Management Forum	Roadside Environment Committee	Sydney, 2012			Presentations: 1. Road reserves in NSW: values, challenges, and opportunities 2. Implementing the Great Eastern Ranges Initiative: the role of linear reserves in achieving continental connectivity (collaborate to create linkages and corridors, consideration of connectivity, community education re. wildlife crossings, lessen impacts of essential maintenance to protect assets and human life) 3. A Regional Approach to Managing Roadsides (Hunter and Central Coast Regional Environmental Management Strategy). HCCREMS Regional Roadside Environment Program commenced 2005 and aims to maintain and improve the important ecosystem services and environmental values that high quality and well managed roadsides contribute to the landscape. Work to date: Consultation with Councils to identify roadside management issues, identify and documenting values, developing strategy, developing management tools and products, implementing roadside marker scheme, deliver on-ground conservation and rehab works. 4. Working in Albury's Significant Environment Areas. Development of Standard Operating Procedures for working in SEAs and lessons learnt 5. Fire Management in Linear Reserves	Broad guidance councils should be using

Document No.	Name	Author/ Owner	Publication Date	Document Reference	Comments and links	Summary	Usefulness of Document to LGNSW Natural Assets Project
14	The value of the worlds ecosystem services and natural capital	Nature (International Journal of Science)	1997	387:253-260		Concludes that ecosystem services are an important portion of the total contribution to human welfare The 'natural' capital stock must be given adequate weight in decision making Ecosystem services are often ignored or undervalued, leading to the error of construction projects whose social costs outweigh their benefits. More research is required	Supports valuing ecosystem services but of no further direct value to the natural assets project
15	Environmental Australia Financial Statement	Environment Australia				Department of Environment in their financial statement consider financial assets and non financial assets - but limited to buildings and land, plant, equipment and infrastructure, computer software, water entitlements and other non financial assets (not described). No natural assets valued.	No further use to the natural assets project.
16	National Asset Management Strategy Council Annual Report 2015-2016	IPWEA - NAMS	2015-2016		https://www.ipwea.org/communities/assetmanagement/namscouncil	Nil	No further use to the natural assets project.
17	National Asset Management Strategy Business Plan	IPWEA - NAMS	2017-2018		https://www.ipwea.org/communities/assetmanagement/namscouncil	Developing a Practice Note for natural assets/ waterways over 2017/18	No further use to the natural assets project.
18	National Asset Management Strategy - Council Strategic Plan 2017-20	IPWEA - NAMS	Jun-17		https://www.ipwea.org/communities/assetmanagement/namscouncil	Priority action to publish Practice Note for Natural Assets within Year 1 of the 2017-2020 Business Plan	No further use to the natural assets project.
19	Local Government Asset Management - Better Practice Guide 2015	Local Government Victoria	2015		http://www.delwp.vic.gov.au	Nil	General asset management. No specific to natural assets. No further use to the natural assets project.
20	Framework for Long term Financial and Asset Management Planning for all Tasmanian Councils	Tasmanian State Government and Local Government Association of Tasmania Jeff Roorda and Associates	Sep-09	IPWEA Document ID: 59.254.090928 LGAT Common Framework Final Report V3		Encouraging a focus on long term financial planning	No further use to the natural assets project.
21	Asset management, purchasing and capital investment	Department of Defence	2016-17	Department of Defence. Australian Government	Annual Report 2016-17 Chapter 8	Defence comply with requirements for financial statements defined in the Australian Accounting Standards. Annual fair value assessment of all assets 'Non Financial' assets are recognised in the financial statement but no specific inclusion of natural assets given	No further use to the natural assets project.
22	Natural Assets Capitalisation	IPWEA Ask Your Mates			i-tree Eco Modified Burnley method (Croydon conservation) Eco Assets - Town of Gibsons, British Columbia, Canada IPWEA Parks Practice Note 10.2 https://www.ipwea.org/communities/community-home/digestviewer/viewthread?GroupId=289&MessageKey=311c9218-c2c0-4aee-8f6a-f8a996b304c1&CommunityKey=40161684-473f-4db3-9dbc-ff10c03497e2&tab=digestviewer	I tree is free software to comprehensively store tree data. It also provides some functionality for quantifying the $ value of annual environmental and aesthetic benefits: energy conservation, air quality improvement, CO2 reduction, storm water control and property value increase. The Burnley method was developed in 1988 by the Victoria College of Horticulture and Agriculture. Uses some basic principles to value trees.	Both the itree software and the Burnley method of valuing trees should be research in more detail with a view to recommending for LGNSW Councils. Update of the Burnley method may be required.
23	Guide to environmental accounting in Australia	Australian Government Bureau of Meteorology	Canberra 2013	657.73	Part A - intro to environmental accounting Part B - pathways for implementing accounts (designing accounts, institutional and capability considerations) Part C - supplementary technical reference material	Non-monetary valuation required - not possible to value many aspects of ecosystems by monetary methods. System of Environmental-Economic Accounting (SEEA) Framework is international standard used to account for individual natural assets (such as land, water, timber, and fish), environmental degradation, depletion, and expenditure on environmental protection or restoration. Table 3 - Difference between 'env accounts' and 'env assessment and monitoring'	Refer to commentary of SEEA

Document No.	Name	Author/ Owner	Publication Date	Document Reference	Comments and links	Summary	Usefulness of Document to LGNSW Natural Assets Project
24	Australian Environmental- Economic Accounts 2017	Australian Bureau of Statistics	5-May-17		http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4655.0Main+Features12017	Environmental Assets The notion of environmental assets used in this publication is consistent with the System of Environmental-Economic Accounting 2012 (SEEA) definition and can include: subsoil assets, both mineral and energy; land; soil resources; timber resources, both plantation and native forest; aquatic resources (e.g. fish), both cultivated and natural; water resources, comprising surface water, ground water and soil water; and other biological resources. The ABS makes estimates of the value of subsoil, land and timber assets. While the ABS does not separately identify the value of water resources on the national balance sheet, ABS research in this area is described in a recent feature article Experimental estimates of the value of water resource stocks, Australia in Australian Environmental-Economic Accounts, 2016 (cat. no. 4655.0). The value of Australia's environmental assets (in current prices) increased 108% over the period 2005-06 to 2015-16 from $2,953.1b to $6,138.1b. The value of Australia's produced capital also increased over this period, although to a lesser extent (74%), rising from $3,276.3b to $5,680.7b. Environmental assets now make up the largest share of Australia's capital base as reported on the national balance sheet.	Interesting to read but of no direct value to progress the natural assets project.
25	Parks management: Inventories, Condition and Performance Assessment Practice Note 10.1	IPWEA	2014		$100 cost for hardcopy - https://www.ipwea.org/publications/ipweabookshop/practicenotes/pn10	This Parks Management Practice Note provides practical advice and guidance to assist parks management practitioners in the application of asset management practices. It uses parks terminology and parks examples to translate the typical engineering focused asset management approach to the parks environment. It includes information to assist in the following tasks: Design of asset inventories Asset information collection and upkeep Assessment of condition and remaining life Use of performance assessment to compliment or use as an alternative to condition The relationship of levels of service to condition and performance Dealing with green and natural assets	Useful for the management of natural assets. All the IPWEA Practice Notes 10.1, 10.2, 10.3 and 10.4 are relevant to councils
26	A comparative analysis of ecosystem service valuation	UNE	Dec-16		http://www.policysupport.org/costingnature https://www.sciencedirect.com/science/article/pii/S2212041616304259	Comparison of various approaches to valuation of natural assets and eco systems (UNE tab). Mainly at policy level but links to Co$ting Nature http://www.policysupport.org/costingnature	Interesting to read but of no direct value to progress the natural assets project.
27	UN Expert meeting on Ecosystem Valuations	UN	Bonn Germany 2018			Starting from the SEEA EEA research agenda on valuation and accounting, the meeting will address key issues on valuation concepts for ecosystem services and assets, explore suitable valuation methods for key ecosystem services, present the current state of the art of valuation in the context of ecosystem accounting and discuss issues pertaining to the valuation of ecosystem degradation and enhancement in the context in the SEEA EEA revision process.	Outcomes not known at time of review but likely to be economic and high level. No further use to the natural assets project.
28	Accounting for Environmental Benefits in the Environmental Profit and Loss	Kering	2016			Objective of paper to set out an accounting framework to integrate positive contributions into the Environmental Profit and Loss (EP&L). EP&L places monetary value on environmental impacts along a supply chain. Includes water pollution, water consumption, air pollution, GHG emissions, land use, waste. Measures against a baseline of level of environmental quality in the absence of the company activities. Report discusses accounting with project specific baselines so company can demonstrate positive changes as well as positive changes outside of the immediate supply chain.	Interesting to read but of no direct value to progress the natural assets project.
29		European Union			No specifics found		
30	Best practice Manual Trees and Tree Roots	State-wide Mutual	Aug-11	Version 6		Discussion about tree risk management but includes a suggested 'Tree Inspection' template.	The inspection template may be useful for councils if they don't have one or wondering where to start.
31	TechOne	Tech One				Comprehensive software solution to asset management. No specifics to natural assets.	Technology One AMIS a possible software option for councils. More research as to specifics of the tool required.
32	Authority 7	Civica				Software with 40 modules to assist management of organisations. Includes an Assets module that covers: asset register, fleet, maintenance management, asset financials, strategic asset management and works.	Civica AMIS a possible software option for councils. More research into specifics of the tool required.

Document No.	Name	Author/ Owner	Publication Date	Document Reference	Comments and links	Summary	Usefulness of Document to LGNSW Natural Assets Project
33	Advancing Municipal Natural Asset Management: The Town of Gibsons' experience in financial planning & reporting	Town of Gibsons, BC, Canada	2017		The Town of Gibsons recognises the value of natural assets but has not yet developed a financial calculation for valuing these assets. They currently add a note to their financial summary. They have proposed a data hierarchy for natural assets - see Gibsons Unicode format worksheet.	*3.5 Think in terms of lifecycle costing and investment returns* *Bottom line: Considering only immediate costs hides expenses that occur over the life of the asset. Also, engineered assets must be disposed of (and replaced) at the end of their life, whereas natural assets may well grow in value and have no end of life.* As part of its more integrated decision-making, the Town, where relevant, now compares the lifecycle of natural and engineered assets before making capital decisions, including: • **Start-up costs and financial flexibility.** Existing natural assets often have no upfront capital costs, whereas engineered assets do.[6] Using them effectively can therefore reduce costs. The Town was able to develop an alternative to an engineered stormwater pipe to service a higher-elevation area, using natural assets. The cost of the engineered option is approximately $4 million, which creates a barrier to development, both given the high cost, and the fact that the engineered option must be built all at once. Natural asset costs, by contrast, were estimated at $30,000-$50,000 per acre of maintenance costs. Additionally, implementation can be phased in over time, so costs would be incremental and achievable as development progresses. • **Operating and maintenance costs.** Operating and maintenance costs for engineered assets are just that: necessary but committed costs that keep the asset functioning and delivering service until the end of its useful life. An operating cost for a natural asset can be an *investment* because the natural asset does not necessarily have an end of life, and with proper stewardship, gets more valuable. For example, making operational improvements to a creek to ensure safe stormwater conveyance could include replanting of natural vegetation and making upstream improvements (e.g. upstream ponds and wetlands) that reduce silt and allow existing creek plantings to become more mature and established, all which can improve habitat for aquatic life. • **End-of-life.** Both natural assets and engineered assets require ongoing maintenance and/or rehabilitation. However, at the end of the lifecycle of an engineered asset, the local government is left with an asset that has completely depreciated and must be disposed of and replaced. By contrast, well-maintained natural assets such as a forest or wetland will likely have appreciated in terms of both service to the municipality and benefits from healthy ecosystems including habitat, biodiversity, cultural and recreational value.	Not as advanced as NSW councils are looking for but interesting to read about how other councils are managing natural assets.
34	Brisbane City Council	Brisbane City Council			BCC also referenced on the itree software web site as a user of I Tree for street trees	Brisbane City Council's *Natural Assets Local Law 2003 (NALL)* helps to protect our natural assets, including bushland areas, wetlands, waterway corridors and trees in urban areas. The NALL also allows better management of the impacts of weeds and hazardous vegetation. Council has been protecting vegetation with Local Laws since 1991. The NALL delivers a balance between protecting the city's environment and people, property and lifestyle. The Local Law is not a land use control. However, along with the Brisbane City Plan 2014 it requires landowners to consult Council to adopt a responsible approach to deciding what vegetation will be retained as part of any proposal to build a house, subdivide or develop land. BCC street trees are estimated to be returning $1.67M/ year in air quality, rainfall interception, carbon storage and sequestration benefits and $29.7M in residential property value benefits (measured using itree Eco V5 in 2011) The BCC Asset management Policy only relates to infrastructure services and physical assets, focussing on long term assets. They list roads, bridges, stormwater, water and waste water, buildings, parks and other physical assets (excludes Council owned land)	Itree potentially of value to councils (street trees). BCC interviewed and use the Queensland Herbarium assessment methodology which is useful for councils with bushland areas.
35	Logan City Council	Logan City Council			Street trees are recorded but not valued https://www.logan.qld.gov.au/__data/assets/pdf_file/0004/384673/Asset-Management-Plan-Transport-network.pdf but the Parks ASMP does not cover trees.	Infrastructure assets (a) Infrastructure assets for which there is no liquid and active market are measured during valuation at depreciated replacement cost. (b) As there is no active market for these assets, recoverable value is also measured as depreciated replacement cost, which means that infrastructure asset carrying values and recoverable amounts will be the same. (c) Any adjustment to infrastructure asset carrying values as a result of impairment is treated as a revaluation adjustment and accounted for in terms of Council's asset revaluation policy	No further use to the natural assets project.
36	Logan City Council	Logan City Council			https://www.logan.qld.gov.au/__data/assets/pdf_file/0020/301826/Tree-Management.pdf Not specifically mentioned in the LCC Total assets and services management plan (2015). May be rolled up under roads or parks Parks AMP covers fixed and hard assets only - no trees etc	Management of existing trees (a) Logan City Council values trees as green assets and healthy trees that do not meet tree removal criteria will be retained in the first instance. (b) Parks branch is to be consulted regarding possible impacts to trees as a result of proposed works prior to works commencing. In the event of tree loss or failure, the cost of the cleanup and/or replacement planting and establishment is borne by the party/s undertaking the works. (c) Council will maintain a tree register to recognise the value of, encourage the protection of and manage trees of significance and/or of concern. The register for trees of concern is to be maintained detailing trees requiring regular inspections and ongoing maintenance where there is a perception of unacceptable risk such as large trees located in close proximity to private property. (d) Requests for tree removal works resulting from the installation of solar panels/billboards/signage will not be supported in the first instance. If the requestor in this scenario is willing to meet the vegetation offset cost then removal will be considered. Determining vegetation offset costs will be calculated using the tree canopy loss calculator. Pruning works will be considered and programmed if appropriate for the specimen tree species and tree condition.	Useful to understand the process for tree management of another interstate council but no specific use for the natural assets project.
37	Gold Coast City Council	Gold Coast City Council				The GCCC Asset Management Policy only relates to built physical assets (does not includes road reserve trees) Comprehensive Natural Area Management Plans are used and the numbers and types of trees are recorded. No evidence of similar for road reserve trees outside of any Natural Area The GCCC Asset Custodian Policy includes green assets. Trees are classified under Category B - Trees and Landscaping. The Manager Parks & Recreational Services is the custodian.	No further use to the natural assets project.

