Pavement Rehabilitation in Campbelltown – Transition to Circular Economy

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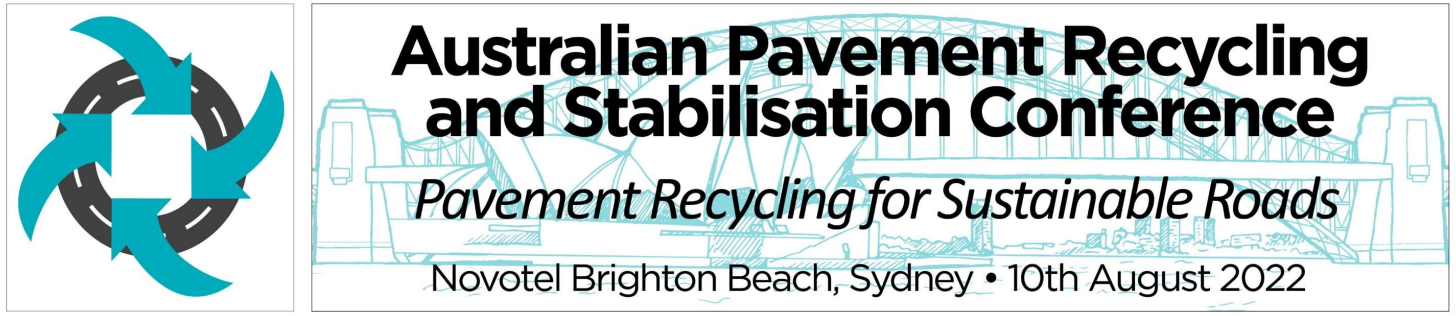
Campbelltown City Council



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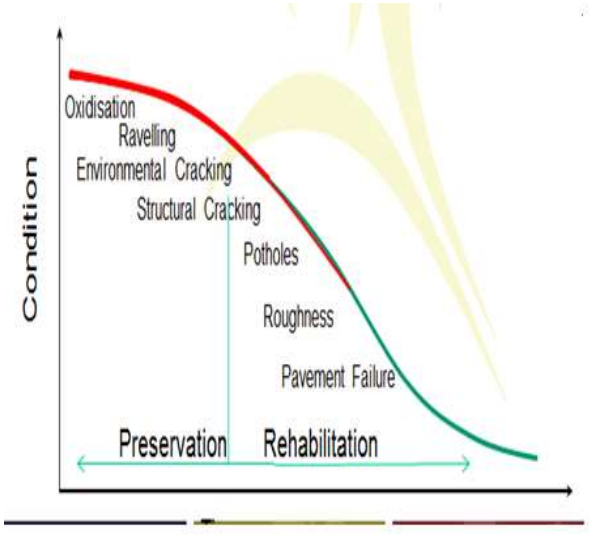
Overview and Objectives

- 800 km of roads (4800 segments) with $400m Replacement Value.
- 88% is urban, 12% Rural
- Community Expectation: Good conditioned Roads
- Budget Constraint: requires significant investment to maintain the whole network at acceptable standard.
- Overall Challenge is to ensure all roads are fit over long periods of time at a minimum lifecycle cost.
- Stabilised 302 Road Projects in the last 31 years for Poor to very Poor condition Pavements (alternative to Full Depth Reconstruction).
- Cost wise: 40 to 50% Cheaper than Full depth Reconstruction.
- Time wise: Rehabilitation project can be completed within a week.
- Innovative approach by Campbelltown City Council: PMS integrates Pavement recycling options to achieve longer term financial sustainability in its network management.

