



WARRNAMBOOL
CITY COUNCIL

Simpson Street Tunnel Rehabilitation and Lining Stage 1

Rohan McKinnon
Senior Projects Engineer
August 2019



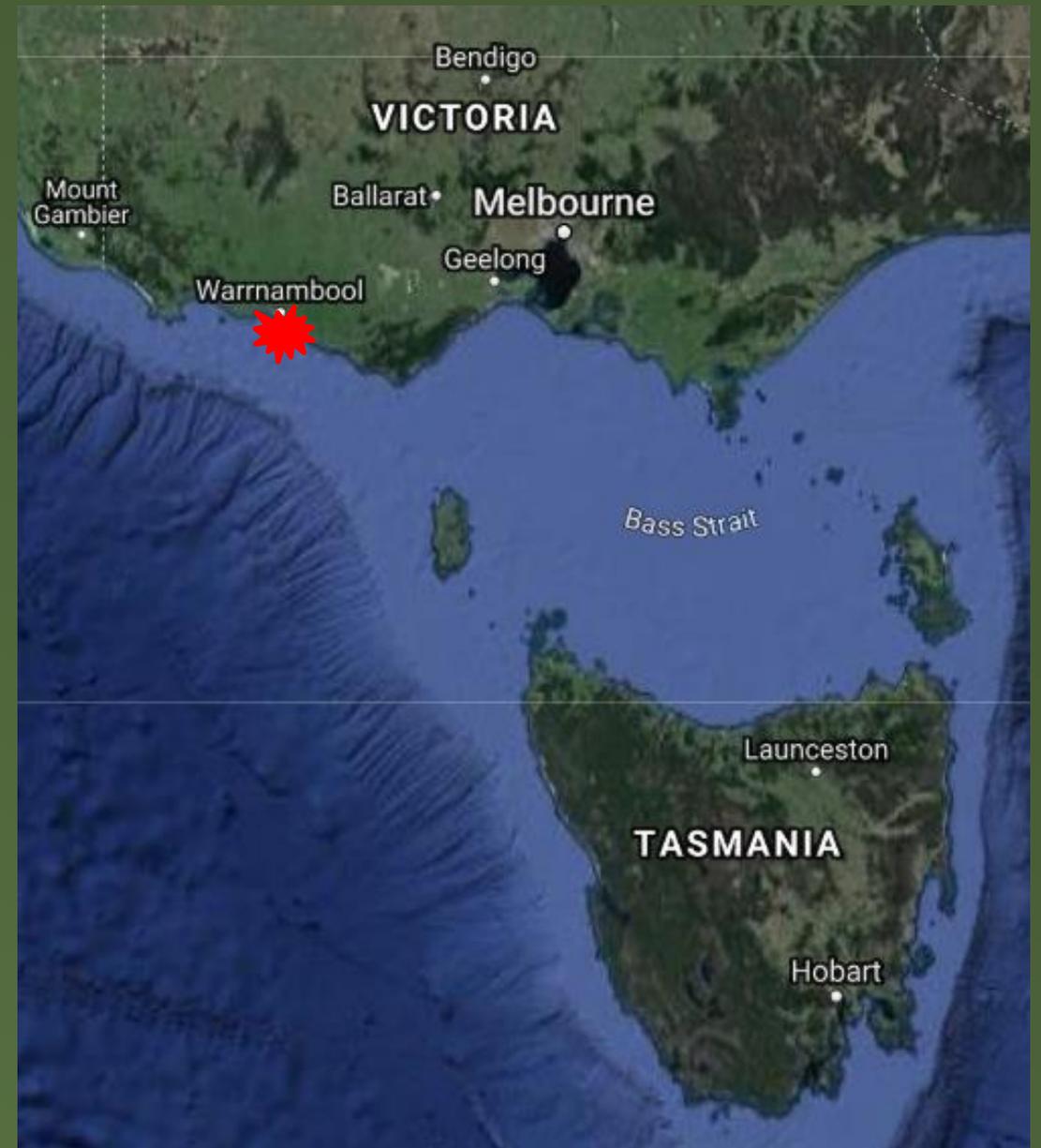
www.warrnambool.vic.gov.au

Connect to Council



Warrnambool

- On the Great South Coast
- 270km south-west of Melbourne
- Population 35,957
- municipal area 120sqkm.