Document No.	Name	Author/ Owner	Publication Date	Document Reference	Comments and links	Summary	Usefulness of Document to LGNSW Natural Assets Project
38	The Removal and Replacement of Trees on National Land - Finance Policy	NCA	Apr-13	Version 4		NCA has determined that trees meet the definition of an asset and can be valued in accordance with AASB Framework NCA tree policy: Initial recognition - costs associated with planting, clearing of and, labour and initial nurturing Asset register - trees are a sub ledger item of the Land Class Measurement after recognition - trees are revalued to fair value Depreciation - NCA do not depreciate trees because they have an 80-100 yr life so depreciation is immaterial Impairment - annual assessment to identify dead, dying, diseased or damaged trees Tree removal - costs are only capitalised if the tree is removed for the planting of new	NCA has integrated their natural assets (trees, gardens, lake) into their asset management system using standard practices for the development of a SAMP, AMPs and valuations. Useful for councils to know that special processes are not necessarily required to integrate natural assets with other assets.
39	Urban Tree Valuation - A Current Perspective and Progress Report	Dr G M Moore, University of Melbourne	2006		See Moore paper summary worksheet	Multiple methods of valuing trees available but nothing (as of 2006) adopted by Standards Australia due to heavy influences from organisations such as public utilities.	Interesting to read about the various valuation formula developed. The Burnley formula is reasonably simple and worth investigating as part of the next step in the natural assets project.
40	Treenet	Treenet			19th National Street Tree Symposium, 6 and 7 September 2018, Adelaide https://treenet.org/resources/urban-tree-valuation	Trees have long been recognised in the scientific field for the benefits they provide both to the environment and people, such as: climate change adaptation and mitigation, providing flora and fauna habitat and resources, improving human health and well-being, and increasing local economic prosperity and real estate values. Though the benefits of trees and associated green infrastructure elements is not new, only recently has their importance been actively recognised and pursued by urban planners and decision-makers. As a result, there is now a rapidly growing impetus at the local government level to increase urban green infrastructure as an adaptation strategy. However, justifying and advocating for more trees has proven difficult in urban areas where competition for land area is high. Being able to value trees as an urban asset allows us to justify the business-case for trees and so advocate for increased tree plantings on public land. However, effectively and efficiently increasing tree cover in urban areas also requires trees to be retained and planted on private property, which will need a cultural and behavioural shift by the people living and working in urban areas. Local councils play a key role in leading and nurturing such cultural and behavioural change.	Treenet are advocates of street trees. They point to itree and Moore. A lot of material on their website and worth reading in detail but no new material relating to valuation of trees.
41	Tree Management Policy	City of Sydney	2013 (policy adopted)			Part of their Tree Management Policy: tree asset management – specialised care and management for our trees, as they are growing in a harsh urban environment;	Interviewed - refer report.
42	itree tools	i-tree			http://arboriculture.org.au/Uploads/Editor/Doc/i%20-%20tree%20ECO%20Australia/2012%20Sept%20iTreeEco%20Australia%20Users%20Manual.pdf itree tool is free software. The user manual can be accessed through the link above.	This paper provides an overview of a case study project conducted by the City of Unley aimed at valuing their urban trees and then engaging the local community as a means of initiating positive cultural and behavioural changes towards trees.	itree worth investigating further and of potential use to councils.
43	Tree Ecosystem Services Assessment, Ridge Park	City of Unley (through SEED Consultants using itree), South Australia	18-May-16			City of Unley have used itree software to value trees in a specific location (the tool can be used for street trees as well). Value is assessed by function and on a financial basis. By function: 1. air pollution removal, 2. carbon dioxide storage and sequestration, 3. rainfall interception itree also estimates structural value (= replacement value). The depreciated replacement cost is based on a Council of Tree and Landscape Appraisers (CTLA) formulae (Watson 2001 and 2002). Replacement value is calculated from : tree species, size, condition and location. The calculation aligns with a valuation of a structural asset (ie the cost of replacement from a nursery)	itree worth investigating further and of potential use to councils.
44	Urban Forest Tree valuations - Tree Valuations in the City of Melbourne	City of Melbourne			Estimates the cost of removing a tree. They too use the itree software.	**A – Removal Costs**: Amounting to the fees incurred by Council for physically removing the tree **B – Amenity Value**: Calculated in accordance with Council's Amenity Formula. **C – Ecological Services Value**: Calculated in accordance with the i-Tree valuation tool **D – Reinstatement Costs**: Calculated in accordance with the greening required to replace the loss to the landscape incurred by the removal.	itree worth investigating further and of potential use to councils.

Document No.	Name	Author/ Owner	Publication Date	Document Reference	Comments and links	Summary	Usefulness of Document to LGNSW Natural Assets Project
45	Forestry & Natural Resources - Tree Appraisal	Lindsay Purcell, Purdue Extension, Purdue University	May-18	FNR-473-W		Offers a number of valuation formula but maintains there are 4 common elements: Tree species, condition, size and location. The Guide to Plant Appraisal, 9th Edition by CTLA covers three methods of valuation: cost, income and market approaches.	CTLA formula potentially useful for councils
46	The Guide for Plant Appraisal	Council of Tree and Landscape Appraisers (CTLA)		9th edition Catalogue Number P1209	The Guide for Plant Appraisal authored by the Council of Tree and Landscape Appraisers can only be purchased - not available free on line. http://arboriculture.org.au/Products/Books--Videos-and-Audio/Overseas-Books--CDs---CD-ROMs/P1209-Guide-for-Plant-Appraisal--9th-edition---FREE-Workbook--valued-at--36-99----Non-member-Price	Tree Value = base value* cross sectional area* species class* condition class* location class	CTLA formula potentially useful for councils
47		Director Risk and Insurance Department of Transport and Main Roads (QLD)	18/07/2018		We value landscaping, as a part of the road asset valuation but not trees specifically (depreciation, economic life, liability at the end of life would be a minefield) We were looking at valuing trees when the carbon tax was being muted, but not any more We have some offset areas (for example, koala offsets, and possibly carbon offsets, but these are clumps of trees specifically bought to replace lost habitat) Some major construction projects require long term landscape maintenance agreements (upto 10 years), to ensure the trees grow The climate change risk we're most susceptible to is increased extreme weather conditions, cyclones, storm, flood and tempest. The existing network is self-insured, and if damage does occur, 80% of the repair costs funded by Canberra. For projects under construction the risk is transferred to insurers (Contract Works Insurance). Over 90% of TMR's contract works claims are weather related, therefore this risk is included in the premium rate we pay for the insurance. Other climate change risk such as global warming, sea level rises and more severe weather events aren't covered by insurance, but are incorporated into design standard revisions		TMR interviewed. They manage natural assets under legislation but do not value them because they believe natural assets do not depreciate in value. Stance of interest but does not align with the majority of other stakeholders. No further use to the natural assets project.
48	Valuing Victoria's Parks - Accounting for ecosystems and valuing their benefits: Report if first phase findings	Parks Victoria	2015(?)			Very comprehensive attempt to value ecosystems in the Victorian Parks network. Assets themselves are not necessarily valued but the role they play in an ecosystem eg trees in carbon sequestering, or in the production of honey. Attempts have been made to assess condition of assets but on a location basis ie quite crude. Possibly too complex an approach for initial consideration by LGNSW.	Complex approach to valuing natural assets. A less complex methodology deemed more useful. Of no further use to the natural assets project.
49	System of Environmental- Economic Accounting - Central Framework 2012	United nations			https://unstats.un.org/unsd/envaccounting/seearev/seea_cf_final_en.pdf	The System of Environmental-Economic Accounting 2012—SEEA Central Framework (SEEA Central Framework), which was adopted as an international standard by the United Nations Statistical Commission at its forty-third session in March 20121 is the first international statistical standard for environmental-economic accounting. The SEEA Central Framework is a multipurpose conceptual framework for understanding the interactions between the economy and the environment, and for describing stocks and changes in stocks of environmental assets. It puts statistics on the environment and its relationship to the economy at the core of official statistics. This version of the SEEA is an outcome of much path-breaking work on extending and refining concepts for the measurement of the interaction between the economy and the environment. Some important measurement challenges remain and are included in the research agenda in annex 2. Regular compilation of environmental-economic accounts in countries as part of a programme of official statistics will foster international statistical comparability, provide policy-relevant information at national, regional and international levels, improve the quality of the resulting statistics and ensure a better understanding of the measurement concepts.	Complex framework better suited to a national assessment. Relates to environmental economic accounting. Not recommended as value for LGNSW
50	Office of Environment & Heritage Annual Report 2016-17	Office of Environment & Heritage, NSW Government	Oct-17		NSW National Parks & Wildlife Service (NPWS) is a Service Group within OEH	**v. Assets not able to be reliably measured** OEH holds certain assets that have not been recognised in the statement of financial position because the value of these assets cannot be measured reliably, due to absence of a reliable and comparable market. These assets include natural cultural artefacts with unlimited life.	No further use to the natural assets project.
51	Accounting for Natural Capital - the elephant in the board room	Chartered Institutes of Management Accounting (CIMA)	May-14			Natural capital refers to the elements of nature that produce value, directly and indirectly, for people, such as forests, rivers, land, minerals and oceans. It includes the living aspects of nature, such as fish stocks, as well as the non-living aspects, such as minerals and renewable or non-renewable resources. Natural capital underpins all other types of capital and is the foundation on which our economies, societies and prosperity are built.	No further use to the natural assets project.

Document No.	Name	Author/ Owner	Publication Date	Document Reference	Comments and links	Summary	Usefulness of Document to LGNSW Natural Assets Project
52	Australian Infrastructure Financial Management Manual (AIFMM)	IPWEA	2015			Asset definition: 1. future economic benefits - the future economic benefit embodied in an asset is the potential to contribute, directly or indirectly, to the flow of cash and cash equivalents to the entity 2. control by the entity - control means the ability od the entity to benefit from the future economic benefits or to restrict the access of others to those benefits 3. Occurrence of a past event - the asset must be in existence In practical terms an infrastructure asset is a physical component of a facility which has value, enables services to be provided and has an expected life of greater than 12 months. No specific guidance for the financial valuation of natural assets although parks and open spaces are listed as assets	Of direct relevance to councils in terms of process.
53	Biodiversity Assessment Method	Office of Environment and Heritage for the NSW Government	Aug-17	ISBN 978 1 76039 773 9		The NSW biodiversity offsets scheme (the offsets scheme) is established under Part 6 of the NSW Biodiversity Conservation Act 2016 (BC Act). The Biodiversity Assessment Method (BAM) is established under section 6.7 of the BC Act. The BAM is established for the purpose of assessing certain impacts on threatened species and threatened ecological communities (TECs), and their habitats, and the impact on biodiversity values, where required under the BC Act, Local Land Services Act 2013 (LLS Act) or the State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017). The BAM is structured around three primary stages. Stage 1 of the BAM establishes a single consistent approach to assessing the biodiversity values on land. Under the proposed offsets scheme, this will include: (a) land proposed as a development site, including for a Part 5 activity (proposed development site) (b) land subject to a vegetation clearing proposal which is required to be assessed by the BAM under the LLS Act (proposed clearing site) (c) land proposed to be biodiversity certified, and (d) land proposed as a biodiversity stewardship site under a biodiversity stewardship agreement (proposed biodiversity stewardship site).	A potential means of valuing natural assets to support funding applications. This methodology if of use to councils.