Pavement Management Strategy Development

Link Condition/Defects with



Maintenance Applications

Rejuvenation

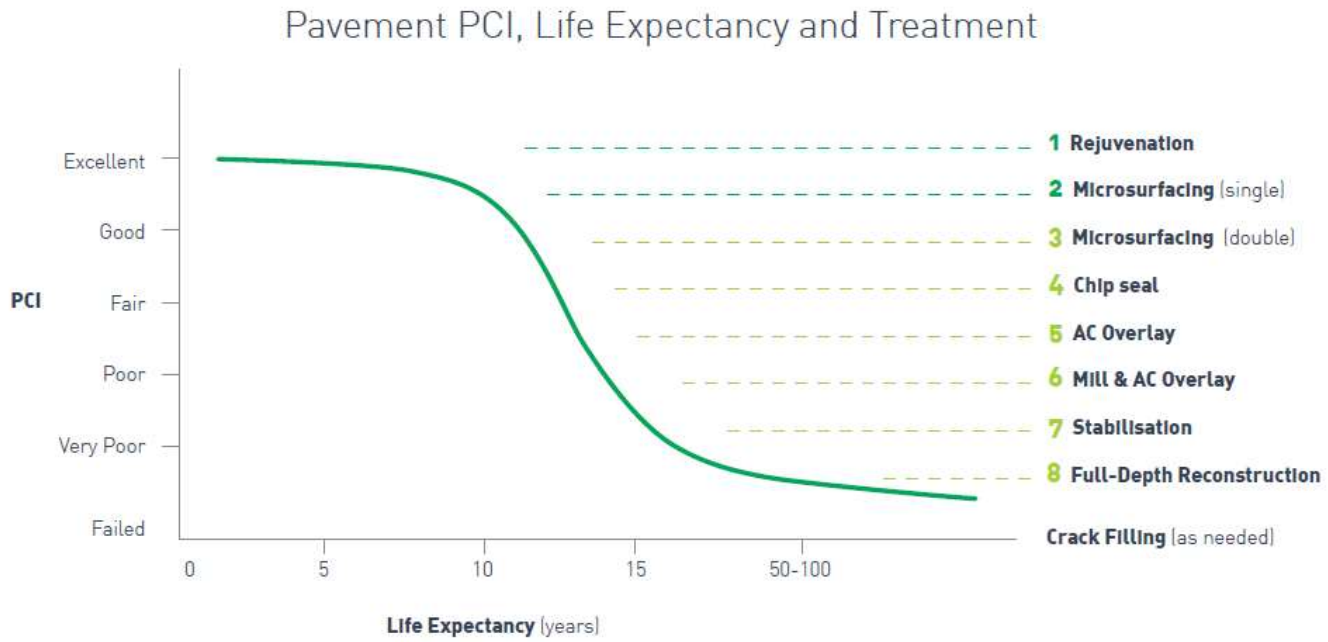
Microsurfacing

Reseal

Asphalt Resurfacing

Rehabilitation

Pavement Management Strategy



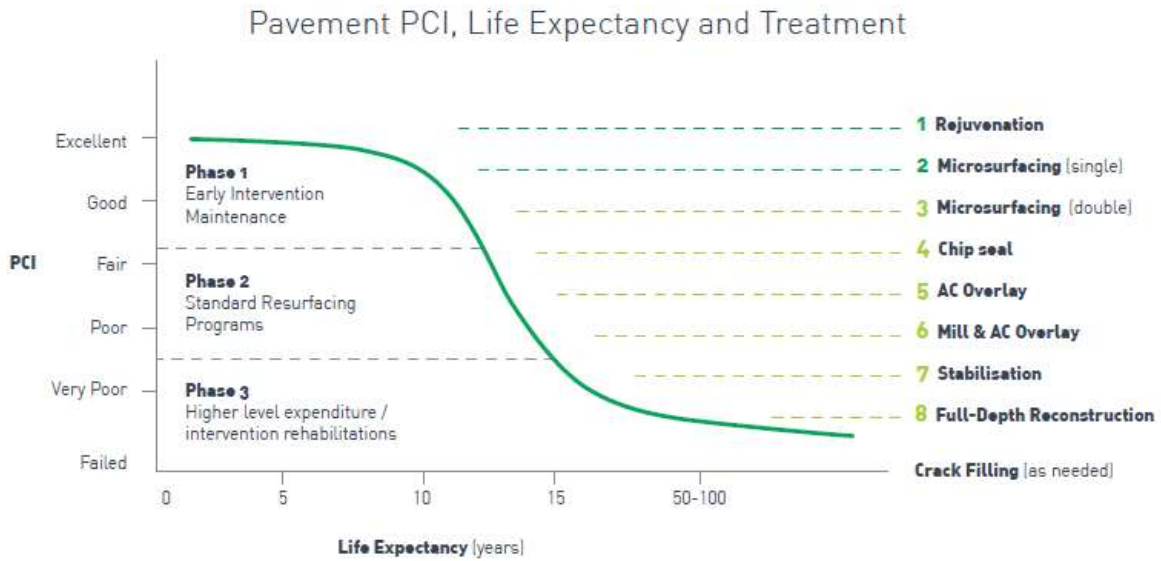
Treatment Selection Divided into 3 Phases