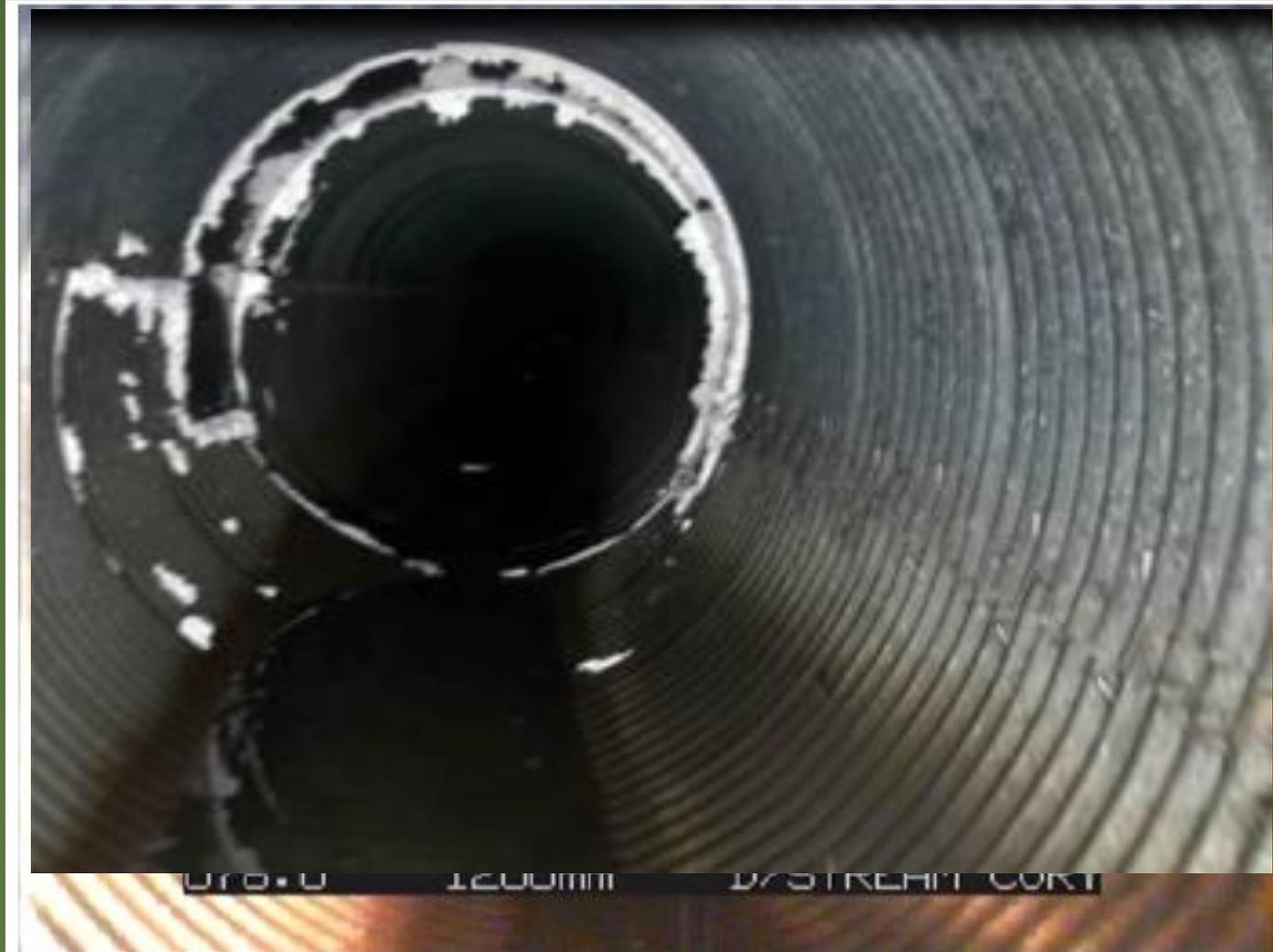
Simpson Street Tunnel

- Constructed 1968 to 1972
- Runs from Princes Highway to outfall at Hopkins River.
- 725m long
- Cut through Bridgewater formation of limestone/sandstone
- Redirects water from Merri River catchment to the Hopkins river catchment



