State of Asset Resilience SAMPLE

Executive Summary

This State of Asset Resilience (SOAR) report provides a financially quantitative analysis of the risk of failure for the asset portfolio, due to climate and weather hazards, both today and over the lifetime of the assets.

The AdaptInfrastructure™ analytic system has been used to refresh this report following recent updates of asset data.

The State of Asset Resilience report is broken into four major sections:
(a) The Resilience Index
(b) Internal benchmarking
(c) Resilience Outlook
(d) Adaptation planning

This sample SOAR assessment covers 1,000 assets, and the following weather and climate related hazards: flooding, bushfire, heat waves, extreme wind, coastal inundation and sea level rise. This is a sample report of dummy data modelled on a real SOAR analysis.

Current Resilience Index (a)

The Resilience Index, up to a maximum of 1, is a measure of the annual asset value considered resilient to weather extremes and climate.

The Resilience Index compares the annual costs of risk and the total asset value, creating a financial and service failure index, broadly comparable with 'availability'.

The current Resilience Index score is 0.981

This indicates that the annual cost of risk (equivalent to external insurance costs and self-insured losses) is approximately 1.9% of total asset value this year.

Internal Resilience Benchmarking (b)

In this sample, the overarching Resilience Index is made up of contributions from 8 asset types. The Resilience Indices vary from 0.996 to 0.893, with half having a Resilience Index at or close to 0.99. The remaining asset types have an index considerably lower. These asset types have been internally benchmarked in Figure 1.

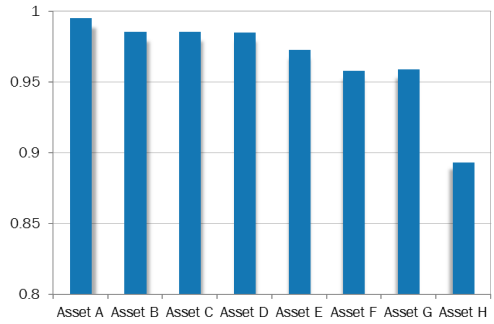

Figure 1: Resilience Index benchmarking across each of the major asset types in AdaptInfrastructure™

Internal benchmarking considers the proportional asset value and risk cost (the product of risk probability and asset value). As such, the individual resilience indices do not contribute equally to the Resilience Index, where Figure 2 demonstrates the current asset value, and comparatively, Figure 3 shows the annual cost of risk associated with each asset type.

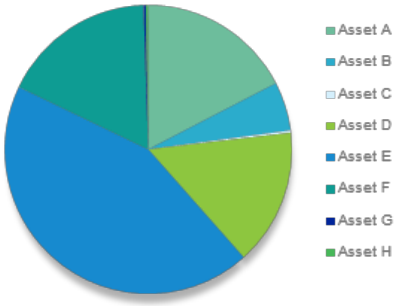

Figure 2: Proportion of asset value across each of the major asset types.

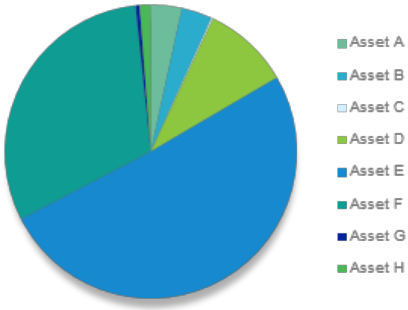

Figure 3: Proportion of current asset risk cost for each major asset type.

The business impact of risk cost is the direct cost of damage to assets (insured or uninsured), and consequential costs of customer compensation and environmental discharge.

The number of assets determined to be at risk for the current year is summarised in Table 1.