Treatment selections are broken into 3 distinct phases-

Phase1: Preservation *(early intervention maintenance)*

Phase2: Standard Resurfacing Program

Phase3: Rehabilitation *(higher Level expenditure/intervention).*

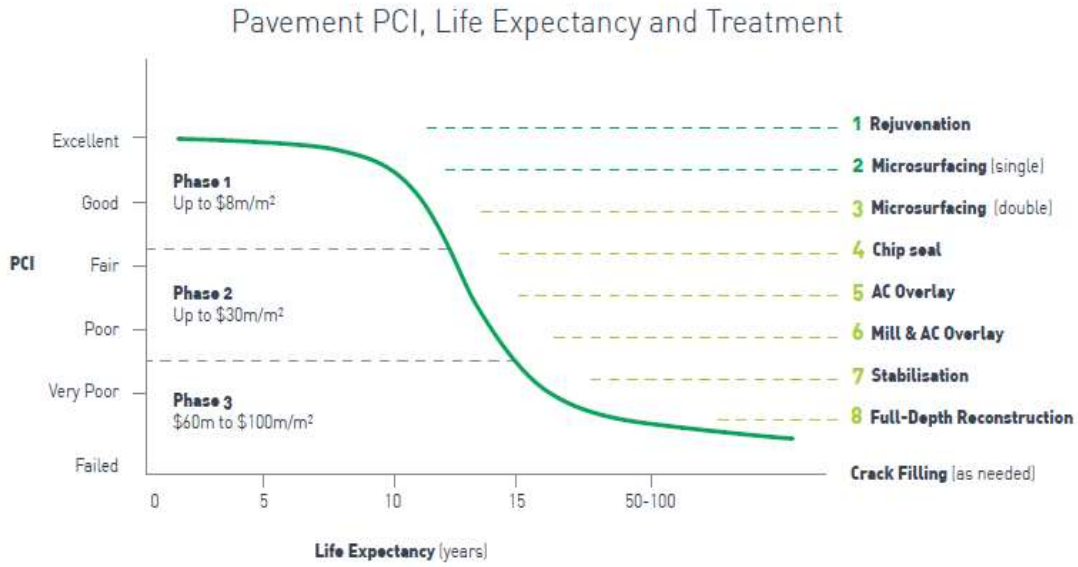


Funding Strategy

Phase 1: 100% funded, cheaper and keep the good conditioned road in good condition for a long time. (allocation 20%)

Phase 2: Maximum projects in this category; Fund the worst projects first so that remaining projects do not go to Phase 3 (allocation 65%)

Phase 3: Long term Planning. Eliminate this in 5/10 years. No increase in number. Allow some funding for reactive (allocation 15%)



CCC Road Rehabilitation Applications

Mill and Fill

Insitu Stabilisation

Pavement Rehabilitation (Phase 3 Treatment)

Treatments:

Mill & Fill, Stabilisation and Reconstruction

99% cases we use pavement Stabilisation as it is the most cost effective pavement rehabilitation treatment.