Simpson Street Tunnel

Upper Section



Multi-plate Steel
Culvert
1200 mm dia

Princes Highway
Thompson street

Some plates
dislodged

Invert
Corrosion

Simpson Street Tunnel

Middle Section



Simpson Street Tunnel

Pit 5 Change of direction

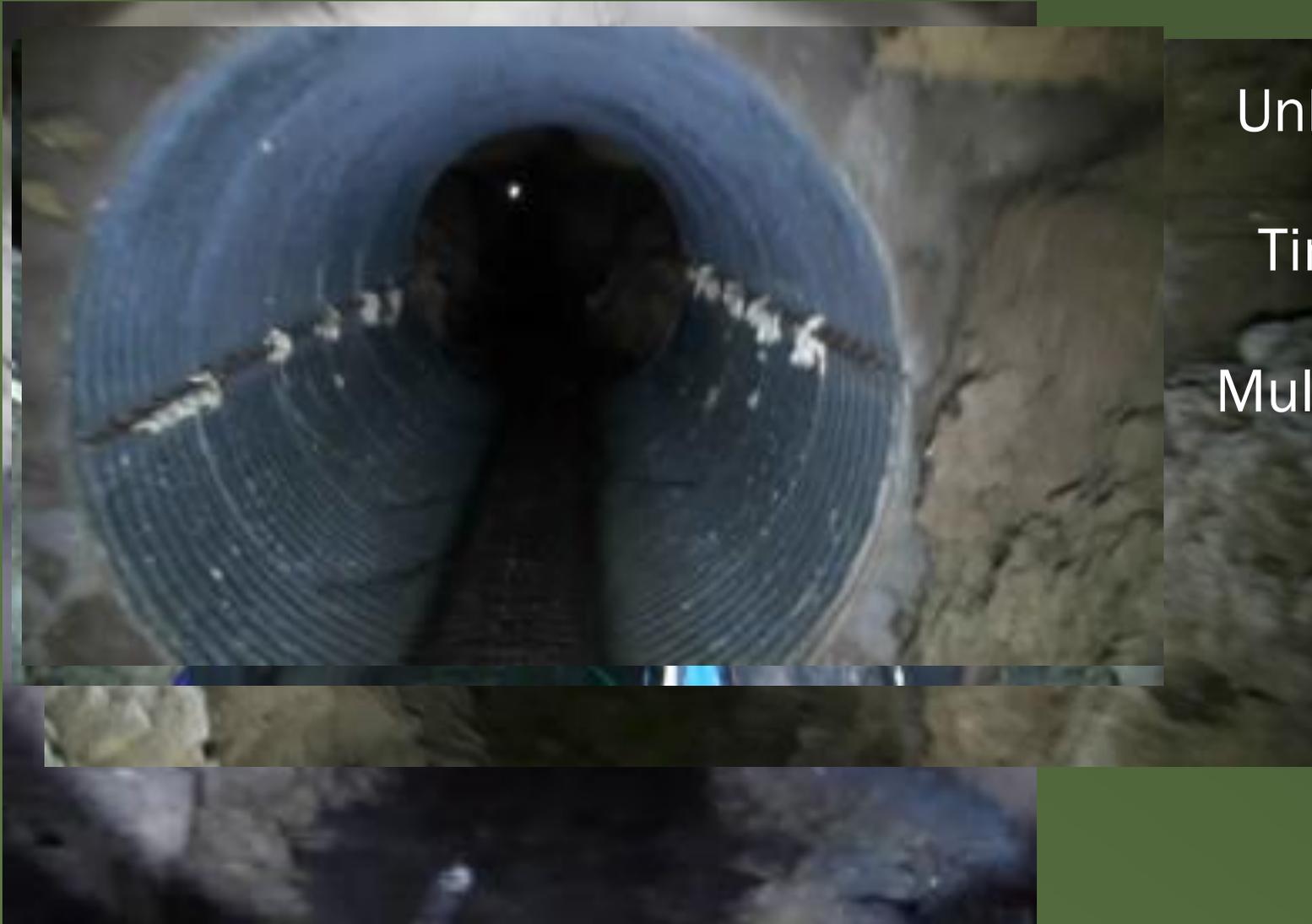


Storm water to the left
Sewer on the right
Sewer inspection plate

Sewer continues
down Simpson
Street

Simpson Street Tunnel

Lower Section



Unlined sections
Timber sets
Multi plate culvert

Simpson Street Tunnel

Strategy

Option 1 Do Nothing

Option 2 Partial re-sleeve of tunnel and upstream catchment diversion

Option 3 Re-sleeve existing tunnel and duplicate tunnel along side -1500 mm dia

Option 4 Larger diameter tunnel same alignment 2400mm

Option 5 New tunnel alignment and back filling existing tunnel

Simpson Street Tunnel



Preferred

Option 2 Partial re-sleeve of tunnel and upstream catchment diversion

- Critical section from Thompson street to Pit 5 to be re-sleeved
- Treatment of Pit 5 and Void (sewer tunnel)
- Consequential works replacement of Pit Cover at Thompson Street