APPENDIX

B

STAKEHOLDER ENGAGEMENT PLAN

Interview Answer Sheet

Council: City of Sydney Date: 23/08/18 Interviewee(s): Karen, Phil and Carl Interviewer(s): Kevin Roberts, Chloe V and Kathy (LG NSW)

Question No.	Topic	Question	Answer
1	Stakeholder Details	Brief description of role and responsibilities	Phil and Karen– tree management team Carl – asset strategy manager and system administrator
2		Size of organisation (e.g. staff numbers, area covered, annual budget (opex and capex), current asset values)	**Trees**: 8 staff and 60 operational staff (including contractors) Budget: $7m maintenance, $1.5m renewal, $1m expansion **Parks:** 13 staff and 86 operational staff Budget: $15.3m maintenance, $3m renewal, $9.7m expansion
3		What types of assets are managed, and specifically what natural assets?	Parks, trees, street trees, nature strips, rain gardens, planted 'bushland'
4	Asset Management System	Do your Asset Management Objectives specifically incorporate natural assets?	Yes in terms of setting environmental and canopy targets (see 2030,2050 plans)
5		Do you have a Strategic Asset Management Plan that covers natural assets?	Yes – there is one for parks, open spaces and trees
6		Are natural assets included in any other plans or policies for eg IP&R systems of council? Please list	Yes in tree management and urban forestry documents Significant tree registry Roadside verges starting to be incorporated into civil plans, and rain gardens into stormwater plans.
7		Any specific asset management IT system used? Eg spreadsheets, database, Confirm, TechOne, Civica	Confirm
8		Are natural assets included in this system? If not, is there a specific system used for natural assets? Eg *itree* software	Yes - trees

Question No.	Topic	Question	Answer
9		How effective is this system? What are the pros and cons of having natural and built assets in one/different system(s)? Any recommendations for councils considering the implementation of a similar system?	A bit of work to customise to put in specific needs but once established very effective. It acts as an asset register but also captures the approval process, work history, condition assessments, health, maintenance, contractor work etc. Itree doesn't suit the needs in terms of contractor management Also use confirm for parks and open spaces.
10	Asset Management	What natural assets do you collect data for and how is it collected (e.g. visual, desktop)? Eg trees, waterways, bushland, roadside reserves	Via contractors – inspect in the field using an ipad and report via Confirm
11		Do you differentiate between natural area assets (eg bushland) and urban greening (eg street trees)?	Trees managed via a risk management approach – capture high risk trees individually, and low risk trees by group (e.g. street trees or trees near a school high risk)
12		What natural assets inventory data is collected? Eg numbers, types, location, age	46,000 trees identified Age, condition, location, type, zone 50% mature, 35% semi-mature, 1% over mature, 14% young.
13		Are condition assessments of natural assets undertaken and if so, on what frequency and what coverage? Eg annual condition assessment of 20% of the tree inventory	Annually each tree Given a health and structural rating of 1-4
14		Can you explain the basis of the condition assessment?	Health and structural condition
15		Is the natural assets data stored in the same way as the infrastructure assets data?	yes

Question No.	Topic	Question	Answer
16		How do you resource natural assets data collection Eg in house, outsourced	10-15% in-house and the rest contracted to specialists
17		Are natural assets part of your forward works plans?	Yes, inform plans for expansion and tree planting etc.
18		Are any forward works plans for natural assets developed from the condition and other data you collect?	Yes – respond immediately to condition assessments
19		Are your natural assets the responsibility (in terms of reporting, finance etc) of the Asset Management Team, or the Environmental team? Both? Other?	Environment (tree) team is the asset owner
20	Natural Asset Valuation	Do you undertake a financial valuation of your natural assets? Or do you engage specialists to undertake the natural assets valuation?	Yes
21		What standards or formula do you use to guide the valuation?	Removal and replacement cost (replacement being with an advanced sized tree) Some trees valued higher due to their character such as the fig trees in Hyde Park Don't depreciate the valule of the trees
22		How often do you update or revalue your natural assets?	Every 3-4 years
23		How are natural asset valuations reported?	IP&R through standard reports, government submissions etc Value of trees (replacement cost): $34 million park tree and $82m for street trees
24		Is there any specific software you use to guide the natural assets valuation?	In transmission – moving asset values into asset management system and trees will be one of the first to come across
25	Natural Assets Insurance	Do you insure any of your natural assets?	Insure turf, parks and trees for damage but not for incidentals Quite limited in terms of what can be claimed.
26		If you do insure natural assets, does the policy differ	Limited – turf, parks and trees just one category Not a specific policy for natural assets such as trees etc.

Question No.	Topic	Question	Answer
		in any way to that for other assets?	
27		If you don't insure natural assets, what is the reasoning or barriers to doing so?	N/A
28		If you do insure for loss or damage to natural assets, does your policy account for the effects of climate change?	Unclear about the question. Looking to climate change planning across other assets on a broader scale
29	Funding Natural Asset Maintenance	How do you secure funding for maintenance and management of natural assets?	Council funding – aligns with strategic vision Part of council allocation and 4 year budget Ongoing program
30		Does maintenance of natural assets compete for funding with maintenance of other assets?	Yes, everything competes
31		Do you invest in replacing or renewing natural assets where applicable? Have you funded new natural assets?	Yes – tree budget $7m maintenance, $1.5m renewal, $1m expansion $1.3m planting of tress in footpaths etc $1.5m planting program to plant trees within roadway
32	Maintaining Natural Assets	Have you developed Levels of Service and/ or Performance Measures to guide the maintenance of natural assets? (and can we have a copy?)	Yes with contractors – incorporates KPIs (outcome and performance) The service level standard/agreement established tries to be replicated by the in-house team. PHIL TO EMAIL THE SERVICE STANDARDS
33		Do you outsource the maintenance of your natural assets or deliver in house?	Yes
34		Have you developed maintenance specifications or Standard Operating	Yes see qn 32.

Question No.	Topic	Question	Answer
		Procedures specifically for natural asset maintenance?	
35	Customers	What are the benefits, or otherwise, to your customers from managing and valuing natural assets?	Risk management – living and working under trees etc. Environmental benefits of leafy trees Generally high level of support in council area Property values etc Interesting people more protective about trees in public space compared to private (often want to cut them down for development, but want to sue council for removing a Hyde Park fig)
36	General	What challenges did you face, or are you facing, in managing and valuing natural assets?	Valuing trees can get complicated which is why they use the remove/replace equation (not fool-proof but a good basis to value trees). Takes resources and time High investment costs to setup, requires customisation and ongoing investment to maintain. Need time and data (need to understand how to get the data and how to maintain it)
37		What are the main pros and cons to managing and valuing natural assets?	It can be difficult to value trees. CoS chose to go with simple 'replacement' process Need to understand what data you want to collect and how you are going to use it
38		Would you be willing to have your experience documented as a case study for the LGNSW project?	Yes, with prior review before publication.
39		Did you use or consult with any other organisation when introducing natural asset management? If so can you provide any good examples and or contacts	No, but Sutherland council is coming to learn from CoS to see how they manage their trees.
40		What challenges have been faced within council/organisation in integrating natural assets into existing systems? Can you identify any lessons learnt or experiences to share with others?	Need to think ahead of what data you might need in 5-10 years – data for valuation, operation, risk management, canopy cover

Question No.	Topic	Question	Answer
41		How has integrating natural assets benefitted council/organisation?	Yes – big advantage Immediate access to too much data! A lot of data for individual trees which could be useful for universities etc Need to make sure the tree people can communicate with the data people
42		What was the integration process, and would it be repeated or altered?	No regrets. Choice of system should be value driven. There are off the shelf subscription services available which almost do what Council's system does but not as customised. Don't necessarily need to invest a lot to start up but need to make sure it integrates appropriately – difference between an asset registry and one that incorporates works, conditions, contractors etc.
43		What were the drivers behind the adoption of a natural asset management system (eg efficiency, cost-benefit, etc)?	Asset management should all value natural assets. Having it all in one system is great and more efficient. Enabling areas such as roadside (concrete and grass) to be valued individually rather than grouped as just concrete, or grass.
Any other comments?			Risk based approach is key - maintain all trees to a high standard.

Interview Answer Sheet

Council: Queanbeyan Palerang Regional Council (QPRC)

Date: 27 August 2018

Interviewee(s): Simon Holloway (02 6238 8129)

Interviewer(s): Susan Chamberlain

Question No.	Topic	Question	Answer
1	Stakeholder Details	Brief description of role and responsibilities	Coordinator of Natural Resources Management, Responsible for two programs - Biodiversity and Biosecurity (weed management) (60 programs across Council) Has had 10 years with Council, 8 of those years with Palerang prior to amalgamation with Queanbeyan
2		Size of organisation (e.g. staff numbers, area covered, annual budget (opex and capex), current asset values)	460 FTE Area ≈ 5,200km^2 Operating Expenditure 2018/19 = $112M
3		What types of assets are managed, and specifically what natural assets?	QPRC is a merger of two Councils: Palerang – rural Queanbeyan – urban Bushland reserves ≈ 600 properties owned or managed ≈ 150 bushland blocks Approx 1500km of road (mostly rural), with 40% high value roadside reserve of environmental value (mapped vegetation)_
4	Asset Management System	Do your Asset Management Objectives specifically incorporate natural assets?	Not as of date of interview but being actively progressed New software being implemented now. There were no natural assets recorded but now discussing a GIS mapping approach. Considering including: threatened species, habitats and tree hollows
5		Do you have a Strategic Asset Management Plan that covers natural assets?	SAMP – not aware of a SAMP. Unlikely to cover natural assets if there is one. Post interview note: QPRC have a comprehensive Asset Management Strategy but it does not include natural assets
6		Are natural assets included in any other plans or policies for eg IP&R systems of council? Please list	Biodiversity Strategy – simple document eg how many properties have EEC, threatened species. There is a single plan for natural areas, a single plan for sports areas etc. Special properties have their own plans
7		Any specific asset management IT system used?	One Council asset management module (TechOne rebadged)

Question No.	Topic	Question	Answer
		Eg spreadsheets, database, Confirm, TechOne, Civica	
8		Are natural assets included in this system? If not, is there a specific system used for natural assets? Eg *itree* software	Will be populating One Council Currently collecting roadside data – going into GIS then feeding into One Council
9		How effective is this system? What are the pros and cons of having natural and built assets in one/different system(s)? Any recommendations for councils considering the implementation of a similar system?	Not yet effective because natural assets data is in a separate GIS system. Data mapped and passed to the works department
10	Asset Management	What natural assets do you collect data for and how is it collected (e.g. visual, desktop)? Eg trees, waterways, bushland, roadside reserves	Roadsides – trees and other vegetation, plot based survey + grass, shrubs and condition Native vegetation mapping Higher priority bushland with threatened species Drone used (CASA certification), primarily for weed mapping but now used to map natural assets. One cm resolution imagery, used for plant identification
11		Do you differentiate between natural area assets (eg bushland) and urban greening (eg street trees)?	Yes - Managed by different branches of Council – Natural Landscapes and Urban Landscapes
12		What natural assets inventory data is collected? Eg numbers, types, location, age	Roadsides – standard methodology (refer Road Sides Reserves Project) Ie type, condition, location, presence of hollows, species, ground debris. Tree planting (20M trees planting project) – trying to get data, some rough counts available Weeds – mapping undertaken – from property inspections they can be mapped in detail New legislation – Biosecurity Information System, reporting requirements
13		Are condition assessments of natural assets undertaken	Condition data being collected for the first time Biodiversity Strategy being written – bushlands and roadside bushland. Four year cycle of assessing blocks. Looking at introducing a levy (eg environmental levy Wingecaribee Council apply)

Question No.	Topic	Question	Answer
		and if so, on what frequency and what coverage? Eg annual condition assessment of 20% of the tree inventory	Post interview note – Queanbeyan City has an asset register listing 6500 street trees with a 5 year inspection plan.
14		Can you explain the basis of the condition assessment?	Vegetation type – from the LGNSW project
15		Is the natural assets data stored in the same way as the infrastructure assets data?	Yes – in One Council. Holds Both natural and non natural assets data
16		How do you resource natural assets data collection Eg in house, outsourced	In house currently (some externally funded). Trying to build internal capacity.
17		Are natural assets part of your forward works plans?	Fairly ad hoc at the moment. Grants applied for eg gully erosion threatening bushland area Not a lot of day to day maintenance work, more reactive activities, other than weed control The 20M trees project may include watering and maintenance
18		Are any forward works plans for natural assets developed from the condition and other data you collect?	Yes – for urban/roadside tree safety and weeds found to be posing a biosecurity impact on natural assets
19		Are your natural assets the responsibility (in terms of reporting, finance etc) of the Asset Management Team, or the Environmental team? Both? Other?	Environmental team Value not yet assigned to natural assets
20	Natural Asset Valuation	Do you undertake a financial valuation of your natural assets? Or do you engage specialists to undertake the natural assets valuation?	Haven't been valuing natural assets Note – Biodiversity NSW legislation (Biodiversity Conservation Act 2016) bio banking/ off setting. A $ value can be obtained for maintenance funding applications. Off setting is a new process for NSW. Post interview note – some financial valuations have been undertaken as part of whole assessment of park trees but it is not systematic or widespread.

Question No.	Topic	Question	Answer
21		What standards or formula do you use to guide the valuation?	
22		How often do you update or revalue your natural assets?	Post interview note – not systematic at this time
23		How are natural asset valuations reported?	N/A
24		Is there any specific software you use to guide the natural assets valuation?	N/A
25	Natural Assets Insurance	Do you insure any of your natural assets?	Not aware of any insurance, except Public Liability eg limb falling off a tree. Post interview note – no insurance for natural assets
26		If you do insure natural assets, does the policy differ in any way to that for other assets?	
27		If you don't insure natural assets, what is the reasoning or barriers to doing so?	
28		If you do insure for loss or damage to natural assets, does your policy account for the effects of climate change?	
29	Funding Natural Asset Maintenance	How do you secure funding for maintenance and management of natural assets?	Mostly through grants, except for weed control (legal obligation)
30		Does maintenance of natural assets compete for funding	Still a challenge to secure sufficient funding. Tendency for funding to be directed to the urban areas where a lot of construction is going on. Rural areas a less understood.