Stabilised more than 302 projects in the last 31 years.

5 steps process

Step1: Treatment selection by PMS

CAMPBELLTOWN **Works Program**

Scenario : 13 2017-18 works program **Works program for :** 2018 # 1 **BUDGET** 15,000,000.00

Sub network : SUB_BACKLOG SECTIONS WITH UNACCEPTABLE PCI **Optimisation method :** Maximise Network PCI

Rule Base : TREAT_RECON17 RULEBASE FOR RECONSTRUCTION

Road No	Block	Road Name	Block Name	Code	Description	Cost
1351.00000	10.0000	WANDA PLACE	CRONULL - END CUL	RC2	LOCAL URBAN REHABILITATION	$52,496.00
1430.00000	10.0000	KEIRA PLACE	JUNCTIO - END CUL	RC2	LOCAL URBAN REHABILITATION	$50,965.00
1864.00000	10.0000	COOLABAH PLACE	EUCALYP - END CUL	RC2	LOCAL URBAN REHABILITATION	$49,421.00
1916.00000	10.0000	HEREFORD PLACE	HANSENS - END CUL	RC2	LOCAL URBAN REHABILITATION	$48,312.00
2026.00000	10.0000	AINSLIE PLACE	KEMBLA - END CUL	RC2	LOCAL URBAN REHABILITATION	$46,042.00
2118.00000	30.0000	GERTRUDE ROAD	RODNEY - FIONA P	RC2	LOCAL URBAN REHABILITATION	$136,382.00
2239.00000	20.0000	MEMPHIS STREET	VICTORI - END [KA	RC2	LOCAL URBAN REHABILITATION	$49,500.00
2473.00000	10.0000	RAVENSWORTH PLACE	RIVERSI - END CUL	RC2	LOCAL URBAN REHABILITATION	$48,510.00
2481.00000	10.0000	BRUDENELL AVENUE	TURIMET - MAWK	RC2	LOCAL URBAN REHABILITATION	$133,901.00
2492.00000	20.0000	MACQUARIE AVENUE	BANKS S - RUSSELL	RC2	LOCAL URBAN REHABILITATION	$36,353.00
2548.00000	80.0000	KINGSCLARE STREET	TERALBA - O'SULLI	RC2	LOCAL URBAN REHABILITATION	$44,920.00
2572.00000	20.0000	MEGALONG CRESCENT	NEPEAN - VALLEY	RC2	LOCAL URBAN REHABILITATION	$126,720.00
2584.00000	10.0000	BOTTLEBRUSH AVENUE	JACARAN - BLACKBU	RC2	LOCAL URBAN REHABILITATION	$202,910.00
2843.00000	10.0000	GEARY STREET	KELLICA - MENANGL	RC6	IN-SITU CEMENT STABILISATION	$140,140.00
2917.00000	10.0000	DON PLACE	MISSISS - END CUL	RC2	LOCAL URBAN REHABILITATION	$18,533.00
3024.00000	20.0000	ORCHID PLACE	END CUL - END CUL	RC2	LOCAL URBAN REHABILITATION	$10,039.00
3752.00000	50.0000	GLENQUARIE CENTRE SERVICE	GLENQUA - BLOCK 2	RC2	LOCAL URBAN REHABILITATION	$108,900.00
						$1,304,044.00

