# RESILIENT PUBLIC ESTATE

## CASE STUDY

## THORNTON BRIDGE

Murrindindi
Shire Council

# Thornton bridge Location - context



To Eildon
Back Eildon Road

GOULBURN RIVER

To Alexandra
GV Highway

To Marysville, Melbourne
Taggerty Thornton Road

To Eildon
GV Hwy

# Thornton Bridge Context

Why Was This Site Chosen?

If the Back Eildon Rd is cut, this will reduce access to Eildon by multi-axle trucks use as the alternate route on GV Highway is not suitable due to narrower width

The community and the tourist trade would be significantly impacted.

A 1% AEP event would overtop Eildon dam and overtop this bridge.

This type of older bridge construction is likely to be washed away if a flood overtops the deck

There are many similar bridges - 3 further bridges between Eildon and Thornton

A further 9 bridges between Thornton and Alexandra

# Thornton Bridge
# Data and Realtime Issues

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<u>To do the analysis a range of data is needed</u>

Flood data including impact of climate change

Key details of design of existing and future asset (bridge)

Life of existing asset and maintenance during this life

Use of the asset – in this case traffic data – prefer recent and vehicle types

Impact if asset closed – traffic, tourism, economic, community if can be quantified

Cost of replacement – BAU and adapted structure

<u>What Murrindindi Shire has</u>

Older flood data as GBCMA will not finish a new study until the end of 2024

Recent and detailed inspection and projected maintenance needs/costs

Recent traffic count at nearby intersection leading to bridge

Economic development strategy for Eildon - do not have specific tourism data

General cost per square metre of current construction type

# Thornton Bridge – Adaptation Options

A future design needs to allow overtopping with the bridge being structurally sound afterwards

The analysis considered two feasible options

Betterment – replace now with an upgraded bridge that would survive a flood anticipated for a worst case climate change scenario (option 1)

Current design standards – replace now with a bridge built to current design standards. This significantly reduces flood damage risk (option 2)

For analysis, BAU was leaving the current bridge in place until the end of its design life

# Thornton Bridge Study - Outcomes

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The analysis showed that the design to current standards gave an acceptable risk profile at best cost. This is mainly due to the capital cost being approximately double.

| | Option 1 (Betterment) | Option 2 (Current standards) |
|---|---|---|
| Capital Cost | $1,718,000 | $829,000 |
| Operation & Maintenance | - | - |
| PV Total Cost | $1,718,000 | $829,000 |
| Avoided Repairs | $253,000 | $179,000 |
| Avoided Travel Delays[(a)] | $2,005,000 | $1,978,000 |
| PV Total Benefits / Avoided Cost | $2,259,000 | $2,157,000 |
| NPV | $541,000 | $1,328,000 |
| BCR | 1.31 | 2.60 |

The future approach will balance risk and reward – ensuring the structure is repairable rather than destroyed, and the balance between capital cost to repairs

# Thornton Bridge Case Study

Murrindindi Shire Council

What Next – Use of this study

- Bridge Renewal Program application for replacement Thornton bridge
- General review of all bridges and major culverts within the flood zone in the Mid-Goulburn in conjunction with GBCMA.
- Update our flood intelligence information with VICSES