Question No.	Topic	Question	Answer
		with maintenance of other assets?	
31		Do you invest in replacing or renewing natural assets where applicable? Have you funded new natural assets?	Fairly limited ability – some annual budgets eg Queanbeyan River. Generally investment is in weed control and minor replanting.
32	Maintaining Natural Assets	Have you developed Levels of Service and/ or Performance Measures to guide the maintenance of natural assets? (and can we have a copy?)	No performance measures yet developed (need data and resources) Strategy is being drafted now (Shoal Haven City Council example)
33		Do you outsource the maintenance of your natural assets or deliver in house?	In-house
34		Have you developed maintenance specifications or Standard Operating Procedures specifically for natural asset maintenance?	Weed management – procedures are clear. Trees on roadsides – safety – RTA Guidelines Standard Operating Procedures for planting needed.
35	Customers	What are the benefits, or otherwise, to your customers from managing and valuing natural assets?	Community Strategic Plan – new one in place Vision – 'enjoy natural spaces and landscapes' but this is not matched with funding. Know people like natural assets are that people are interested in it
36	General	What challenges did you face, or are you facing, in managing and valuing natural assets?	Funding for natural assets Biodiversity program – planning, education Resources – too few staff except through grants funding (resources are focussed on weed management) Valuing natural assets – need resources and then a valuation methodology Native vegetation map – need a comprehensive one. Lots of surveys have been undertaken but not comprehensive

Question No.	Topic	Question	Answer
37		What are the main pros and cons to managing and valuing natural assets?	Pros – community values re. natural assets are met and if natural assets are valued they might attract more funding; public safety Cons – resources need to establish initial assessments and ongoing maintenance
38		Would you be willing to have your experience documented as a case study for the LGNSW project?	Yes
39		Did you use or consult with any other organisation when introducing natural asset management? If so can you provide any good examples and or contacts	Wingecarribee (Enviro Levy) Bega Council Coffs Harbour – Enviro Levey and conservation map Bellingen (similar to Palerang) – good sustainability and Environmental section and they also impose a levy Hunter region group of Councils – pooling of resources to get more grants good model
40		What challenges have been faced within council/organisation in integrating natural assets into existing systems? Can you identify any lessons learnt or experiences to share with others?	Categories do not exist in the asset management system. It would be good if there were standard asset categories for natural assets.
41		How has integrating natural assets benefitted council/organisation?	Hasn't happened yet. Less risk of asset being damaged accidentally Broader education and appreciation of natural assets
42		What was the integration process, and would it be repeated or altered?	
43		What were the drivers behind the adoption of a natural asset management system (eg efficiency, cost-benefit, etc)?	Internal efficiencies Reducing chances of accidental damage Integration with other assets – cost benefit Like the idea of one system but expect it will have limitations
Any other comments?			Pilot projects finishing in about 6 months – interesting to see how integration went Better guidelines and more consistency

Interview Answer Sheet

Council: National Capital Authority

Date received: 3 September 2018

Interviewee(s): Ken Gibson

Interviewer(s): via email

Question No.	Topic	Question	NCA
1	Stakeholder Details	Brief description of role and responsibilities	NCA Board and Executive, NCA Estate, NCA Finance, NCA Plan, NCA Corporate & Governance, NCA ICT, NCA Inform & Educate
2		Size of organisation (e.g. staff numbers, area covered, annual budget (opex and capex), current asset values)	65 FTE
3		What types of assets are managed, and specifically what natural assets?	Assets Classes: Buildings, Open Spaces, Transport, Dam & Lake Asset Categories include Land, Trees, Landscape Areas, Conservation Areas.
4	Asset Management System	Do your Asset Management Objectives specifically incorporate natural assets?	Yes.
5		Do you have a Strategic Asset Management Plan that covers natural assets?	Yes.
6		Are natural assets included in any other plans or policies for eg IP&R systems of council? Please list	Yes. Eg. Heritage Management Plans.
7		Any specific asset management IT system used? Eg spreadsheets, database, Confirm, TechOne, Civica	Technology One and ArcGIS
8		Are natural assets included in this system? If not, is there a specific system used for natural assets? Eg *itree* software	Yes. Per Asset Class and Category, as noted at Q3.
9		How effective is this system? What are the pros and cons of having natural and built	Technology One Ci Under construction now.

Question No.	Topic	Question	NCA
		assets in one/different system(s)? Any recommendations for councils considering the implementation of a similar system?	Software as a Services (SaaS) is being considered following the recommendations from the *NCA ICT Strategy.* This will likely upgrade the AMS to CiAnywhere2018b.
10	Asset Management	What natural assets do you collect data for and how is it collected (e.g. visual, desktop)? Eg trees, waterways, bushland, roadside reserves	Data is collected in the field utilising GPS, service providers and condition reports.
11		Do you differentiate between natural area assets (eg bushland) and urban greening (eg street trees)?	Yes.
12		What natural assets inventory data is collected? Eg numbers, types, location, age	Generally between 7-10 attributes. Asset Class, Asset Category, Location, Sub-location, x/y co-ordinates, type, age, use, useful life, species/type, condition, risk rating, key features, other.
13		Are condition assessments of natural assets undertaken and if so, on what frequency and what coverage? Eg annual condition assessment of 20% of the tree inventory	Yes. Range across the Asset Categories. Annual inspections are undertaken via outsourced service providers.
14		Can you explain the basis of the condition assessment?	Identify the current state of an asset, apply a risk rating and outline proposed treatment measures to lower the risk profile.
15		Is the natural assets data stored in the same way as the infrastructure assets data?	Yes.
16		How do you resource natural assets data collection Eg in house, outsourced	Outsourced. In-house staff also undertake independent inspections to verify claims within the reports.
17		Are natural assets part of your forward works plans?	Yes.
18		Are any forward works plans for natural assets developed from the condition and other data you collect?	Yes. Eg. Tree removal and replacement program.
19		Are your natural assets the responsibility (in terms of reporting, finance etc) of the Asset Management Team, or the Environmental team? Both? Other?	Data collection and management: Estate Management. Capitalisation and accounting: Finance.

Question No.	Topic	Question	NCA
20	Natural Asset Valuation	Do you undertake a financial valuation of your natural assets? Or do you engage specialists to undertake the natural assets valuation?	Yes.
21		What standards or formula do you use to guide the valuation?	Australian Accounting Standards Board – *Standard 116 (AASB116) Property, Plant and Equipment*, together with *Australian Accounting Standards Board – Standard 13 (AASB13) Fair Value Measurement*, as well as a valuation for Insurance Purposes of the non-current Administered and Departmental Assets under the demise of the NCA
22		How often do you update or revalue your natural assets?	Annually. By 30 April each year.
23		How are natural asset valuations reported?	Annually, via specialist service provider.
24		Is there any specific software you use to guide the natural assets valuation?	Varies.
25	Natural Assets Insurance	Do you insure any of your natural assets?	Yes.
26		If you do insure natural assets, does the policy differ in any way to that for other assets?	Yes.
27		If you don't insure natural assets, what is the reasoning or barriers to doing so?	
28		If you do insure for loss or damage to natural assets, does your policy account for the effects of climate change?	
29	Funding Natural Asset Maintenance	How do you secure funding for maintenance and management of natural assets?	Budget bids based on Departmental and Administered Works Budgets.
30		Does maintenance of natural assets compete for funding with maintenance of other assets?	Yes.
31		Do you invest in replacing or renewing natural assets where applicable? Have you funded new natural assets?	Yes.
32	Maintaining Natural Assets	Have you developed Levels of Service and/ or Performance Measures to guide the maintenance of natural assets? (and can we have a copy?)	Underway. Through Cardno AMS Works. First identified in Cardno 2014 NCA AMS.
33		Do you outsource the maintenance of your natural assets or deliver in house?	Outsourced.

Question No.	Topic	Question	NCA
34		Have you developed maintenance specifications or Standard Operating Procedures specifically for natural asset maintenance?	Yes.
35	Customers	What are the benefits, or otherwise, to your customers from managing and valuing natural assets?	Amenity, aesthetic, sense of place, environmental.
36	General	What challenges did you face, or are you facing, in managing and valuing natural assets?	Internal: Competing budgets, budget constraints, budgets affecting the management of natural (eg. water budget for irrigation), management of the land with limited resources. External: inclement weather, events held on the land, service provider delivery standards,
37		What are the main pros and cons to managing and valuing natural assets?	Consistency in reporting, apply consistent risk management and judgement, benchmarking, effective and efficient management of assets across the NCA land.
38		Would you be willing to have your experience documented as a case study for the LGNSW project?	Yes.
39		Did you use or consult with any other organisation when introducing natural asset management? If so can you provide any good examples and or contacts	Yes. Centennial Parklands, SOPA, ACT Government.
40		What challenges have been faced within council/organisation in integrating natural assets into existing systems? Can you identify any lessons learnt or experiences to share with others?	Managing risk profiles vs built assets. ***Eg***. natural assets perceived as lower risk vs potholes, bridge failure… etc
41		How has integrating natural assets benefitted council/organisation?	Consistent reporting processes.
42		What was the integration process, and would it be repeated or altered?	Integrated at the same time as all other Asset Categories.
43		What were the drivers behind the adoption of a natural asset management system (eg efficiency, cost-benefit, etc)?	Effective and efficient management processes, consistency in reporting and overview

Interview Answer Sheet

Council: Blue Mountains City Council Date: 4 September, 2018 Interviewee(s): Matthew Chambers Interviewer(s): KR & DZ

Question No.	Topic	Question	Answer
1	Stakeholder Details	Brief description of role and responsibilities	Program leader for natural area management – natural areas and visitor facilities (walking tracks, lookouts) Within the Environment branch Includes bush regen., walking tracks, urban weeds (regulatory and public lands man.), bush team
2		Size of organisation (e.g. staff numbers, area covered, annual budget (opex and capex), current asset values)	30 staff in MC's team 500 staff in Council 1450 km2 LGA size ~120M opex ~17M capex ~1.3B built assets
3		What types of assets are managed, and specifically what natural assets?	Road, drainage, waste management facilities, buildings, open space, visitor facilities and natural areas (6500 ha of bushland of which 500 ha are TECs, 200 reserves, 300 km of creeks, 20 ha of open freshwater bodies) Roadside vegetation attached to large reserve hence treated as natural areas re: man.
4	Asset Management System	Do your Asset Management Objectives specifically incorporate natural assets?	Yes. Community strategic plan has specific section for environment includes management of natural areas and undertaking appropriate asset man. – clear objective. Also standalone natural area asset management plan (bushland and waterways but excludes tree management). Discussion of tree asset management plan, currently spans across other asset management portfolios thus delay in developing asset management plan.
5		Do you have a Strategic Asset Management Plan that covers natural assets?	See above.
6		Are natural assets included in any other plans or policies for eg IP&R systems of council? Please list	Other plans including weed man. strategy from a catchment management approach.
7		Any specific asset management IT system used? Eg spreadsheets, database, Confirm, TechOne, Civica	Civica previously but not currently using it because the system has not met its ability to deliver what Council requires. Additional plugins of Civica were not forthcoming or did not work well. In the market to procure another system.

Question No.	Topic	Question	Answer
8		Are natural assets included in this system? If not, is there a specific system used for natural assets? Eg *itree* software	MapInfo used for natural asset management system rather than Civica.
9		How effective is this system? What are the pros and cons of having natural and built assets in one/different system(s)? Any recommendations for councils considering the implementation of a similar system?	MapInfo able to manipulate and use for works programming. Requires a geographic interface as an asset management tool. Different from other built assets as it's not a depreciating asset.
10	Asset Management	What natural assets do you collect data for and how is it collected (e.g. visual, desktop)? Eg trees, waterways, bushland, roadside reserves	Bushland – condition, weed mapping (driving for maintenance), vegetation. Currently mapping other landscape features (e.g. soil erosion). Each reserve visited yearly thus, mapping occurs. Waterways are mapped and conditions assessed as well as aquatic weed mapping. Trees mapped in some park assets and significant trees. Condition done on visual assessment but did modelling in 2014 done for natural area condition via desktop for cost of restoring natural areas (1.9B, higher than built assets, peer reviewed at 2.2B *REPORT AVAILABLE TO BE SENT BY MC*).
11		Do you differentiate between natural area assets (eg bushland) and urban greening (eg street trees)?	See Q4.
12		What natural assets inventory data is collected? Eg numbers, types, location, age	See Q10.
13		Are condition assessments of natural assets undertaken and if so, on what frequency and what coverage?	See Q10.

Question No.	Topic	Question	Answer
		Eg annual condition assessment of 20% of the tree inventory	
14		Can you explain the basis of the condition assessment?	Condition of bushland categorised into 'degraded', 'recovering' or 'pristine' assessed on three year basis but landscape features assessed yearly and weeds assessed every two years. Categories from visual inspection (officer's opinion).
15		Is the natural assets data stored in the same way as the infrastructure assets data?	Stored in MapInfo.
16		How do you resource natural assets data collection Eg in house, outsourced	In house. Dedicated officer who man. bushland and another for waterways. Other staff who deal with trees and visitor facilities across portfolios. Report on condition.
17		Are natural assets part of your forward works plans?	Yes. Work plans for natural areas. Natural areas can be an appreciating assets by improving condition.
18		Are any forward works plans for natural assets developed from the condition and other data you collect?	See above.
19		Are your natural assets the responsibility (in terms of reporting, finance etc) of the Asset Management Team, or the Environmental team? Both? Other?	Environment team and natural area management team for bushland and waterways. No external (financial) reporting obligations.
20	Natural Asset Valuation	Do you undertake a financial valuation of your natural assets? Or do you engage specialists to undertake the natural assets valuation?	See Q10.
21		What standards or formula do you use to guide the valuation?	See reports.
22		How often do you update or revalue your natural assets?	Shift from theoretical model to an on-ground model in the future but unlikely to overall. Currently broken up into categories thus can re-evaluate individually. Can be done for in line with condition reporting and index financial costs but no current driver and not in hurry to repeat.