Investigation

Step 2: Deflection Testing

Falling Weight Deflectometer Results

SMEC

RABY ROAD

PAVEMENT MANAGEMENT SERVICES ®
ACN 002 245 329

Survey Date: 20-Aug-02

Road Id RABY002
From Street THUNDERBOLT RD
To Street KEARNS RD

Chainage (m)	Lane	Surface Temp	Load kPa	Measured Deflections (um) at distance (mm) from load 0	200	300	450	600	750	900	1200	1500	E1 MPa	CBR (%)	Beam (mm)	Curv (mm)
0.025	2	26.0	711	1264	907	690	485	278	155	92	63	35	366	2	1.22	0.34
0.050	1	26.0	610	808	487	325	220	146	100	77	48	7	449	6	0.80	0.24
0.075	2	26.0	761	591	384	227	159	121	99	84	56	32	468	21	0.56	0.20
0.100	1	26.0	638	915	641	444	285	174	115	83	55	33	399	4	0.99	0.29
0.125	2	26.0	770	519	376	283	225	167	130	105	70	45	912	12	0.50	0.13
0.150	1	26.0	625	588	408	281	197	138	104	80	56	37	529	10	0.67	0.20
0.175	2	26.0	563	656	559	414	287	201	140	96	61	24	522	4	0.90	0.30
0.200	1	26.0	643	548	349	233	166	120	95	78	58	42	479	15	0.61	0.21
0.225	2	26.0	279	649	607	421	252	144	94	66	46	56	175	2	2.05	0.56
0.250	1	26.0	654	492	325	213	159	111	80	63	36	25	844	11	0.55	0.18
0.275	2	26.0	558	516	340	250	181	136	106	84	52	36	501	12	0.66	0.20
0.300	1	26.0	635	519	330	225	161	113	84	68	43	23	566	11	0.59	0.20
0.325	2	26.0	466	1126	787	555	366	223	144	113	64	45	217	3	1.64	0.49
0.350	1	26.0	614	485	353	261	207	158	126	105	70	54	607	13	0.57	0.15
0.375	2	26.0	506	688	473	312	187	118	84	67	52	35	417	7	0.79	0.22
0.400	1	26.0	626	520	321	212	133	88	66	53	37	24	488	12	0.60	0.22
0.425	2	26.0	480	797	563	387	257	175	131	105	74	51	290	5	1.14	0.33
Overall													477	9	0.87	0.26
Stnd Dev													176	5	0.43	0.12

Step 3: Geotechnical

Unconfined Compressive Strength of Compacted Stabilised Materials

NATA Accredited Laboratory Number: 2750

Project: Woodland Road, Bradbury — Project No.: 15314/9723A
Client: Campbelltown City Council — Report No. 04/0706
Address: PO Box 57, Campbelltown — Report Date 02/08/04
Sheet 2 of 3

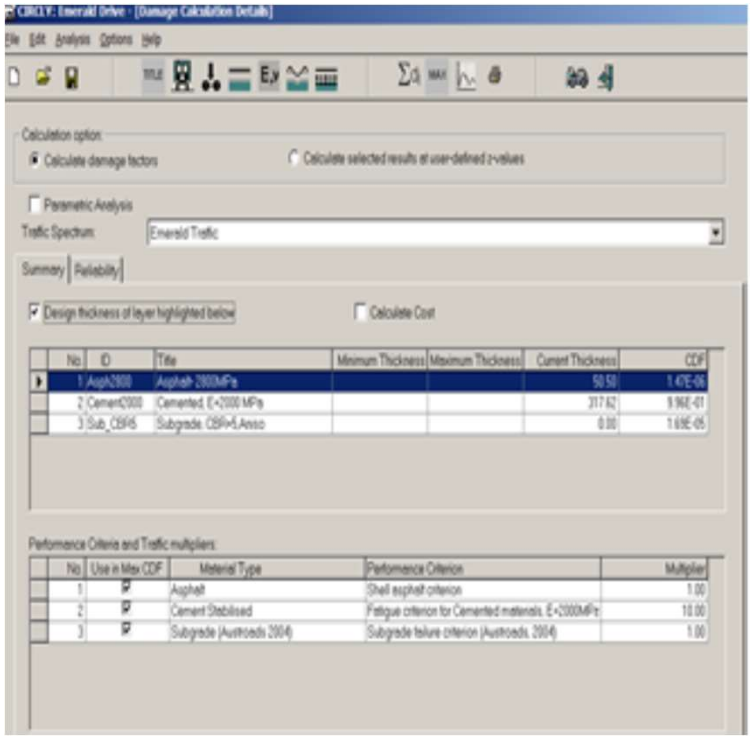
Test Method: AS1141.51 Standard Compactive Effort