Simpson Street Tunnel



Tunneline treatment 2015

Preparation

Custom Steel form work

Cast in 10 m sections

Removing air

Fibre reinforce Concrete liner

80 meter completed Pit 5 towards

Rail overpass

Cost \$680,000

\$8600 per lineal metre

Simpson Street Tunnel



AGT Geotechnical Investigation
Simpson Street, Warrnambool
REPORT NUMBER: AGT17473



Chainage	Location	Schmidt Hammer (MPa)	Pick Difficulty to Rip	Knife Difficulty to Rip	Point Load Test (MPa)	Estimated Strength
0	E/W/R	25/26/28	X	X	1.77	H
3	E/W/R	5/18/28	Very Difficult	Very Difficult		M
6	E/W/R	X	Easy	Easy		VL
8.3	W/R	18/20	Very	Very Difficult		M
10.7	R	17	Very Difficult	Very Difficult		M
14.5	R	21	X	X		H

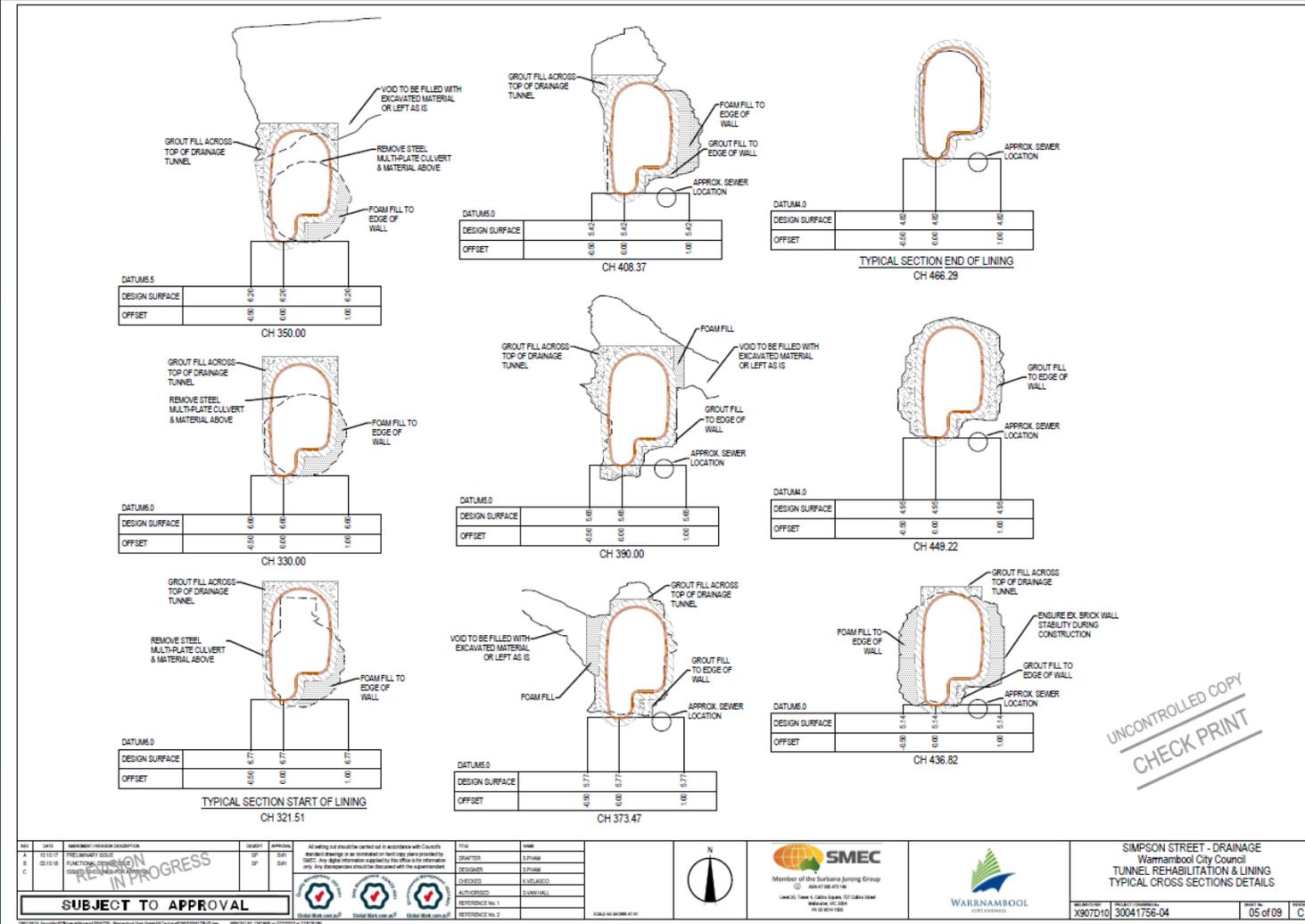
Further Investigation

Geotechnical Investigation

- Visual inspection
- Pick and Knife test
- Schmidt hammer
- Lab point load test

Simpson Street Tunnel

Further Investigation



Survey
 Laser Scanned point
 Cloud
 Accurate 3d Model
 for design
 Better understanding of
 damage and voiding
 Better quality plans



Simpson Street Tunnel

GFRP Liner Grouted in place 2018

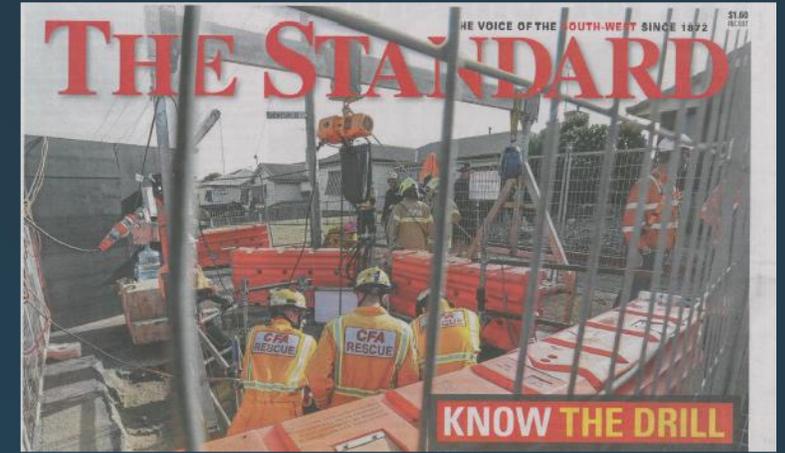


Pit 4 Cover removed for access
2.4 m dia depth 20 m
Tunnel Preparation
GFRP Section lowered into tunnel
Assembly of liner
Grouting liner in place
Inside the liner
Cost \$1.3m
\$8700 per lineal metre



WARRNAMBOOL
CITY COUNCIL

Questions



standard.net.au Wednesday January 23, 2019 THE STANDARD 3 NEWS

Training to help, if needed