Question No.	Topic	Question	Answer
23		How are natural asset valuations reported?	See report.
24		Is there any specific software you use to guide the natural assets valuation?	Methodology in reports. Trees are different and have not been costed for asset valuations.
25	Natural Assets Insurance	Do you insure any of your natural assets?	No. Insures only buildings.
26		If you do insure natural assets, does the policy differ in any way to that for other assets?	N/A
27		If you don't insure natural assets, what is the reasoning or barriers to doing so?	Cost.
28		~~If you do insure for loss or damage to natural assets, does your policy account for the effects of climate change?~~	N/A
29	Funding Natural Asset Maintenance	How do you secure funding for maintenance and management of natural assets?	Allocations for each program have remained constant with some special rate variations (additional funds). 37% funding gap for natural areas, visitor facilities 50% funding gap.
30		Does maintenance of natural assets compete for funding with maintenance of other assets?	Independent budget allocations except for special variations. Demonstrate shortfall in maintaining current service levels and community requires this then can put in special rate variations. Community is a big driver in funding. Community perceives natural assets as a recreational asset.
31		Do you invest in replacing or renewing natural assets where applicable? Have you funded new natural assets?	Program for degraded lands, restore greenfield areas. Mown park surrendered to be restored.
32	Maintaining Natural Assets	Have you developed Levels of Service and/ or Performance Measures to guide the maintenance of	No SOPs but rely on experience of staff and contractors (external contractors trained by Council with a long-standing relationship).

Question No.	Topic	Question	Answer
		natural assets? (and can we have a copy?)	
33		Do you outsource the maintenance of your natural assets or deliver in house?	1.3M internal delivery and a min. of 500K plus matching grants (LLS, Crown Lands and agency funding) thus 1M for external.
34		Have you developed maintenance specifications or Standard Operating Procedures specifically for natural asset maintenance?	See above.
35	Customers	What are the benefits, or otherwise, to your customers from managing and valuing natural assets?	See above. Council community survey. Reporting on area of man., hours of man., weed management.
36	General	What challenges did you face, or are you facing, in managing and valuing natural assets?	About 10% of properties inspected annually and about 15% is directed towards private land (inspectors, education and extension material and a small amount of private lands on ground expenditure (high conservation value land or State government funded targeted weed programs). Council's driven by community complaints and the environment does not receive as much attention from the community as other assets. Asset management systems are not adapted to managing natural assets v. built assets. Reporting to government is not the same/required as it is for built assets. External reporting requirement needs to drive internal changes.
37		What are the main pros and cons to managing and valuing natural assets?	See above.
38		Would you be willing to have your experience documented as a case study for the LGNSW project?	Yes.
39		Did you use or consult with any other organisation when introducing natural asset management? If so can you provide any good examples and or contacts	Lake Macquarie. City of Melville, WA. Jeff Rorda and Associates - IPWEA
40		What challenges have been faced within council/organisation in integrating natural assets	Council recognised environment as an important asset (culture in place). No obligations to report. Training for staff for understanding the value of natural assets.

Question No.	Topic	Question	Answer
		into existing systems? Can you identify any lessons learnt or experiences to share with others?	
41		How has integrating natural assets benefitted council/organisation?	Asset planning is done by the program management hence staff are not divorced from the process.
42		What was the integration process, and would it be repeated or altered?	See above.
43		What were the drivers behind the adoption of a natural asset management system (eg efficiency, cost-benefit, etc)?	See above.
Any other comments?			

Interview Answer Sheet

Council: Port Stephens Date: 4 September 2018 Interviewee(s): John Maritech Interviewer(s): KR + DZ

Question No.	Topic	Question	Answer
1	Stakeholder Details	Brief description of role and responsibilities	Asset Manager – parks and reserves but excludes waste/IT. Facilitates and services (asset man., capital works, public domain, puts people in/on).
2		Size of organisation (e.g. staff numbers, area covered, annual budget (opex and capex), current asset values)	Approx. 500. 110M opex. 20/30M capex.
3		What types of assets are managed, and specifically what natural assets?	Strategic asset man. plan – tangible Road reserve natural, naturally grown parks and Crown land, foreshores, AMZ, trees (risk, only recently listed in AMP).
4	Asset Management System	Do your Asset Management Objectives specifically incorporate natural assets?	Not very well. Foreshores are easy to manage and check unlike bushland/road reserves. No triggers for actions.
5		Do you have a Strategic Asset Management Plan that covers natural assets?	See above. GIS for natural assets (developer constraints).
6		Are natural assets included in any other plans or policies for eg IP&R systems of council? Please list	IP&R document in community strategic plan, Coastal Management Policy and EMS for specific works.
7		Any specific asset management IT system used? Eg spreadsheets, database, Confirm, TechOne, Civica	Civica, spreadsheets and GIS.
8		Are natural assets included in this system? If not, is there a specific system used for natural assets? Eg *itree* software	Not yet in Civica – data collected but not incorporated.
9		How effective is this system? What are the pros and cons	Not very.

Question No.	Topic	Question	Answer
		of having natural and built assets in one/different system(s)? Any recommendations for councils considering the implementation of a similar system?	Early stages for man. natural assets (except for foreshores) – data there but not incorporated.
10	Asset Management	What natural assets do you collect data for and how is it collected (e.g. visual, desktop)? Eg trees, waterways, bushland, roadside reserves	Trees (incidents/inspections) – web map to log health and status of trees.
11		Do you differentiate between natural area assets (eg bushland) and urban greening (eg street trees)?	Not yet. Not identified in systems (street trees).
12		What natural assets inventory data is collected? Eg numbers, types, location, age	Natural areas, F&F mapped, exotic plants, threatened species and heritage.
13		Are condition assessments of natural assets undertaken and if so, on what frequency and what coverage? Eg annual condition assessment of 20% of the tree inventory	Assessment of condition triggered by need for work.
14		Can you explain the basis of the condition assessment?	Only triggered by need for work but started on CBD tree assessment.
15		Is the natural assets data stored in the same way as the infrastructure assets data?	No. GIS data for natural areas.
16		How do you resource natural assets data collection Eg in house, outsourced	In house.

Question No.	Topic	Question	Answer
17		Are natural assets part of your forward works plans?	Not part of CM policy work plans. Not part of funding for future works – funds/approval limited. 700 self-directed volunteers involved with Council.
18		Are any forward works plans for natural assets developed from the condition and other data you collect?	Only foreshores for CMPs and priority works.
19		Are your natural assets the responsibility (in terms of reporting, finance etc) of the Asset Management Team, or the Environmental team? Both? Other?	Asset man. team. Driven by impact.
20	Natural Asset Valuation	Do you undertake a financial valuation of your natural assets? Or do you engage specialists to undertake the natural assets valuation?	No. Delphi Method for street trees.
21		What standards or formula do you use to guide the valuation?	See above.
22		How often do you update or revalue your natural assets?	Never.
23		How are natural asset valuations reported?	Previous SoE reports but still reports on objectives as part of CSP.
24		Is there any specific software you use to guide the natural assets valuation?	No.
25	Natural Assets Insurance	Do you insure any of your natural assets?	Unsure, maybe some heritage trees are insured?
26		If you do insure natural assets, does the policy differ in any way to that for other assets?	TBC.

Question No.	Topic	Question	Answer
27		If you don't insure natural assets, what is the reasoning or barriers to doing so?	TBC.
28		~~If you do insure for loss or damage to natural assets, does your policy account for the effects of climate change?~~	N/A
29	Funding Natural Asset Maintenance	How do you secure funding for maintenance and management of natural assets?	Treasury model, separate teams, capital works funding for foreshore if available. Weed eradication in natural areas triggered by local knowledge and maintenance. No funding unless driven by needs/threatened species (Council/OEH) picked up by env. assessment triggered by works.
30		Does maintenance of natural assets compete for funding with maintenance of other assets?	Yes. Capped budgets under treasury model.
31		Do you invest in replacing or renewing natural assets where applicable? Have you funded new natural assets?	Cost as a result of own activities but not natural events. Improve Koala corridor from grants program.
32	Maintaining Natural Assets	Have you developed Levels of Service and/ or Performance Measures to guide the maintenance of natural assets? (and can we have a copy?)	TBC (mostly no).
33		Do you outsource the maintenance of your natural assets or deliver in house?	In house.
34		Have you developed maintenance specifications or Standard Operating Procedures specifically for natural asset maintenance?	Yes. EMS – levels of triggers for delegation of work. Permissible activities rather than SOP – some SOP adjacent to SEPP 14 Wetlands.
35	Customers	What are the benefits, or otherwise, to your customers	Lifestyle/tourism and natural environment – economic. Working with NPWS.

Question No.	Topic	Question	Answer
		from managing and valuing natural assets?	
36	General	What challenges did you face, or are you facing, in managing and valuing natural assets?	No standards/guidelines. Valuing natural assets as a liability – problem.
37		What are the main pros and cons to managing and valuing natural assets?	Repeatability of man. assets. Endless financial requirement to man. natural assets.
38		Would you be willing to have your experience documented as a case study for the LGNSW project?	Yes – view before distribution.
39		Did you use or consult with any other organisation when introducing natural asset management? If so can you provide any good examples and or contacts	Steve Wilson – Hunter Council.
40		What challenges have been faced within council/organisation in integrating natural assets into existing systems? Can you identify any lessons learnt or experiences to share with others?	Recognised as priority by engineers – responsibility.
41		How has integrating natural assets benefitted council/organisation?	Commenced integration but not there yet. 200K env. sust. Fund – rate of return for works must be shown.
42		What was the integration process, and would it be repeated or altered?	N/A
43		What were the drivers behind the adoption of a natural asset management system (eg efficiency, cost-benefit, etc)?	N/A

Question No.	Topic	Question	Answer
Any other comments?			

Interview Answer Sheet

Council: Brisbane City Council

Date: 5 September 2018

Interviewee(s): Tina Manners

Interviewer(s): Susan Chamberlain

Question No.	Topic	Question	Answer
1	Stakeholder Details	Brief description of role and responsibilities	Policy Officer in the Biodiversity Planning Team (strategic level creating policy) – public and private land advisory) There is a breadth of conservation policy across the city ie Planning Scheme, areas to acquire, Asset Management Plans, threatened species
2		Size of organisation (e.g. staff numbers, area covered, annual budget (opex and capex), current asset values)	BCC is the largest local government in Australia. Diverse Local Government that has moved beyond rates, rubbish and roads. Broad profile with a high community focus
3		What types of assets are managed, and specifically what natural assets?	Definition of natural assets: *Natural habitat cover is remnant and non-remnant (native) vegetation within the habitat areas and ecological corridors across Brisbane.* • *this vegetation includes the 81 different vegetation types across Brisbane, covering wetlands, saltmarshes, mangroves, eucalypt woodlands through to rainforest communities.* • *remnant vegetation is the more mature vegetation, whilst non-remnant is the immature/regrowth vegetation.* o Individual trees and Vegetation Communities are mapped against the Queensland Herbarium assessment methodology. o Park trees are not mapped o Street trees o Waterways Note: natural vegetation assets = natural habitats
4	Asset Management System	Do your Asset Management Objectives specifically incorporate natural assets?	