Table 1: Assets at risk for the current year, broken down by hazard

			Hazard Risk				
	No. Assets	No. > 0.5% Risk	Bushfire	Coastal Inundation	Riverine flooding	Heatwave	Extreme Wind
Asset A	270	1	<1%	0%	0%	0%	<1%
Asset B	165	2	1.2%	<1%	0%	0%	0%
Asset C	30	0	0%	0%	0%	0%	0%
Asset D	14	0	0%	0%	0%	0%	0%
Asset E	29	1	0%	0%	3.4%	0%	0%
Asset F	681	28	1%	3%	<1%	0%	0%
Asset G	57	2	1%	3.5%	0%	0%	0%
Asset H	48	5	1.5%	9%	0%	0%	0%

Resilience Outlook (c)

The Resilience Index is forward looking. Climate change has the potential to alter the frequency, intensity, duration and distribution of climate related hazards, posing an increased risk.

The Resilience Index shows the projected resilience profile of the asset portfolio over an 85-year period to the end of the century. The long term projected Resilience Index indicates a modest decline to 0.975 by 2050, and then a more serious decline to 0.957 by 2100. This equates to the cost of risk **doubling** from current levels to about 4.3% per year in 2100.

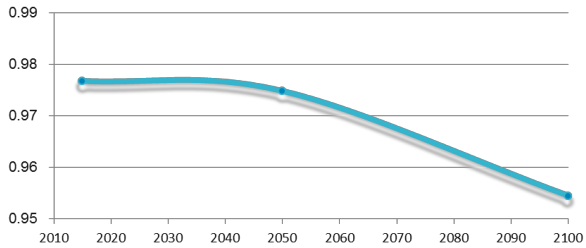

Figure 4: Projected Resilience index to 2050 and 2100.

A breakdown in the Resilience Index by asset type shows deterioration across the board, but particularly acute declines for certain asset types, especially Asset type F.

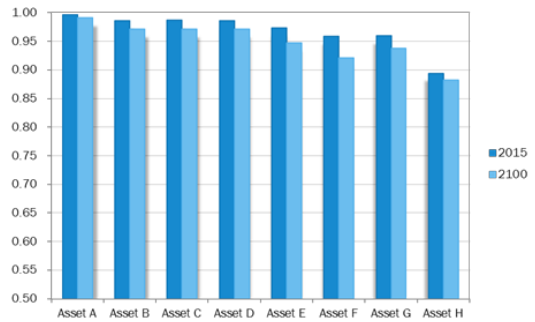

Figure 5: Resilience Index benchmarking for 2015 and 2100

Drivers for the overall deterioration in resilience:

- The risk cost for assets exposed to bushfire will approximately double over the period
- Coastal inundation risk cost for asset type F will increase by 50% in 2070-2100
- High temperature events that exceed the design specification of certain asset types will become more frequent.

Adaptation Planning (d)

The current snap-shot and forward resilience outlook are based on current asset management strategies. Two Adaptation plans are now being considered that would mitigate the identified decline in resilience.

Figure 6 demonstrates the effectiveness of two adaptation plans compared to current asset management strategies which are financially optimised in terms of current renewals schedules versus increased risk over time. The first option (sky blue) provides better resilience performance, whereas the second option (green) has a modest improvement of resilience but a better Net Present Value.

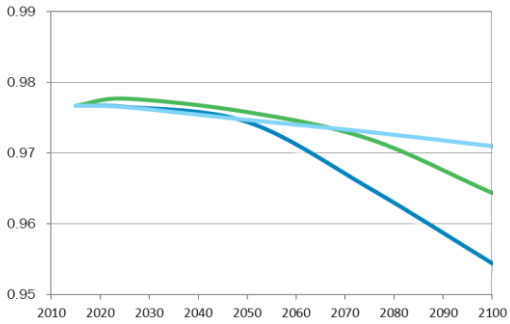

Figure 6: Resilience trajectories

Resilience Reporting

This sample SOAR report is provided for external resilience reporting and internal benchmarking and diagnostics on the resilience and financial risk of each asset type, by hazard type, as well as a projection of the increased financial risk due to climate change into the future.

AdaptInfrastructure analysis uses GIS asset and hazard layers, asset databases, climate impact probability projections and financially quantitative risk/adaptation assessment. The analysis presented is held in AdaptInfrastructure and is available for staff to drill-down into the results by asset type, component elements and location-specific hazards.