CFA, engineers prep for incidents

EMERGENCY SERVICES
BY RACHAEL HOUZHAN
Warrnambool

A MOCK emergency situation was played out on Warrnambool's Simpson Street on Tuesday morning, with an engineering company and the CFA fine-tuning their responses to a potential incident.

The training scenario was organised by Rod Carr, the company conducting works underground on the tunnel's drainage system for the Warrnambool City Council.

Engineer Josh Sneath said it was an opportunity for the company to undertake training and they invited along the Warrnambool Country Fire Authority to assist and learn more.

"We have run through what we would do in an emergency," he said.

"The scenario was that we had a worker down a 20-metre shaft with a broken leg, who could not self-rescue."

"We obviously hope no accidents ever occur, but if they do, we want to be effective and efficient. This was a joint exercise to get to know how systems operate and the procedures used."

Warrnambool Fire Station senior station officer David Ferguson

"patient" - which was actually two bags of cement lying on a stretcher - up to the road.

"It's all about being prepared and knowing what to do."

PREPARED: Warrnambool City Council's Rhyce Milward, Rob Carr engineer Josh Sneath, Rob Carr supervisor Trev



www.warrnambool.vic.gov.au

Connect to Council





WARRNAMBOOL
CITY COUNCIL



www.warrnambool.vic.gov.au

Connect to Council





www.warrnambool.vic.gov.au

Connect to Council