Sample No.	24A	24B
Location	BH 24	BH 24
Depth of Sample	0.0-0.3m	0.0-0.3m
Type Of Additive	RSA HS1585	RSA HS1585
Source of Additive	Hyrock	Hyrock
% Additive added	3.0	3.0
% Greater than 37.5mm	Nil	Nil
% Greater than 19.0mm	Nil	Nil
Initial Curing Time	1 Hr	1 Hr
Moisture Content as Compacted t/m3	9.0	9.0
Dry Density as Compacted t/m3	2.08	2.08
Density Ratio %	NA	NA
Moisture Ratio %	NA	NA
Type of Specimen Curing	Accelerated	Accelerated
Specimen Curing Time	7 Days	7 Days
Average Unconfined Compressive Strength MPa	3.5	3.5

Remarks: Additive Composition (85% Slag, 15% Lime)
NA - Not Applicable
Technician: LC
Approved Signatory.....
George Prudnyk - Laboratory Manager

Pavement Design and Construction

Step 4: Pavement Design (in-house)



Step 5: Pavement Construction

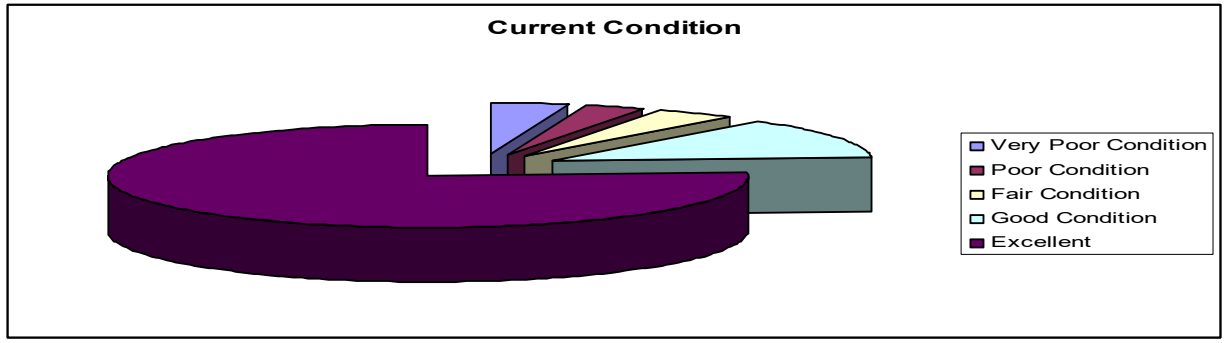
Savings Achieved from 302 Stabilisation Projects (From 1991 to 2022)