Question No.	Topic	Question	Answer
5		Do you have a Strategic Asset Management Plan that covers natural assets?	No specific asset management plan for natural assets – to be addressed in the future. The Asset Management Plan is city wide
6		Are natural assets included in any other plans or policies for eg IP&R systems of council? Please list	Planning Scheme – biodiversity area overlay – across the whole city Natural Assets Local Law (NALL) – opportunity to protect vegetation Blue print for the future: Clean Green sustainable strategy – reinstate 40% of natural habitat - 75% in a healthy condition ↓ NALL – stop pre-emptive clearing (applies to all Council land and activities) ↓ Planning Scheme ↓ AMPS – managing individual assets
7		Any specific asset management IT system used? Eg spreadsheets, database, Confirm, TechOne, Civica	SAP – for all assets. Street trees are being added now. Park trees may not have been mapped Natural vegetation/ habitat is mapped as Vegetation Communities – includes condition and targets
8		Are natural assets included in this system? If not, is there a specific system used for natural assets? Eg *itree* software	AIM – asset information system *i tree* is used for street trees (Jeni Ayres)
9		How effective is this system? What are the pros and cons of having natural and built assets in one/different	SAP good for keeping tracks of works undertaken on the asset and costing and budgeting (it is used by the operational staff) One system – tracks implementation and resources required to achieve desired outcomes

Question No.	Topic	Question	Answer
		system(s)? Any recommendations for councils considering the implementation of a similar system?	Mapping – holds all information about what is wanted and assigned to that asset. Allows very specific knowledge of where $ are allocated and allows better reporting for policy and operational needs. Queensland Herbarium – defines how vegetation is classified and assessed. Four levels of condition in the Classification System BCC has formally recognised natural assets through their Asset management Framework. This has allowed informed conversations with communities
10	Asset Management	What natural assets do you collect data for and how is it collected (e.g. visual, desktop)? Eg trees, waterways, bushland, roadside reserves	Mapped – on ground, regional ecosystem. Condition benchmark. Adopted the bio condition methodology which requires a benchmark. Now finalising the current and desired condition. Where level of service can be achieved can be assessed An urban environment can be more expensive to maintain eg riparian edges Asset management model – cost factors can be built in to determine spend decisions
11		Do you differentiate between natural area assets (eg bushland) and urban greening (eg street trees)?	Refer No. 8
12		What natural assets inventory data is collected? Eg numbers, types, location, age	Condition – existing and desired
13		Are condition assessments of natural assets undertaken and if so, on what frequency and what coverage? Eg annual condition assessment of 20% of the tree inventory	Yes Condition – once every 5 years Weed mapping – occurs more frequently. Weeds are 90% of the problem Allows identification of 'at risk' assets/ areas
14		Can you explain the basis of the condition assessment?	Condition attributes – number of large trees, height of canopy, canopy coverage, species richness, % of leaf cover, logs on the ground, presence of weeds
15		Is the natural assets data stored in the same way as the infrastructure assets data?	Yes

Question No.	Topic	Question	Answer
16		How do you resource natural assets data collection Eg in house, outsourced	Historically insourced data collection. Used the Queensland herbarium for base data. Future procurement is to be determined.
17		Are natural assets part of your forward works plans?	Planned to be – yes. Eg parks already have a detailed Forward Works Plan There are 8 different programs involved in natural habitat restoration
18		Are any forward works plans for natural assets developed from the condition and other data you collect?	Yes
19		Are your natural assets the responsibility (in terms of reporting, finance etc) of the Asset Management Team, or the Environmental team? Both? Other?	Asset Owner – Natural Environment Water Sustainability Branch (NEWS) AMP – asset management branch Asset services – implement AMPS This is similar for waterways and street trees
20	Natural Asset Valuation	Do you undertake a financial valuation of your natural assets? Or do you engage specialists to undertake the natural assets valuation?	Not included at this point – have looked at valuing natural assets 15 years ago a report was commissioned – using land value, but a peer review did not support it.
21		What standards or formula do you use to guide the valuation?	At this stage focussing on management. Valuing will come later.
22		How often do you update or revalue your natural assets?	N/A
23		How are natural asset valuations reported?	N/A
24		Is there any specific software you use to guide the natural assets valuation?	N/A
25		Do you insure any of your natural assets?	Currently investigating the need to insure

Question No.	Topic	Question	Answer
	Natural Assets Insurance		
26		If you do insure natural assets, does the policy differ in any way to that for other assets?	Risk management is used even if insurance is not in place
27		If you don't insure natural assets, what is the reasoning or barriers to doing so?	N/A
28		If you do insure for loss or damage to natural assets, does your policy account for the effects of climate change?	N/A
29	Funding Natural Asset Maintenance	How do you secure funding for maintenance and management of natural assets?	Through the annual budget process Work with Catchment Groups and secure external funding through Grants.
30		Does maintenance of natural assets compete for funding with maintenance of other assets?	Yes
31		Do you invest in replacing or renewing natural assets where applicable? Have you funded new natural assets?	Yes – strategy for 40% reinstatement
32	Maintaining Natural Assets	Have you developed Levels of Service and/ or Performance Measures to guide the maintenance of natural assets? (and can we have a copy?)	Using the Queensland Herbarium Bio Condition A Condition Assessment Framework for Terrestrial Biodiversity in Queensland Assessment Manual
33		Do you outsource the maintenance of your natural assets or deliver in house?	Varies depending on the program 1. Staff – in house 2. 2 outsourcing

Question No.	Topic	Question	Answer
			3. Community Groups (Habitat Brisbane and Creek Catchment Conservation) – very cost effective
34		Have you developed maintenance specifications or Standard Operating Procedures specifically for natural asset maintenance?	Bio condition benchmark – documents the outcomes desired. Internal restoration guidelines and framework Habitat Brisbane – have their own operating procedures
35	Customers	What are the benefits, or otherwise, to your customers from managing and valuing natural assets?	Community involvement AMPs – require customer levels of service (city wide and will provide evidence of what needs to be achieved
36	General	What challenges did you face, or are you facing, in managing and valuing natural assets?	Three types of customer have to be accounted for: - residents - Neighbours to bushland areas - Visitors to Brisbane
37		What are the main pros and cons to managing and valuing natural assets?	Evidenced based decision making framework that can be documented and visualised Targets and goals are key to enable the gap analysis and actions to be determined There are 81 vegetation communities – all have their own benchmarks One page condition profiles are good talking points for community discussion as they are outcome focussed
38		Would you be willing to have your experience documented as a case study for the LGNSW project?	Yes
39		Did you use or consult with any other organisation when introducing natural asset management? If so can you provide any good examples and or contacts	CSIRO – how to create AMPs for natural assets Queensland Herbarium – Bio condition assessment – basis of BCC framework Used university students to research AMPs
40		What challenges have been faced within council/organisation in integrating natural assets into existing systems? Can you identify any lessons learnt or experiences to share with others?	Getting information from the AMP to operational staff and presenting in the context of the other AMPs (eg Parks – have several AMPs that overlap and may conflict, thereby potential confusion to operational resources) SAP – provides the opportunity for clarity

Question No.	Topic	Question	Answer
41		How has integrating natural assets benefitted council/organisation?	It has provided a platform for the quantification of assets and condition
42		What was the integration process, and would it be repeated or altered?	Putting the framework in place – this has facilitated funding justification Getting systems in place has enabled progress
43		What were the drivers behind the adoption of a natural asset management system (eg efficiency, cost-benefit, etc)?	Policy, funding, community expectations
Any other comments?			Non asset solutions are important eg community understanding and support

Interview Answer Sheet

Council: Queensland Department of Transport and Main Roads

Date: 6 September 2018

Interviewee(s): Andrew Golding

Interviewer(s): Susan Chamberlain

Question No.	Topic	Question	Answer
1	Stakeholder Details	Brief description of role and responsibilities	Director (Transport System Asset Management) Strategic Investment & Asset Management Portfolio Investment & Programming Branch Policy Planning and Investment Division Department of Transport and Main Roads Facilitates the program through data, systems, policies and procedures
2		Size of organisation (e.g. staff numbers, area covered, annual budget (opex and capex), current asset values)	QTRIP is a $3.2B program (4 years) TMR has a $70B asset base
3		What types of assets are managed, and specifically what natural assets?	All road assets present in the TMR network\ Natural 'assets' are not recognised by TMR as assets but they do have road reserve flora
4	Asset Management System	Do your Asset Management Objectives specifically incorporate natural assets?	No
5		Do you have a Strategic Asset Management Plan that covers natural assets?	No Each region has a Tactical Asset Management Plan which covers environmental components
6		Are natural assets included in any other plans or policies for eg IP&R systems of council? Please list	Regulatory requirements are met and TMR take seriously the role of good corporate citizen. Risks associated with 'natural assets eg fire. Lines of sight and invasive species are managed. Most projects include landscaping (which may be capitalised).

Question No.	Topic	Question	Answer
7		Any specific asset management IT system used? Eg spreadsheets, database, Confirm, TechOne, Civica	N/A
8		Are natural assets included in this system? If not, is there a specific system used for natural assets? Eg *itree* software	N/A
9		How effective is this system? What are the pros and cons of having natural and built assets in one/different system(s)? Any recommendations for councils considering the implementation of a similar system?	N/A
10	Asset Management	What natural assets do you collect data for and how is it collected (e.g. visual, desktop)? Eg trees, waterways, bushland, roadside reserves	Vegetation data is collected and mapped (Catherine Mahoney) but there is nothing in the asset register or the financial register
11		Do you differentiate between natural area assets (eg bushland) and urban greening (eg street trees)?	N/A
12		What natural assets inventory data is collected? Eg numbers, types, location, age	Fire fuel load is monitored Invasive species are also monitored
13		Are condition assessments of natural assets undertaken	N/A

Question No.	Topic	Question	Answer
		and if so, on what frequency and what coverage? Eg annual condition assessment of 20% of the tree inventory	
14		Can you explain the basis of the condition assessment?	N/A
15		Is the natural assets data stored in the same way as the infrastructure assets data?	N/A
16		How do you resource natural assets data collection Eg in house, outsourced	N/A
17		Are natural assets part of your forward works plans?	N/A
18		Are any forward works plans for natural assets developed from the condition and other data you collect?	N/A
19		Are your natural assets the responsibility (in terms of reporting, finance etc) of the Asset Management Team, or the Environmental team? Both? Other?	At District level the Element Managers and Program Managers are responsible Environmental officers may manage contracts but overall management is at a higher level
20	Natural Asset Valuation	Do you undertake a financial valuation of your natural assets? Or do you engage specialists to undertake the natural assets valuation?	'Natural assets are considered immaterial to the overall value of the asset. The larger the tree, the greater the liability Safety is the prime concern eg a tree may be cut down from the median when it gets to a certain size Landscaping constructed during a project may be capitalised. It will sit within the earthworks category. Most projects include landscaping (which may be capitalised).

Question No.	Topic	Question	Answer
			There is no consumption of the asset – there is no depreciation associated with natural assets/ trees
21		What standards or formula do you use to guide the valuation?	N/A
22		How often do you update or revalue your natural assets?	N/A
23		How are natural asset valuations reported?	N/A
24		Is there any specific software you use to guide the natural assets valuation?	N/A
25	Natural Assets Insurance	Do you insure any of your natural assets?	Not natural assets
26		If you do insure natural assets, does the policy differ in any way to that for other assets?	N/A
27		If you don't insure natural assets, what is the reasoning or barriers to doing so?	Not considered an asset. No loss acknowledged if damaged or lost.
28		If you do insure for loss or damage to natural assets, does your policy account for the effects of climate change?	N/A
29	Funding Natural Asset Maintenance	How do you secure funding for maintenance and management of natural assets?	Funding for natural assets is lesser than for other assets but they are considered.
30		Does maintenance of natural assets compete for funding with maintenance of other assets?	Yes All assets are grouped into an 'Element' based on risk and asset type. Element Management Plans – covers prioritisation within the Element.

Question No.	Topic	Question	Answer
			An overall Steering Committee seeks balance across the various Elements and reprioritisation can occur through the year if necessary (eg flood, drought effects on vegetation Costs are monitored
31		Do you invest in replacing or renewing natural assets where applicable? Have you funded new natural assets?	Landscaping TMR used to fund town entry points but this is now funded through the relevant local authority. For community valued areas TMR may cost share with the local authority
32	Maintaining Natural Assets	Have you developed Levels of Service and/ or Performance Measures to guide the maintenance of natural assets? (and can we have a copy?)	Plans in collaboration with local government and the Rural Fire Board are maintained – they detail he direct priorities and activities required (fire threat and invasive species) TMR interested in developing performance measures around fire threat
33		Do you outsource the maintenance of your natural assets or deliver in house?	TMR, local government, landowners and neighbours are all involved in weed eradication
34		Have you developed maintenance specifications or Standard Operating Procedures specifically for natural asset maintenance?	Invasive species eradication and fire threat activities
35	Customers	What are the benefits, or otherwise, to your customers from managing and valuing natural assets?	N/A
36	General	What challenges did you face, or are you facing, in managing and valuing natural assets?	N/A

Question No.	Topic	Question	Answer
37		What are the main pros and cons to managing and valuing natural assets?	N/A
38		Would you be willing to have your experience documented as a case study for the LGNSW project?	Not appropriate for a Case Study but good to include interview in the report
39		Did you use or consult with any other organisation when introducing natural asset management? If so can you provide any good examples and or contacts	N/A
40		What challenges have been faced within council/organisation in integrating natural assets into existing systems? Can you identify any lessons learnt or experiences to share with others?	N/A
41		How has integrating natural assets benefitted council/organisation?	N/A
42		What was the integration process, and would it be repeated or altered?	N/A
43		What were the drivers behind the adoption of a natural asset management system (eg efficiency, cost-benefit, etc)?	N/A
Any other comments?			TMR fund activities that relate to an outcome or deliverable

Interview Answer Sheet

Council: Central Coast Council Date: 14/09/2018 Interviewee(s): Kim Radford, Alison Woodward, Rochelle Lawson Interviewer(s): KR + DZ

Question No.	Topic	Question	Answer
1	Stakeholder Details	Brief description of role and responsibilities	Kim – facilities manager (asset management forms a part of this) Alison – asset systems Rochelle – ecologist (natural asset management), writes management plans and runs the on-ground programs and involved in buying and selling credits.
2		Size of organisation (e.g. staff numbers, area covered, annual budget (opex and capex), current asset values)	Various teams – waterways and coastal protection team (2/3) Team manages reserves (6) Landcare teams (6) Within natural asset management group – street trees management (8) Part 5 assessment and EMS run with roadside Asset management team – waterways, coasts, bushland, built, open space.
3		What types of assets are managed, and specifically what natural assets?	Built – within natural areas and open spaces One BioBanking agreement under the old scheme and about to enter a number or reserves under the new system.
4	Asset Management System	Do your Asset Management Objectives specifically incorporate natural assets?	Currently in setup phase and still need to determine work orders and level of reporting. Gosford did not have anything other than a condition rating. Assets are relationships based to determine where they sit. BBAM and BAM sites being setup to help manage the site.
5		Do you have a Strategic Asset Management Plan that covers natural assets?	Yes. Strategy, policy and plan. Natural assets has its own plan, just been completed. *COUNCIL TO PROVIDE COPY*
6		Are natural assets included in any other plans or policies for eg IP&R systems of council? Please list	Natural assets policy. Env. strategy. *Potential urban sustain*ability strategy. Community strategic plan.
7		Any specific asset management IT system used? Eg spreadsheets, database, Confirm, TechOne, Civica	IPS, used to be Hansen.