Performance Data for 300 Projects

Stabilised 302 projects in the last 31 years

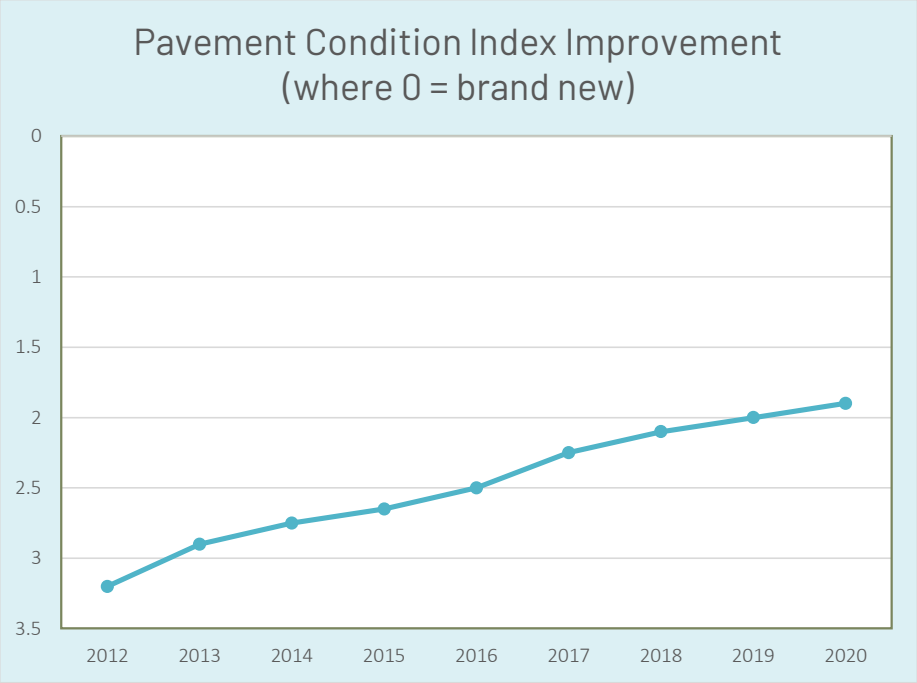
The current condition of 301 Projects

- 76% is still in Excellent condition
- 13% in Good Condition
- 4% in Average Condition
- 7% are in a Poor Condition.

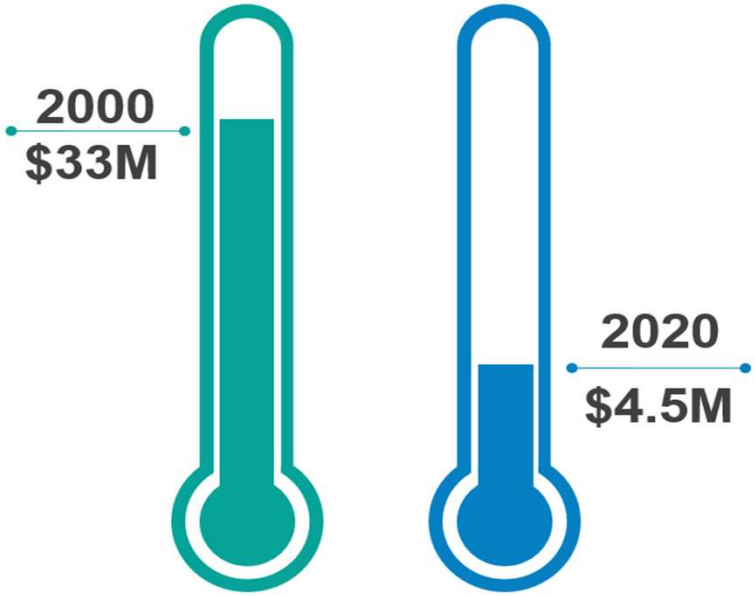


Achievements

Condition Improvement



Backlog Reduction



Australian Pavement Recycling and Stabilisation Conference

Pavement Recycling for Sustainable Roads

Novotel Brighton Beach, Sydney • 10th August 2022

Blaxland Road Stabilisation

Subgrade stabilisation

Foam Bitumen Stabilisation existing and widening area

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An Example of Recently Completed Project

Moving from Linear to Circular Economy

Linear Economy
Conventional Asphalt

Finite resources quarried for asphalt
Energy required for mixing at asphalt plant

↓

Construction – Excavate and remove existing material, replace with new asphalt material

↓

Asphalt pavement requires upgrading – remove as old asphalt cannot be reused for the new pavement

↓

Dispose unserviceable asphalt to mak way for new pavement – waste to landfill or Council stockpile

Unsustainable

High amount of waste

Depletion of finite resources

Economically inefficient

Keep resources in use for as long as possible

Extract maximum value whilst in use

Lower cost

Circular Economy
Foamed Asphalt