Question No.	Topic	Question	Answer
8		Are natural assets included in this system? If not, is there a specific system used for natural assets? Eg *itree* software	Yes, it will be.
9		How effective is this system? What are the pros and cons of having natural and built assets in one/different system(s)? Any recommendations for councils considering the implementation of a similar system?	Still working out some things surrounding bushland, but system ok if data collected is ok.
10	Asset Management	What natural assets do you collect data for and how is it collected (e.g. visual, desktop)? Eg trees, waterways, bushland, roadside reserves	Componentise structure and given condition rating by inspectors. Information is collected based on standard system yet to be finalised. Condition mapping of vegetation and threatened species but does not form part of the asset management.
11		Do you differentiate between natural area assets (eg bushland) and urban greening (eg street trees)?	Yes – managed by different teams.
12		What natural assets inventory data is collected? Eg numbers, types, location, age	See Q10. Built structures in natural areas and other features as needed.
13		Are condition assessments of natural assets undertaken and if so, on what frequency and what coverage? Eg annual condition assessment of 20% of the tree inventory	6.5 ha reserves. Condition assessments done but not a standard system.
14		Can you explain the basis of the condition assessment?	See above.

Question No.	Topic	Question	Answer
15		Is the natural assets data stored in the same way as the infrastructure assets data?	Work in progress
16		How do you resource natural assets data collection Eg in house, outsourced	Outsources (consultants who also prepare management plans).
17		Are natural assets part of your forward works plans?	Yes and rolling budgets for reserves.
18		Are any forward works plans for natural assets developed from the condition and other data you collect?	Work plans are based on management plans and information collected for those.
19		Are your natural assets the responsibility (in terms of reporting, finance etc) of the Asset Management Team, or the Environmental team? Both? Other?	Reported through environmental programs.
20	Natural Asset Valuation	Do you undertake a financial valuation of your natural assets? Or do you engage specialists to undertake the natural assets valuation?	In the process of land valuation to establish credits but not anything done to date.
21		What standards or formula do you use to guide the valuation?	BAM not necessarily applicable as it would only be reflective of market demand rather than the actual value of natural assets. Value of natural assets not considered tied to condition.
22		How often do you update or revalue your natural assets?	N/A, currently not valued.
23		How are natural asset valuations reported?	Reporting for BAM sites. Financial reporting.
24		Is there any specific software you use to guide the natural assets valuation?	BBAM and BAM calculator. Issues with valuation based on condition.

Question No.	Topic	Question	Answer
25	Natural Assets Insurance	Do you insure any of your natural assets?	No.
26		If you do insure natural assets, does the policy differ in any way to that for other assets?	N/A
27		If you don't insure natural assets, what is the reasoning or barriers to doing so?	Self-funding and lack of need.
28		~~If you do insure for loss or damage to natural assets, does your policy account for the effects of climate change?~~	N/A
29	Funding Natural Asset Maintenance	How do you secure funding for maintenance and management of natural assets?	Opex and some Capex. Why asset management system is required to bid for budget. Built infrastructure in natural areas and bushfire management is Capex, includes RSF funding. Some bush regen. from Capex. Section 94 from development, restricted funds. BBAM and BAM credit market.
30		Does maintenance of natural assets compete for funding with maintenance of other assets?	Not much cross-over between budgets.
31		Do you invest in replacing or renewing natural assets where applicable? Have you funded new natural assets?	Only for built, no plan for new/replacement of natural assets but still maintained.
32	Maintaining Natural Assets	Have you developed Levels of Service and/ or Performance Measures to guide the maintenance of natural assets? (and can we have a copy?)	In the process of updating POMs. Not legally binding for PMs so no initiative to meet them.
33		Do you outsource the maintenance of your natural assets or deliver in house?	Built asset in natural areas are inhouse but actual maintenance of natural assets are out-sourced.

Question No.	Topic	Question	Answer
34		Have you developed maintenance specifications or Standard Operating Procedures specifically for natural asset maintenance?	No. Currently for manmade wetlands from a flood management PoV.
35	Customers	What are the benefits, or otherwise, to your customers from managing and valuing natural assets?	Yes, environment is a key driver for community lifestyle. Indicated in the recently released community strategic plan. *FIND COMMUNITY STRATEGIC PLAN*. Recreational and aesthetic.
36	General	What challenges did you face, or are you facing, in managing and valuing natural assets?	Not enough resources (money/people). Size of area to manage. Complexity – subject to influence out of Council's control (natural and community influence).
37		What are the main pros and cons to managing and valuing natural assets?	Ideas on valuing assets in Natural Asset MP.
38		Would you be willing to have your experience documented as a case study for the LGNSW project?	Want more guidance in managing natural assets. Yes, confirm with Council before released.
39		Did you use or consult with any other organisation when introducing natural asset management? If so can you provide any good examples and or contacts	Not at this stage. Potential to liaise with other Councils when the time comes.
40		What challenges have been faced within council/organisation in integrating natural assets into existing systems? Can you identify any lessons learnt or experiences to share with others?	Not currently integrated, committed to do this as required.
41		How has integrating natural assets benefitted council/organisation?	N/A

Question No.	Topic	Question	Answer
42		What was the integration process, and would it be repeated or altered?	Work in progress following amalgamation.
43		What were the drivers behind the adoption of a natural asset management system (eg efficiency, cost-benefit, etc)?	Business driver, visibility (of data particularly), reporting, more resources and efficiency in allocation of resources.
Any other comments?			Consistent way of scoring reserves for cross-comparison (structural integrity, habitat features, connectivity, weed intensity) in a matrix. Would like guidance, potentially based on what other Councils are doing.

Interview Answer Sheet

Council: Newcastle City Council Date: 14/09/2018 Interviewee(s): Karenne Jurd Interviewer(s): KR + DZ

Question No.	Topic	Question	Answer
1	Stakeholder Details	Brief description of role and responsibilities	Assets and Projects unit under the infrastructure directorate Karenne is the Asset Program Coordinator - Environment
2		Size of organisation (e.g. staff numbers, area covered, annual budget (opex and capex), current asset values)	4 main areas in assets management – roads, stormwater, buildings and structures, natural environment. Small environment team and a panel of ecological contracts and a city arborist. $6M pa required as per Natural SAMP. 2018-2019 reduced budget to $2.8M.
3		What types of assets are managed, and specifically what natural assets?	See excerpt. Coastal assets, estuaries, bushland, watercourses (shared with Hunter Water) and public trees. Natural assets are defined as those areas which rely on ecological/natural processes (i.e. not parks and recreational) for their performance.
4	Asset Management System	Do your Asset Management Objectives specifically incorporate natural assets?	Yes, driven service asset plans and strategic natural asset management plan. See supplied reports.
5		Do you have a Strategic Asset Management Plan that covers natural assets?	Yes, overarching compilation of multiple service asset plans (Strategic Asset Management Strategy).
6		Are natural assets included in any other plans or policies for eg IP&R systems of council? Please list	Yes, layer in LEP of environmentally sensitive lands, urban forest policy, policy initiatives in water management (urban water policy for all parts of the water cycle), biodiversity policy (no longer current), landscape precinct plan which covers biodiversity corridors and hotspots and environmental management policy (systems-based city-wide overarching document reviewed into a strategy and currently in review), urban forest policy, coast and estuary MP. Do not have a riparian policy.
7		Any specific asset management IT system used? Eg spreadsheets, database, Confirm, TechOne, Civica	OneCouncil from TechOne – hold register of assets but currently holds register for fair value. Currently a GUI interface holds SQL for waterways and trees. Purpose-built (from Mapinfo) holds urban forest data (median, street and park trees). Bushlands and urban creeks have a linked dataset in AMS. Or Excel datasets.
8		Are natural assets included in this system? If not, is there a specific system used for natural assets? Eg *itree* software	No benefit from having multiple systems which is why OneCouncil was used but it may not work based on the requirements natural asset management. TAMS – street trees and median vegetation. Excel spreadsheets.

Question No.	Topic	Question	Answer
9		How effective is this system? What are the pros and cons of having natural and built assets in one/different system(s)? Any recommendations for councils considering the implementation of a similar system?	See above.
10	Asset Management	What natural assets do you collect data for and how is it collected (e.g. visual, desktop)? Eg trees, waterways, bushland, roadside reserves	Public trees (street, park), including clusters inspected by Arborist. Habitat Trees (containing hollows) visual inspection by Ecologist. Bushland condition survey quadrats by Ecologist. Watercourses condition and morphology visual inspection by specialist.
11		Do you differentiate between natural area assets (eg bushland) and urban greening (eg street trees)?	Yes, however we do identify habitat trees in both bushland and street/median
12		What natural assets inventory data is collected? Eg numbers, types, location, age	See above and below. Quadrat data, transects, edge effects, connectivity, biodiversity, weed abundance, erosion, canopy cover, number of hollows, tree age, size, location and riparian vegetation width.
13		Are condition assessments of natural assets undertaken and if so, on what frequency and what coverage? Eg annual condition assessment of 20% of the tree inventory	Condition and functionality assessment based on best practice, predetermined parameters. Prioritisation comes from the functionality measure. Approximately a 5 year turnover and up to 15 year for trees. Driven by risk assessment basis (sometimes annual for trees nearhigh risk assets such as schools, childcare).
14		Can you explain the basis of the condition assessment?	See above.
15		Is the natural assets data stored in the same way as the infrastructure assets data?	Not at the stage as built assets are being integrated into OneCouncil.

Question No.	Topic	Question	Answer
16		How do you resource natural assets data collection Eg in house, outsourced	Budget for the inspection process meets risk determination. Agreement for targets for inspections (procedures and standards for tree life). Outsourced currently.
17		Are natural assets part of your forward works plans?	Yes, see plans.
18		Are any forward works plans for natural assets developed from the condition and other data you collect?	Yes, see plans.
19		Are your natural assets the responsibility (in terms of reporting, finance etc) of the Asset Management Team, or the Environmental team? Both? Other?	Asset management 101 from the plans and also based on stewardship. Delivery areas have operational $ to maintain assets. Additional program of capital renewal.
20	Natural Asset Valuation	Do you undertake a financial valuation of your natural assets? Or do you engage specialists to undertake the natural assets valuation?	Yes, unit rate for natural assets generated from previous project work. Costing for renewal and maintenance. Don't deal with varying vegetation classes but do for TECs. Own local nursery.
21		What standards or formula do you use to guide the valuation?	See above. Trees are valued at actual replacement costs. Bushland – unit rates derived from a range of on ground project work including full restoration $69/m2, bush regeneration primary phase $25/m2 and bush regeneration maintenance phase $9/m2. Ecosystem services costs not included yet in natural asset management processes.
22		How often do you update or revalue your natural assets?	Revalue is undertaken as reporting requires, nominally yearly. Tree valuation is available daily as data is updated into TAMS.
23		How are natural asset valuations reported?	See above.
24		Is there any specific software you use to guide the natural assets valuation?	See above.

Question No.	Topic	Question	Answer
25	Natural Assets Insurance	Do you insure any of your natural assets?	No. Self-insured.
26		If you do insure natural assets, does the policy differ in any way to that for other assets?	N/A.
27		If you don't insure natural assets, what is the reasoning or barriers to doing so?	
28		~~If you do insure for loss or damage to natural assets, does your policy account for the effects of climate change?~~	N/A
29	Funding Natural Asset Maintenance	How do you secure funding for maintenance and management of natural assets?	10 year window of expected requirements include projections for climate change and implications for vegetation. See plans. Community-driven costs for natural asset management.
30		Does maintenance of natural assets compete for funding with maintenance of other assets?	Yes, budgets have been cut based on requirements for other assets.
31		Do you invest in replacing or renewing natural assets where applicable? Have you funded new natural assets?	Yes, see above. Fire management an issue for future works and maintenance program.
32	Maintaining Natural Assets	Have you developed Levels of Service and/ or Performance Measures to guide the maintenance of natural assets? (and can we have a copy?)	No PoM because natural areas have been mapped but not categorised. Multivariate levels (star rating) for all natural assets. See plans.
33		Do you outsource the maintenance of your natural assets or deliver in house?	Mostly outsourced.

Question No.	Topic	Question	Answer
34		Have you developed maintenance specifications or Standard Operating Procedures specifically for natural asset maintenance?	Yes.
35	Customers	What are the benefits, or otherwise, to your customers from managing and valuing natural assets?	Securing a future and healthy environment – based on community survey of 1,900 people. Working with residents on natural connections (citizen science). See CSP in plans.
36	General	What challenges did you face, or are you facing, in managing and valuing natural assets?	
37		What are the main pros and cons to managing and valuing natural assets?	
38		Would you be willing to have your experience documented as a case study for the LGNSW project?	Yes. Review before distribution.
39		Did you use or consult with any other organisation when introducing natural asset management? If so can you provide any good examples and or contacts	LHCCREMS – rapid assessment Inhouse based on the LGA's requirements. TAMs inhouse. Have shared information with others.
40		What challenges have been faced within council/organisation in integrating natural assets into existing systems? Can you identify any lessons learnt or experiences to share with others?	Suitability of the systems and process for integration is long and complicated.
41		How has integrating natural assets benefitted council/organisation?	N/A

Question No.	Topic	Question	Answer
42		What was the integration process, and would it be repeated or altered?	N/A
43		What were the drivers behind the adoption of a natural asset management system (eg efficiency, cost-benefit, etc)?	Valuing is difficult but cultural value is evident.
Any other comments?			

APPENDIX C

STAKEHOLDER INTERVIEWS

Stakeholder Engagement Plan

Council Roadside Reserves Project - Integrating Natural Asset Management into Councils' Asset Management Systems (Stage 1)

Prepared for

Local Government NSW

August 2018

Cardno

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Table of Contents

Tables

Figures

1 Introduction

1.1 Background

Local government owns or is responsible for a significant portion of the 2.5 million hectares of roadside vegetation in New South Wales (NSW). Councils are required to consider a multitude of complex factors in managing road reserves, such as: road safety, routine maintenance activities, conservation, cultural values, firewood collection, bushfire risk, legal requirements, recreational use and development pressures.

Natural assets found in road reserves are rarely valued in a Council's asset management system when compared to the adjoining infrastructure assets such as roads and parks.

Under the planning and reporting activities prescribed in the Local Government Act 1993 and the Local Government (General) Regulation 2005 Councils are required to undertake asset management planning for their physical assets. However, some Councils chose to plan for their long term, 'soft assets' (intangibles), such as natural assets. There is no national standard methodology to guide Councils valuing of natural assets. Quantifying value and defining replacement costs is therefore complex and subjective.

1.2 Stakeholder Engagement Objectives

The objectives of the stakeholder engagement are to:

- Consult a cross section of stakeholders
- Understand :
  - what data a stakeholder captures, how it is captured and where that data is stored
  - how natural assets data is integrated into any existing asset management systems and/ or asset management plans
  - any differences in dealing with natural assets compared to infrastructure assets
- Identify the pros and cons of natural asset management
- Review various methodologies and formula for valuing natural assets
- Discuss challenges that have or are being faced
- Compile a set of relevant case studies

1.3 Scope of Stakeholder Engagement Plan (SEP)

The scope of the SEP is:

1. Identification of relevant stakeholders
2. Document the engagement methodology for each stakeholder
3. Propose the program of engagement
4. Outline the questions that will be posed to each stakeholder

2 Project Description

The Council Roadside Reserves (CRR) Project is a three year project funded by the NSW Environmental Trust and managed by Local Government NSW aiming to assist Councils towards best practice roadside environmental management. One of the items in the CRR Project Business Plan is to explore how Councils currently approach natural asset management with a view to how roadside environmental activities could be included and incorporated into Councils asset management systems.

Phase 1 of the project included the development of the Council Roadside Environmental Management Framework (CREMF) to streamline roadside environmental management. The CREMF included a section on natural assets. As this is a complex aspect of the CREMF, further investigation into this emerging area has been initiated (this project) to enable integration of natural asset data and management into other Council activities to facilitate practice change.

3 Stakeholder Identification

3.1 Council Roadside Reserves Advisory Committee

Local Government NSW has set up the CRR Advisory Committee to guide the direction and outcomes of the Council Roadside Reserves project.

The Advisory Committee comprises the following members:

- A nominee of the Roads and Maritime Services (RMS)
- A nominee of the Roadside Environment Committee (REC)
- A nominee of Local Land Services (LLS)
- A nominee of Local Government NSW (LGNSW)
- A nominee of Office of Environment and Heritage (OEH)
- An independent person with knowledge in linear reserve management

The Advisory Committee will:

- Review the SEP and provide further suggestions for alternate stakeholders and/ or areas of questioning
- Receive, review and provide feedback on the draft Final Report

3.2 Stakeholders to Interview

A project inception meeting was held on the 3 July 2018. At that meeting preliminary agreement was made to include the following stakeholders:

- Blue Mountains City Council
- Newcastle City Council
- Central Coast Council
- Brisbane/Logan City or Gold Coast Councils
- Queanbeyan-Palerang Regional Council

With discussion about possibly including:

- Local Land Services
- NSW Parks and Wildlife Services
- Wingecarribee Council
- City of Sydney Council

Preliminary findings from a literature search show that the following organisations have been actively managing and/ or valuing natural assets:

- National Capital Authority
- City of Melbourne
- City of Unley (South Australia)
- Parks Victoria.

Also identified as potential engagement stakeholders were:

- Bathurst Regional Council
- Northern Beaches Council
- Cooma Council
- Albury Council

- Lismore Council
- Port Stephens Council
- Sydney Catchment Authority
- Roads and Maritime Services (RMS)

Recognising time and budget limitations ideally six Councils and two non Council organisations should be consulted. The organisations recommended are listed in Table 3-1.

Table 3-1 Organisations recommended for consultation

Organisation	Justification for Consultation
Blue Mountains City Council	Discussed at project inception meeting
Newcastle City Council	Discussed at project inception meeting
Central Coast Council	Discussed at project inception meeting
Brisbane City Council	BCC website does not specifically show that trees are managed as assets or valued but the *itree* website lists BCC as a software user, indicating they do manage and value road reserve trees
Queanbeyan-Palerang Regional Council	Discussed at project inception meeting
City of Sydney	Holds an asset register of street trees and undertakes condition assessment
Port Stephens Council	Suggested by Local Government NSW as the Asset Manager has indicated interest in being involved
National Capital Authority	Actively manage trees, have a Tree Policy and value trees under the AASB Framework
Parks Victoria	Comprehensive attempt to value ecosystems, which include natural assets.
Department of Transport and Main Roads (QLD)	Conscious decision not to value their road reserve natural assets – opportunity to understand why this decision has been made

4 Engagement Methodology

4.1 Meetings

Face to face meetings are preferred for all stakeholders identified but a video based meeting will be necessary where distance is a factor. Recommended meeting formats for each organisation are provided in Table 4-1.

Table 4-1 Recommended meeting formats

Organisation	Distance from Sydney or Brisbane	Meeting format
Blue Mountains City Council	138km (2h 20m drive)	Video
Newcastle City Council	168km (2h 25m drive)	Face to face in Newcastle
Central Coast Council	83km (1h 30m drive)	Face to face in Gosford
Brisbane City Council	0km	Face to face in Brisbane
Queanbeyan-Palerang Regional Council	286km (3h 25m drive)	Face to face (fly)
City of Sydney	0km	Face to face in Sydney
National Capital Authority	287km (3h 30m drive)	Face to face (fly)
Port Stephens Council	183km (2h 20m drive)	Face to Face in Port Stephens
Parks Victoria	880km (9h drive)	Video
Department of Transport and Main Roads (QLD)	0km	Face to face in Brisbane

Prior to meetings being held each stakeholder will be contacted, initially by phone and then followed up via email to establish and confirm:

- The most appropriate attendees to the stakeholder meeting (including environmental, asset and finance representatives)
- The background to the project, topic for discussion and scope of questioning
- Timing and location of the meeting

It is recommended that the initial letter sent to each stakeholder is drafted by Cardno but signed by Local Government NSW. Meetings will be attended by Cardno team members.

4.2 Stakeholder Contacts

Initial contacts for each stakeholder are presented in Table 4-2.

Table 4-2 Stakeholder contacts

Stakeholder	Initial Contact
Blue Mountains City Council	To be determined
Newcastle City Council	Karenne Judd
Central Coast Council	Larry Mellican larry.mellican@centralcoast.nsw.gov.au
Brisbane City Council	Inga Condric
Queanbeyan-Palerang Regional Council	Simon Holloway
City of Sydney	Phil Julian
National Capital Authority	Ken Gibson Ken.gibson@nca.gov.au
Port Stephens	John Maretich (Asset Manager) John.Maretich@portstephens.nsw.gov.au

Stakeholder	Initial Contact
Parks Victoria	To be determined
Department of Transport and Main Roads (QLD)	Andrew Golding

5 Engagement Program

The project program is shown in Figure 5-1. The project program shows stakeholder engagement occurring between 20 August 018 and 7 September 2018. Arrangements for meetings will be made in the week starting 3 August 2018.

Task	Week Ending													
	06/07/18	13/07/18	20/07/18	27/07/18	03/08/18	10/08/18	17/08/18	24/08/18	31/08/18	07/09/18	14/09/18	21/09/18	28/09/18	05/10/18
Project Inception Meeting														
Literature Review														
Stakeholder Engagement Plan														
LGNSW review of SEP														
Organise Stakeholder Interviews														
Stakeholder Interviews														
Draft Report														
LGNSW review of SEP														
Final Report														

Figure 5-1 Project Program

A possible program for the two weeks of stakeholder meetings is presented in Figure 5-2.

Stakeholder	27/08/2018	28/08/2018	29/08/2018	30/08/2018	31/08/2018	3/09/2018	4/09/2018	5/09/2018	6/09/2018	7/09/2018
Blue Mountains City Council										
Newcastle City Council										
Central Coast Council										
Port Stephens Council										
Brisbane City Council										
Queanbeyan-Palerang Regional Council										
City of Sydney										
National Capital Authority										
Parks Victoria										
Transport and Main Roads (QLD)										

Figure 5-2 Program for stakeholder meetings

6 Stakeholder Questions

The objective of the stakeholder meetings is to:

- Understand :
  - what data a stakeholder captures, how it is captured and where that data is stored
  - how natural assets data is integrated into any existing asset management systems and/ or asset management plans
  - any differences in dealing with natural assets compared to infrastructure assets
- Identify the pros and cons of natural asset management
- Identify various methodologies and formula for valuing natural assets
- Discuss challenges that have or are being faced
- Explore any case studies that can be documented

Each meeting is estimated to be 1.5 -2 hours in length but will depend on the complexity of the processes and systems used by each stakeholder to manage and value natural assets. In some cases they may be able to provide documentation for further review after the meetings.

Without overly constraining discussion the questions in Table 6-1 will be used to prompt thought and could be used as a basis for surveying additional stakeholders.

Table 6-1 Stakeholder engagement questions

Question No.	Topic	Question
1	Stakeholder Details	Brief description of role and responsibilities
2		Size of organisation (e.g. staff numbers, area covered, annual budget (opex and capex), current asset values)
3		What types of assets are managed, and specifically what natural assets?
4	Asset Management System	Do your Asset Management Objectives specifically incorporate natural assets?
5		Do you have a Strategic Asset Management Plan that covers natural assets?
6		Are natural assets included in any other plans or policies for eg IP&R systems of council? Please list
7		Any specific asset management IT system used? Eg spreadsheets, database, Confirm, TechOne, Civica
8		Are natural assets included in this system? If not, is there a specific system used for natural assets? Eg *itree* software
9		How effective is this system? What are the pros and cons of having natural and built assets in one/different system(s)? Any recommendations for councils considering the implementation of a similar system?
10	Asset Management	What natural assets do you collect data for and how is it collected (e.g. visual, desktop)? Eg trees, waterways, bushland, roadside reserves
11		Do you differentiate between natural area assets (eg bushland) and urban greening (eg street trees)?
12		What natural assets inventory data is collected? Eg numbers, types, location, age
13		Are condition assessments of natural assets undertaken and if so, on what frequency and what coverage?

Question No.	Topic	Question
		Eg annual condition assessment of 20% of the tree inventory
14		Can you explain the basis of the condition assessment?
15		Is the natural assets data stored in the same way as the infrastructure assets data?
16		How do you resource natural assets data collection Eg in house, outsourced
17		Are natural assets part of your forward works plans?
18		Are any forward works plans for natural assets developed from the condition and other data you collect?
19		Are your natural assets the responsibility (in terms of reporting, finance etc) of the Asset Management Team, or the Environmental team? Both? Other?
20	Natural Asset Valuation	Do you undertake a financial valuation of your natural assets? Or do you engage specialists to undertake the natural assets valuation?
21		What standards or formula do you use to guide the valuation?
22		How often do you update or revalue your natural assets?
23		How are natural asset valuations reported?
24		Is there any specific software you use to guide the natural assets valuation?
25	Natural Assets Insurance	Do you insure any of your natural assets?
26		If you do insure natural assets, does the policy differ in any way to that for other assets?
27		If you don't insure natural assets, what is the reasoning or barriers to doing so?
28		If you do insure for loss or damage to natural assets, does your policy account for the effects of climate change?
29	Funding Natural Asset Maintenance	How do you secure funding for maintenance and management of natural assets?
30		Does maintenance of natural assets compete for funding with maintenance of other assets?
31		Do you invest in replacing or renewing natural assets where applicable? Have you funded new natural assets?
32	Maintaining Natural Assets	Have you developed Levels of Service and/ or Performance Measures to guide the maintenance of natural assets? (and can we have a copy?)
33		Do you outsource the maintenance of your natural assets or deliver in house?
34		Have you developed maintenance specifications or Standard Operating Procedures specifically for natural asset maintenance?
35	Customers	What are the benefits, or otherwise, to your customers from managing and valuing natural assets?
36	General	What challenges did you face, or are you facing, in managing and valuing natural assets?
37		What are the main pros and cons to managing and valuing natural assets?
38		Would you be willing to have your experience documented as a case study for the LGNSW project?
39		Did you use or consult with any other organisation when introducing natural asset management? If so can you provide any good examples and or contacts

Question No.	Topic	Question
40		What challenges have been faced within council/organisation in integrating natural assets into existing systems? Can you identify any lessons learnt or experiences to share with others?
41		How has integrating natural assets benefitted council/organisation?
42		What was the integration process, and would it be repeated or altered?
43		What were the drivers behind the adoption of a natural asset management system (eg efficiency, cost-benefit, etc)?

7 Risks

The significant risks to successful stakeholder engagement are:

- Unable to secure meetings with appropriate personal in the identified stakeholder organisations within the timeframe of the project
- Cardno unable to allocate resources to stakeholders meetings at the required times
- Local Government NSW unable to support Cardno in stakeholder meetings
- Stakeholders not willing to impart sufficient information to progress the project

8 Next Steps

The next steps will include:

1. Approval of stakeholder engagement plan by Local Government NSW;
2. Initial contact with stakeholders;
3. Schedule and conduct stakeholder meetings; and
4. Reporting.